BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter, on the Commission's own motion, to open a docket that will be used to collaboratively consider issues related to both the deployment of plug-in electric vehicle charging facilities and to examine issues germane to the use of compressed natural gas as a motor vehicle transportation fuel in Michigan.	Case No. U-18368

COMMENTS OF THE NATURAL RESOURCES DEFENSE COUNCIL, ECOLOGY CENTER, SIERRA CLUB, AND ENVIRONMENTAL LAW AND POLICY CENTER

November 17, 2017

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I. INTRODUCTION

The Natural Resources Defense Council ("NRDC"), Ecology Center, Sierra Club, and the Environmental Law and Policy Center ("ELPC") (collectively, "Commenters") appreciate the opportunity to provide comments to the Michigan Public Utilities Commission ("Commission") regarding guidance on the implementation of electric vehicle ("EV") utility pilot programs. We commend the Commission for initiating this important discussion, and respectfully submit these comments in response to the Commission's *Order and Notice of Opportunity to Comment* ("*Order*"), dated October 25, 2017.[1]

Commenters have deep experience addressing the issues that arise at the intersection of the transportation and electric utility sectors. The Natural Resources Defense Council ("NDRC"), Sierra Club, The Ecology Center, and the Environmental Law & Policy Center ("ELPC") are all members of Charge Up Midwest, a coalition focused on accelerating transportation electrification through policy and advocacy efforts in several Midwestern states, including Michigan.

We believe Michigan is poised to be a leader of transportation electrification in the Midwest.[2] With the recent successes of the Michigan Technical Conference (in Case No. U-18368) on August 9, 2017, the Commission and the utilities under its jurisdiction are well positioned to implement programs to accelerate the electrification of the transportation sector. The Commission can help ensure Michigan remains at the forefront of the most important evolution in automotive technology since the commercialization of the internal combustion

[1] *Order and Notice of Opportunity to Comment*, Michigan Public Service Commission, October 2017, available at: http://efile.mpsc.state.mi.us/efile/docs/18368/0027.pdf

[2] Note: commenters use the term "transportation electrification" to encompass light, medium, and heavy-duty vehicles and equipment, as well as on-road, off-road, and non-road vehicles and equipment.

engine. Recent commitments by automakers across the globe underscore the fact that the future is electric, which provides electric utility regulators a new opportunity to shape that future in a manner that maximizes consumer benefits. The Commission should seize this chance and move quickly to implement utility programs that can accelerate this transition. Given that the Commission's *Order* invites *pilot* programs, which are designed to provide the opportunity to learn-by-doing, the Commission need not address every open policy and program design question before authorizing initial utility investments. Nevertheless, the Commission is wise to ask the questions posed in its *Order*, which could help inform pilot program design. Responses to those questions are included below, followed by more specific recommendations for potential pilot programs.

II. RESPONSES TO QUESTIONS POSED IN THE ORDER

The responses below are organized under the categories established in the *Order*.

A. Rate Design

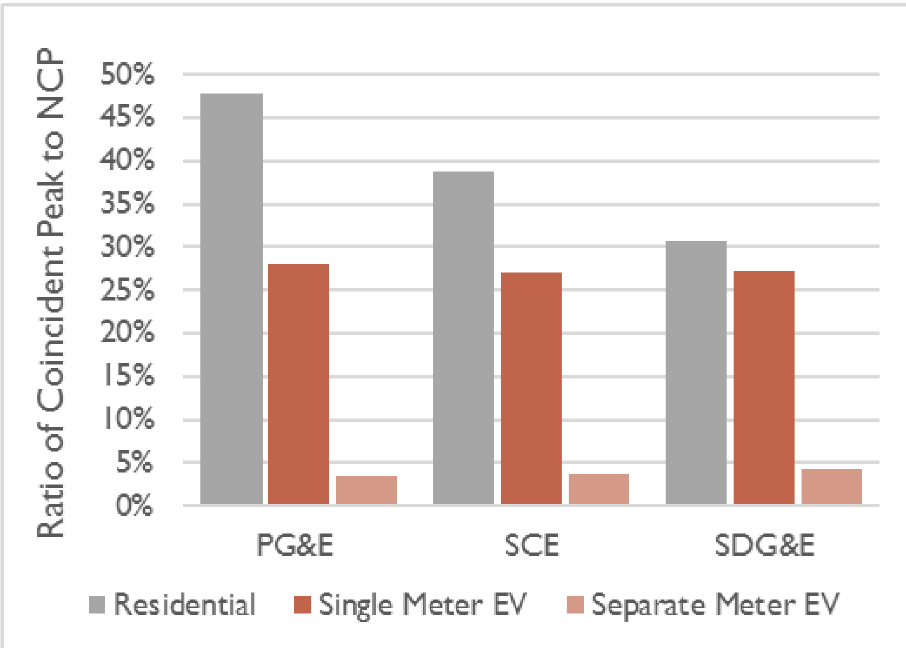
1. The Use of Time-varying or Dynamic Rates for Charging Infrastructure or Other Options to Shift Charging Behavior

