September 18, 2020

**Via Electronic Mail**
Aida Camacho-Welch
Secretary of the Board
NJ Board of Public Utilities
44 South Clinton Avenue, 9th Floor
P.O. Box 350
Trenton, NJ 08625-0350

**Re: In the Matter of the Petition of Atlantic City Electric Company for Approval of a Voluntary Program for Plug-In Vehicle Charging**
**BPU Docket No. EO18020190**

Dear Secretary Camacho-Welch:

On behalf of the Natural Resources Defense Council, Environment New Jersey, Sierra Club, Tri-State Transportation Campaign, New Jersey Work Environment Council, GreenFaith, and Isles, please find enclosed the Direct Testimony of Kathleen Harris (with attached Exhibits) in the above-referenced matter. Copies of this Direct Testimony of Kathleen Harris (with attached Exhibits) are being provided to all parties on the service list by electronic mail only.

**Please acknowledge receipt of this Direct Testimony of Kathleen Harris (with attached Exhibits).**

Respectfully submitted,

/s/ William D. Bittinger

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Cc: Service list

**STATE OF NEW JERSEY**
**BOARD OF PUBLIC UTILITIES**

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| **In the Matter of the Petition of Atlantic City Electric Company for Approval of a Voluntary Program for Plug-In Vehicle Charging** | ) | Docket No. EO18020190 |

# TESTIMONY OF KATHLEEN HARRIS

## ON BEHALF OF

## NATURAL RESOURCES DEFENSE COUNCIL, ENVIRONMENT NEW JERSEY, SIERRA CLUB, TRI-STATE TRANSPORTATION CAMPAIGN, NEW JERSEY WORK ENVIRONMENT COUNCIL, GREENFAITH, AND ISLES

**September 18, 2020**

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## I. INTRODUCTION

**Q. Please state for the record your name, position, and business address.**

A. My name is Kathleen Harris. I am employed by Natural Resources Defense Council ("NRDC") as a Clean Vehicles and Fuels Advocate. My business address is 40 W 20th Street, New York, New York 10011.

**Q. On whose behalf are you testifying in this proceeding?**

A. I am testifying on behalf of the Natural Resources Defense Council, Environment New Jersey, Sierra Club, Tri-State Transportation Campaign, New Jersey Work Environment Council, Greenfaith, and Isles ("Environmental and Community Groups") regarding the request for approval, with modifications, of Atlantic City Electric Company's ("ACE's" or "Company's") Voluntary Program for Plug-In Vehicle Charging ("PIV program"). The Environmental and Community Groups are nonprofit organizations working to use diverse partnerships, community organizing, advocacy, best practices, and market mechanisms to inform energy policy that benefits the environment, public health, and at-risk members of their communities.

**Q. Please describe your current work duties, work experience, and educational background.**

A. My current position at NRDC is Eastern Clean Vehicles and Fuels Advocate. I manage the organization's legislative, regulatory, and administrative efforts to expand transportation electrification in the Mid-Atlantic and Eastern region of the United States. In this position, I am also personally familiar with NRDC's efforts on transportation electrification around the country.

I hold a Bachelor of Science in Environmental Science with a concentration in marine science and a minor in Political Science and a Master of Marine Policy, both from the University of

Delaware. At the University of Delaware, I worked as a research assistant at the Center for Carbon