Time-varying rates can provide a foundational form of load management to ensure that transportation electrification does not strain the grid, but instead improves grid utilization to the benefit of all utility customers. Simple time-of-use rates (TOU) have proven extremely effective at shifting EV load to "super-off-peak" hours in the real world.[3] There is no need for additional pilots to test that fundamental proposition; however, the lesson should be incorporated into

[3] See, for example, The Department of Energy's EV Project, which has tracked the charging behavior of thousands of EVs since 2011, has shown that in areas with time-of-use ("TOU") rates and effective utility education and outreach, the majority of EV charging occurs during off-peak hours. This was not the case in areas without TOU rates, where EV demand generally peaked in the early evening, exacerbating early-evening system-wide peak demand. See Schey, et al., *A First Look at the Impact of Electric Vehicle Charging on the Electric Grid, The EV Project at EVS26* (May 2012).

program design going forward. Since TOU rates send expected, pre-defined price signals, they encourage regular and prolonged behavior modifications that benefit the overall grid. See Figure 1 for data from three utilities with hundreds of thousands of EVs in their collective service territories.

Figure 1: EV Customers on TOU Rates Consume Little During System Peak Hours[4]



Dynamic rates—which more closely reflect the cost of energy generation and delivery at a given time—can maximize fuel cost savings and shape EV charging in response to real-time grid conditions, lowering the cost of integrating variable resources. They can be effective for charging in "long-dwell time" locations, such as the home or workplace, where drivers can either program their EVs or their charging stations to respond to those dynamic price signals without the need for manual intervention. For example, San Diego Gas & Electric ("SDG&E") is

[4] Synapse Economics, *Electric Vehicles Are Not Crashing the Grid: Lessons from California*, prepared on behalf of NRDC, November 2017.

currently incorporating dynamic rates at the ~3,500 charging stations the utility is deploying at multi-unit dwellings (MUDs), workplaces and other "long-dwell time" locations.[5] Drivers will see a day-ahead electricity price through a app and web-based tools, and be able to set parameters for an automated response to the rate.

However, dynamic rates may not be appropriate for all charging applications, or in all market segments. For example, in the case of public charging, the customer-of-record (i.e., the utility customer paying the energy costs) is not generally the end-user (i.e., the EV driver). Itinerant EV drivers cannot easily be armed with the tools needed to "set-and-forget" in response to dynamic price signals, nor will they necessarily have the flexibility to do so. Drivers who arrive at a public Direct Current Fast Charging (DCFC) station would be unhappy to discover that the price of electricity has suddenly quadrupled. Simpler TOU rates, which could be published on websites such as Plugshare[6] and which could be learned by drivers easily are more appropriate for public Level 2 or DCFC.

Most Michigan utilities currently offer time-varying rates for a subset of EV owners. The Commission should examine these rates to ensure they reflect best practices (e.g., "Are the on-peak to off-peak price ratios sufficient to shift EV load?, " "Are customers who charge mainly during off-peak hours going to realize the fuel cost savings that motivate EV purchases?"), make any necessary changes, and ensure the utilities have robust programs to ensure significant customer participation. EV rates only work if EV load takes service on those rates.

[5] *See Decision Regarding Underlying Vehicle Grid Integration Application and Motion to Adopt Settlement Agreement*, D.16-01- 045 (filed January 28, 2016), California Public Utilities Commission.
[6] PlugShare is the most commonly used web- and app-based tool that helps drivers locate charging stations and aggregates details about specific stations, including applicable fees.

2. The Deployment of Advanced Metering Infrastructure and Other Technological Improvements

Consumers and DTE are in the process of installing Advanced Metering Infrastructure ("AMI") throughout their service territories, and full AMI rollout is expected to be complete by the end of 2017, which should facilitate the application of time-variant pricing to EV load.[7] Commenters submit that utility pilots should test both "EV-only" TOU rates, which utilize a separate or sub-meter, and "whole-home" TOU rates, where all electricity use is billed by time-of-use on a single meter, with a focus on cost effectiveness and ease of access for EV drivers. Whole-home time-varying rates designed with EV load in mind can provide a foundation for successful load management, but may not provide the price transparency of EV-specific TOU rates and involve uncertainty regarding net benefits.[8] Moreover, EV-specific rates may be needed to allow for dynamic pricing. EVs are relatively unique in their potential to respond to dynamic prices, and customers may be reticent to subject their entire home load (which generally lacks the capability to respond autonomously) to dynamic pricing.

Historically, for access to EV-only TOU rates, the installation of a second utility meter has been required, which can be a prohibitive cost for the prospective EV driver.[9] However, placing EV load on EV-specific rates need not require a second utility service meter. Sub-meters can be embedded within electric vehicle supply equipment ("EVSE," colloquially, "charging station") or EVs themselves. In California, for example, sub-metering for EV drivers has

[7] According to AMI rollout maps, a large portion of Consumers' and DTE's service territory have completed residential AMI installation. Final installations expected to end in 2017. Information regarding AMI are available at: https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/pages+under+development/rates-n-meters/advanced-meters & https://www.consumersenergy.com/residential/programs-and-services/smart-energy.
[8] MJ Bradley & Associates, *Electricity Pricing Strategies to Reduce Grid Impacts from Plug-in Electric Vehicle Charging in New York State* at 8 (2015) (recommending that whole-home TOU rates should be designed to be revenue neutral for the majority of customers when compared to the standard rate, but result in a lower bill for the EV driver who charges during off-peak hours but does not shift any non-EV load).
[9] *Id.* at 8.

undergone extensive testing as a simpler metering option for EV drivers. SDG&E is already relying upon sub-meters embedded within EVSE for billing purposes in its "Power Your Drive," which aims to install 3,500 charging stations at workplaces and MUDs that will take service on a dynamic "grid-integrated" rate.[10] The utility also has a proposal before the California Public Utilities Commission ("CPUC") that would deploy 90,000 charging stations at single-family and smaller MUDs, and would use sub-meters embedded in EVSE for billing purposes. The CPUC is expected to issue a decision on that program (and proposals by Pacific Gas & Electric ("PG&E") and Southern California Edison ("SCE") to provide approximately $750 million in supporting electrical infrastructure to electrify medium and heavy-duty vehicles) in May 2018.

3. <u>The Role of Demand Charges and the Effect on Plug-in Electric Vehicle Charging Infrastructure Investment and Usage</u>

Demand charges can undermine the business case for high-power EV charging infrastructure investments to support light, medium, and heavy-duty vehicles, particularly where utilization is likely to be low in the near-term (e.g., DCFC stations that are necessary to enable distance travel and will influence EV purchase decisions, but are located on more remote stretches of highway).[11] We do not recommend that transportation electrification loads be subsidized by being exempted from demand charges, but that rate design should be optimized to account for the intended use cases. Many demand charges often over-collect by including non-facilities-related costs that should be collected in volumetric rates. Likewise, non-coincident demand charges are not generally cost-based. And, TOU rates with a sufficient on-peak to off-peak price ratio can send nearly the same price signal to reduce peak demand as a rate with a

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[10] San Diego Gas & Electric Power Your Drive program, information regarding this pilot available at https://www.sdge.com/clean-energy/electric-vehicles/poweryourdrive.

[11] *See, e.g.*, NYSERDA, *Electricity Rate Tariff Options for Minimizing Direct Current Fast Charger Demand Charges*.

coincident demand charge, but without the complexity associated with charging for both kilowatt-hours and kilowatts. In contrast to purely volumetric rates, rates with demand charges can also frustrate the ability of a DCFC site-host to recover electricity costs from itinerant EV drivers because the site-host cannot know what his ultimate bill will be until the end of a billing cycle and cannot therefore recover those costs in advance. If existing rates in Michigan are not well-suited to the use-cases targeted by potential pilot programs or lack a time-varying component that encourages off-peak charging, Michigan utilities should be encouraged to consider including pilot rate proposals that could be considered and authorized via the same regulatory process.

B. Grid Impact

1. The Potential Grid Impact of Deployment of Charging Infrastructure/Plug-in Electric Vehicle Adoption at Various Distribution System Locations

The prospect of short-term adverse grid impacts should not deter the Commission from taking immediate action to accelerate the electrification of the transportation sector. Even in California, which has approximately 340,000 EVs on the road, with high-concentrations of EVs on certain distribution circuits and even in certain neighborhoods, EV charging has been accommodated with *de minimis* adverse impacts.[12] Only about 0.19 percent EVs have triggered the need for a distribution system upgrade.[13] Forward looking modelling conducted by E3 also demonstrates that mass-market EV adoption can be accommodated with relatively minor associated investments.[14]

[12] Synapse Economics, *Electric Vehicles Are Not Crashing the Grid: Lessons from California*, prepared on behalf of NRDC, November 2017.
[13] *Id.*
[14] *California Transportation Electrification Assessment Phase 2: Grid Impacts,* E3, October 23, 2014.

Nevertheless, the Commission should act now to maximize the potential benefits of EV adoption. EVs represent a unique load that can be both manageable and flexible since most transportation needs occur during a small portion of the day. By charging off-peak, EV load can increase electric demand without the need to increase electric capacity and support variable renewable resources within the grid. Assuming a high EV penetration scenario and largely off-peak charging, analysis conducted by MJ Bradley for Michigan projects cumulative benefits that could exceed $31 billion state-wide by 2050.[15] Utility pilot programs need not be exclusively focused on load management, but the portfolio of proposals should include elements that advance vehicle-grid-integration.

C. Customer Education

1. How Utility Companies Can Provide Information to Customers on Costs and Benefits of Electric Vehicle Ownership

Research conducted at the University of California at Davis concludes: "Current consumer knowledge on the functionality of hybrid electric vehicles (HEVs), plug-in electric vehicles (PEVs), and fuel cell electric vehicles (FCEVs) is so low that new car buyer evaluations of these vehicles are largely based on ignorance."[16] The Commission should encourage utility programs that would help overcome this lack-of-awareness that remains a critical barrier to EV adoption. Information provided by utilities that includes payback analysis, infrastructure installation expectations, and current infrastructure availability would help reduce customer knowledge gaps. Programs should prioritize informing customers of the major benefits that EVs can offer such as lower fuel and maintenance costs. Specific programmatic proposals, including those focused on infrastructure deployment or rate design, should therefore include robust

[15] *Electric Vehicle Cost-Benefit Analysis: Michigan*, MJ Bradley & Associates, August 2017.
[16] *New Car Buyers' Valuation of Zero-Emissions Vehicles: California,* University of California, Davis, Institute of Transportation Studies, March 31, 2016.

education and outreach plans with dedicated funding to ensure significant customer participation. For example, of the $20 million budget approved for SCE's current EV infrastructure program, $3 million is dedicated to education and outreach.[17]

2. How Utility Companies Can Work with Third Parties to Educate Customers

EVs can provide much needed relief from the volatility of the global oil market, especially for families who spend a disproportionate share of their income at the pump. A survey of over 16,000 EV owners reveals the single most important factor in purchasing an EV is "saving money on fuel costs."[18] Unfortunately, auto-dealers are handicapped in their ability to market EVs based on this critical selling point because they cannot explain utility rates. Michigan utilities should be encouraged to consider how they could arm dealers with an accurate response (specific to a given service territory) to the question: "How much is it going to cost me to charge this car?" Utilities should also educate customers directly on this issue.

D. The Role of the Regulated Utility in Infrastructure Deployment Cost Recovery

1. The Outlook for the Competitive Market

Party comments submitted in advance of the Technical Workshop reveal a broad consensus in support of utility involvement to accelerate the deployment of charging infrastructure. The choice between a "competitive" and a "regulated monopoly" model is a false dichotomy. Third-party EV charging companies have different positions as to how best utility programs can accelerate the deployment of charging infrastructure, but they are in universal agreement that an active partnership with the electric industry is needed. There is a growing

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[17] *See Decision Regarding Southern California Edison Company's Application For Charge Ready and Market Education Programs* at 6-45, D.16-01-023 (filed January 14, 2016), California Public Utilities Commission.
[18] Center for Sustainable Energy (2016). *California Air Resources Board Clean Vehicle Rebate Project, EV Consumer Survey Dashboard*. Retrieved from http://cleanvehiclerebate.org/survey-dashboard/EV.

charging infrastructure gap that will be exacerbated with the proliferation of second-generation vehicles that offer longer ranges at affordable price points, like the Chevrolet Bolt and Tesla Model 3.

Well-designed utility programs can help close that gap, engender competition, and grow the marketplace. As noted in our previous comments, a "make-ready" model does not ensure competition and an "end-to-end" ownership model does not inherently hinder it.[19] Ownership of EVSE is only one component of program design that relates to competitive considerations. Of equal importance is the transparency and inclusiveness of the utilities' competitive solicitation of charging equipment and services. Proposed programs should reflect the dynamic nature of the current charging infrastructure market.[20]

2. Global or Localized Market Failures or Barriers

The Commission should prioritize investments that are likely to accelerate the EV market, including those that will increase access in underserved markets, but should not require a finding of a "market failure" in any particular segment before authorizing utility pilot programs. The nature of pilot programs is to tests the viability of specific program designs, and the Commission should not delay that learning process or require extensive economic analyses that attempt to quantify the extent of potential market failures. The existence of a growing charging infrastructure gap is widely recognized and was a common theme in remarks delivered at the recent Technical Workshop. Likewise, there appears to be broad consensus that certain segments are particularly underserved in Michigan and elsewhere, including the MUDs, workplaces, and

[19] *Comments of Sierra Club, Natural Resources Defense Council, The Ecology Center, and Environmental Law & Policy Center: Case No. U-18368*, July 31, 2017. Available at: https://efile.mpsc.state.mi.us/efile/docs/18368/0015.pdf.

[20] A series of utility interviews under the *California Transportation Electrification Assessment Phase 1: Final Report* gave a range of answers regarding the exact role of utilities in EV infrastructure deployment; however, the results showed unanimous agreement for increased involvement.

public DCFC. The current EV market is essentially restricted to single-family homes, given a lack of access to charging infrastructure at MUDs.[21]

The Commission should encourage a portfolio of utility pilots that are designed to overcome barriers that are specific to priority market segments. A one-size-fits-all approach is unlikely to succeed. Different program designs are more likely to succeed in different contexts. For example, there is reason to believe the "make-ready" model may be effective at workplaces, but may not provide the turn-key solution needed at MUDs. Consider that MUDs only account for four percent of site-hosts in Southern California Edison's "Charge Ready" pilot, despite SCE's increased outreach to potential site hosts in that segment.[22] In contrast, about 37 percent of SDG&E's likely site-hosts in the "Power Your Drive" pilot, which includes utility ownership of EVSE, are MUDs, suggesting that landlords would prefer for the utility to own and maintain the charging equipment and do not want to have to procure their own charging stations.[23]

Although the majority of charging occurs at the home, workplace charging infrastructure offers another opportunity to increase public acceptance of electric vehicles. Workplace charging also coincides well with peak production from solar energy and can help facilitate increased renewable energy integration. A study conducted by the U.S. Department of Energy found that employees who work at a company that provides EV charging infrastructure were 20 times more likely to drive an EV than the average worker.[24]

The Rocky Mountain Institute recently published a report that also suggests that the DCFC segment is particularly in need of utility support to overcome persistent barriers to private

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[21] *Driving Out Pollution: How Utilities Can Accelerate the Market for Electric Vehicles,* Natural Resources Defense Council, June 2016.
[22] SCE presentation, *Charge Ready Advisory Board*, November 7, 2017.
[23] *Electric Vehicle-Grid Integration Pilot Program (Power Your Drive) Semi-Annual Report of San Diego Gas & Electric Company,* September 18, 2017.
[24] *Workplace Charging Challenge – Progress Update 2014: Employers Take Charge,* November 2014.

investment.[25] DCFCs across highway corridors are imperative for the adoption of EVs to alleviate concerns of range anxiety. However, there is an additional need for DCFCs in urban centers and short-dwell time areas. Although DCFCs are costly on a per-unit basis and revenue associated with EV load served at DCFCs will likely remain small relative to the revenue from off-peak residential charging, where the vast majority of EV charging will continue to occur, a robust DCFC network could be needed to provide consumers the confidence they need to invest in EVs. Without that confidence, a mass market for EVs, which is needed to realize the benefits described in the following section, may not materialize.

3. Cost/Benefit Analyses Relative to Cost Causation, Customer Benefits, and Potential Cost Recovery

As noted earlier, MJ Bradley's analysis for Michigan finds benefits for all utility customers. Total net benefits by 2050 include $2.6 billion accrued to electric utility customers in the form of reduced electric bills, $5.7 billion accrued to society at large, as the monetized value of reduced greenhouse gas emissions, and $23.1 billion accrued directly to Michigan drivers in the form of reduced fuel and operating costs .[26] The Commission should note that those fuel and operating cost savings accrue to individual utility customers in Michigan, and consider the fact that addressing total fuel bills will greatly improve household economic security.

4. Avenues Beyond Traditional Ratepayer Funded Infrastructure

Utility programs should seek to leverage external sources of match funding and should require appropriate "skin-in-the-game" to ensure active customer participation that will hedge against sub-optimal site-selection and under-utilized assets. However, required customer

[25] *From Gas to Grid: Building Charging Infrastructure to Power Electric Vehicle Demand*, Rocky Mountain Institute, 2017.
[26] *Id.*

contributions should be calibrated to avoid undermining program participation. With respect to external sources of matching funds, the Commission should consider the opportunity presented by the Volkswagen Air Quality Mitigation Trust, which offers the state of Michigan $64.8 million dollars to invest in clean fuel solutions that focus on reducing harmful NOx emissions, including investments in light duty electric vehicle charging infrastructure.[27] With the Trust Effective Date established as of October 2nd of this year, funding could be made available as early as 2018. A partnership between the utilities regulated by the Commission and the Michigan Department of Environmental Quality could stretch utility customer investments in charging infrastructure further, while also allowing the state to focus its efforts on defraying the incremental cost of zero-emission medium and heavy-duty vehicles, allowing for more vehicles to be deployed and increasing associated air quality benefits in the process.

Due to the high upfront cost of DCFCs, current business models that depend on direct revenue are not feasible. However, by capturing indirect value from EV charging services through partnerships with site hosts, automakers, and other stakeholders, funding of EV charging infrastructure beyond traditional means may be possible. Examples of EVSE indirect value include increased sales of businesses near EV chargers, increased tourism from EV travel, increased sales of EVs, and "clean energy" marketing opportunities.[28] Partnerships with Clean Energy Banks ("CEBs") also present an opportunity to build a secondary market for EV charging loans and leases and increase private investment by sharing upfront costs. States such as Utah, Oklahoma, and Oregon currently offer attractive financing options through CEBs to allow for

[27] National Association of State Energy Officials, *Volkswagen Settlement Beneficiary Mitigation Plan Toolkit,* March 27, 2017.
[28] Center for Climate and Energy Solutions Presentation, *Plug-in Electric Vehicles and Charging Infrastructure: Alternative Financing to Develop a Mature Market*, March 25, 2015.

EV market development.[29] Although CEBs have not fully integrated within the transportation sector, the proposed EV utility pilot programs offer a low-risk opportunity to utilize the financial tools available to these entities to increase funding for these programs. By incorporating partnerships with other stakeholders, utility pilot programs can increase options for funding of infrastructure.

Within the utility, investment in charging infrastructure and increased revenue from new electricity demand can offer an opportunity to further fund charging infrastructure. A study by the National Academies of Science noted that utilities can capture the "incremental revenue from additional electricity that EV drivers consume at home, where roughly 80 percent of the charging takes place," to fund additional charging infrastructure within the utility service area.[30]

5. Criteria to Evaluate Utility Involvement

The Commission should encourage a portfolio of pilot programs that will test different models tailored to priority market segments. Likewise, the Commission should avoid a protracted regulatory review process with prescriptive criteria, as doing so would defeat the purpose of inviting *pilot* proposals. We suggest the Commission evaluate utility pilot portfolios holistically and consider the following foundational questions:

- Is the portfolio targeting high-priority segments likely to increase EV adoption?
- Is there an element of load management?
- Does the portfolio prioritize the safe installation of electrical infrastructure?

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[29] *The Role of Clean Energy Banks in Increasing Private Investment in Electric Vehicle Charging Infrastructure* , Center for Climate and Energy Solutions, November 2014. Utah's Clean Fuel Vehicle Grant and Loan Program and Oklahoma's Alternative Fuel Vehicle Loan Program offer low interest loans for the purchase of alternative fuel vehicles and infrastructure. Oregon's State Energy Loan Program offer financing for AFV fleet procurement through a revolving loan fund.

[30] *Overcoming Barriers to Deployment of Plug-in Electric Vehicles,* Committee on Overcoming Barriers to Electric-Vehicle Deployment et al., April 2015.

- Are there reporting requirements that will provide data to inform future program design?
- Will the portfolio increase access/foster an equitable market?
- Will the portfolio meaningfully educate and engage customers?
- Will EV drivers realize the fuel cost savings that motivate EV purchases?

For more context related to these questions, see *Guiding Principles for Utility Programs to Accelerate Transportation Electrification*.[31]

III. SPECIFIC RECOMMENDATIONS FOR UTILITY PILOTS AND INITIATIVES

A. Medium and Heavy-Duty Vehicles

1. School Buses

The Commission should encourage utilities to propose electric school bus pilot programs. By passenger count, school buses represent the largest category of mass transportation in our country, larger than transit and rail combined, that over 25 million children ride each day.[32] A University of Michigan and University of Washington public health study found that cleaner school transportation for children provides significant health benefits and could prevent 14 million school absences each year.[33]

Electric school buses hold potential to serve dual use as clean transportation during the school year and as demand response to the grid during summer peaks. In New York, Con Edison ("ConEd") is piloting vehicle-to-grid electric school buses through a cost-share model where a third of the cost of the buses is provided by the school district (the equivalent of the cost of a

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[31] Natural Resources Defense Council, August 2017, available at: https://www.nrdc.org/sites/default/files/utility-transportation-electrification-ib.pdf.
[32] *The Yellow School Bus Industry*, National School Transportation Association, 2013.
[33] *Adopting Clean Fuels and Technologies on School Buses. Pollution and Health Impacts in Children*, Adar SD et al., June 15, 2015.

conventional bus), a third by NYSERDA, and the remaining third by ConEd. In return, ConEd has exclusive rights to use the bus in the summer months as a grid resource.[34] In California, PG&E has an electric school bus renewables integration pilot proposal currently before the CPUC.[35] Electric school buses can uniquely support renewable integration within the electric grid, which can lower the cost of meeting Michigan's renewable portfolio standard.

The Commission should encourage utilities to introduce similar electric school bus cost-share models in Michigan that leverage Volkswagen Mitigation Funding and zero interest loans that could be offered to schools for such projects by the Michigan Agency for Energy. With all major school bus manufacturers now offering electric models, now is the time for utility and state leadership.[36] Such partnerships would maximize the number of electric school buses powered by renewables on the road in Michigan and jumpstart the transition of Michigan's school bus fleet to zero emissions.

2. Transit Buses

Electric transit buses are another important use case for Michigan to pilot. The advancement of new battery technologies can now propel electric buses up to 350 miles before needing to recharge, making them a reliable transit option for most applications.[37]

The Chicago Transit Authority (CTA) has incorporated two electric buses into its fleet and made additional commitments to purchase up to an additional 27 buses, which can save approximately $300,000 in fuel costs and over $600,000 in terms of health outcomes associated

[34] *Request for Information: Electrification of Transportation*, Consolidated Edison Company of New York, April 20, 2017.
[35] "PG&E Submits $250 Million Proposal Expanding Support for Electric Vehicles in California," Pacific Gas & Electric, Jan 20, 2017.
[36] "Daimler, Blue Bird, IC Bus introduce electric school buses at NAPT," Green Car Congress, November 9, 2017.
[37] "This New Electric Bus Can Drive 350 Miles on One Charge," Aarian Marshall, *Wired*, September 12, 2016.

with respiratory disease and illness over the life of each bus.[38] Because CTA's buses travel approximately 30,000 miles per year and emit harmful pollution in densely populated areas, their replacement with zero emitting buses presents a significant opportunity to reduce fuel costs, clean local air, and safeguard communities.[39] Other Midwest cities plan to roll out electric buses as well. Minneapolis will be incorporating six electric transit buses into its city fleet by 2019, and Columbus has committed to electrify shuttle buses through its Smart Columbus initiative.[40] In addition, PG&E has proposed a comprehensive pilot program to aid participating transit agencies in electrifying buses, which will provide make-ready electrical infrastructure, incentives for charging stations, technical assistance (including rate optimization and load management technology), and a formatted handbook for other interested fleet operators.[41]

The Commission should encourage utilities to leverage Volkswagen Mitigation Funding and federal dollars through the Low-No Emission Vehicle Program to maximize the number of electric transit buses on the road.[42] Utilities could do this by providing the necessary infrastructure, offering optimized tariffs, and allowing on-bill financing for municipalities.

B. Light-Duty Vehicles

1. Michigan Utilities Should Jointly Sponsor a DCFC Siting Study

DCFC is a core component of a comprehensive EV charging network. DCFCs not only enable distance travel, but are also increasingly viewed as a potential home-charging solution for

[38] "CTA poised for massive expansion of electric bus fleet," Rosalind Rossi, *Chicago Sun-Times*, January 17, 2016. Also see Chicago Transit Authority available at: http://www.transitchicago.com/electricbus/.
[39] "CTA Facts at a Glance," Chicago Transit Authority, Spring 2016. Available at: http://www.transitchicago.com/about/facts.aspx.
[40] "Metro Transit getting 6 electric buses in 2019," *Star Tribune*, September 25, 2017; "Columbus wins $50 million DoT Smart Cities Challenge," Heather Kelly and Matt McFarland, *CNNTech*, June 23, 2016.
[41] "PG&E Submits $250 Million Proposal Expanding Support for Electric Vehicles in California," Pacific Gas & Electric, Jan 20, 2017.
[42] "U.S. Department of Transportation Announces $55 Million in Grants to Support High-Tech Low-No Buses, American Manufacturing," Department of Transportation, September 15, 2017.

EV drivers that live in urban settings where access to dedicated parking or regular overnight charging is difficult or impossible.[43] Moreover, consumer research indicates that access to DCFC plays an important role in EV purchase decisions.[44]

At the same time, the development of DCFC networks suffers from a "chicken-or-the-egg" market coordination problem. Prospective EV owners are reluctant to purchase an EV without sufficient access to DCFC; likewise, investment in DCFC is hampered by a risk of limited utilization and return on investment. The market coordination problem is acute for DCFC stations, which have "high upfront costs" and "require significant revenues for the owner-operator to achieve profitability."[45]

Utilities are uniquely situated to address this market coordination problem, as well as the electricity rate and demand charge issues discussed in Section II.A.3 above. With that in mind, as a concrete near-term step, we recommend that the Commission encourage Michigan's utilities to jointly fund a comprehensive siting study for the deployment of DCFC stations. At minimum, this study should include predictions of future EV usage, traffic patterns, EV concentrations, vehicle range, and existing infrastructure. This study would provide baseline information to design and evaluate future DCFC pilots, and help to ensure that such investments—which are likely to be substantial on a per-port basis—will serve the needs of EV drivers.

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[43] Nick Nigro et al., Strategic Planning to Implement Publicly Available EV Charging Stations: A Guide for Businesses and Policymakers (2015) at 11; See, *e.g.*, ICCT, *Expanding the Electric Vehicle Market in U.S. Cities* at 31 (July 2017) (finding that "public charging (and especially public fast charging) and workplace charging are significantly linked with electric vehicle uptake."); Testimony of Laura Renger on Behalf of Southern California Edison at 38-45, Proceeding No. A.17-01-020 *et al.*, California Public Utilities Commission (filed January 20, 2017).

[44] PlugShare, New Survey Data: BEV Drivers and the Desire for DC Fast Charging (March 2014).

[45] Nick Nigro et al., Strategic Planning to Implement Publicly Available EV Charging Stations: A Guide for Businesses and Policymakers (2015) at 11.

2. Near-Term Utility Programs Should Continue to Focus on Home Charging – the Foundational Vehicle-Charging Category

Home charging is the foundational vehicle-charging category. According to the National Academies of Sciences, it is a "virtual necessity" for EV ownership.[46] The home is also the location where cars are most often parked, where most charging occurs, and where drivers are likely to have the most control over fueling their vehicles. As a result, the opportunities for load management are greatest at home. For Michigan to maintain and grow its relatively strong EV sales, we recommend that utilities continue to address home charging needs, focusing on not only single-family homes but also MUDs—a market segment that requires a separate approach.

To improve access to charging in single-family homes, Michigan utilities should initiate and expand their home charging rebate programs, using updated market data to determine incentive levels. To ensure grid benefits, receipt of rebates should, at minimum, be conditioned on customers agreeing to take service on a TOU rate. A rebate program for home charging can also potentially be used to evaluate new electricity rates, AMI capabilities, demand response, and/or to test innovative sub-meter solutions to the "second-meter problem" associated with EV-specific home charging rates.

For several reasons, prospective EV owners that live in MUDs face unique challenges to access vehicle charging: parking lots are often common or shared spaces; the costs of installing infrastructure at a distance from the building is more expensive; and, in the case of renters, investments in charging infrastructure may not be recoverable within their expected tenure. These issues present an opportunity for utilities to leverage existing customer relationships,

[46] National Research Council of the National Academies of Sciences, *Overcoming Barriers to the Deployment of Plug-in Electric Vehicles*, the National Academies Press at 9 (2015).

knowledge of the electric grid, and economies of scale to deploy charging stations in this critical but underserved market. A successful program will be tailored to directly address these issues, and, as noted in Section II.D.2 above, likely must go beyond rebates and investment in "make-ready" investment, and employ a more hands-on approach by utilities.

3. Incenting the Use of EVs in Rideshare and Ride-Hailing

Ridesharing and ride-hailing services (collectively, "Transportation Network Companies" or "TNCs") not only make it easier to get from point A to point B without owning a car, but are increasingly creating important opportunities for people to experience riding or driving an EV. In short, using EVs in the TNC context creates continuous ride-and-drive opportunities.
Utilities can play a role by partnering with TNCs and supporting the deployment of infrastructure to support electric rideshare or ride-hailing vehicles, and in the ride-hailing context, even by providing direct incentives to drivers of EVs. SDG&E and SCE have proposed modest pilots in this area, which are pending approval. SDG&E proposes to "partner with Taxi Companies, Shuttle Companies and Transportation Network Companies interested in the electrification of their fleet to support them with grid integrated charging facilities, including direct current fast chargers ("DCFC") and Level 2 ("L2") electric vehicle supply equipment ("EVSE") … as well as vehicle and fueling incentives."[47] SCE proposes to "provide a monetary reward to rideshare or taxicab drivers who use an EV and exceed a specified number of rides during a given time period," and would "work with interested rideshare companies to administer the pilot, determine reward requirements, and develop communications to drivers."[48]

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[47] Prepared Testimony of Randy Schminka on Behalf of San Diego Gas & Electric: Chapter Three at 61, Proceeding No. A.17-01-020 et al., California Public Utilities Commission (filed January 20, 2017).
[48] Prepared Testimony of Laura Renger on Behalf of Southern California Edison at 34-35, Proceeding No. A.17-01-020 et al., California Public Utilities Commission (filed January 20, 2017).

Ride-sharing can also improve access to clean transportation in low-income neighborhoods. For example, BlueLA and BlueIndy—two ride-share programs in Los Angeles and Indianapolis, respectively—offer 24/7 access to a network of affordable shared electric vehicles placed strategically in low-income neighborhoods. We believe that development of such programs should be a high priority.

IV. CONCLUSION

NRDC, Ecology Center, Sierra Club, and ELPC thank the Commission for the opportunity to submit these comments and look forward to working with the Commission, Staff, utilities, and other stakeholders to support the growth of these utility transportation electrification pilot programs. We urge the Commission to seize the opportunity to ensure Michigan remains at the forefront of the global shift to electrified transportation.

Respectfully submitted,

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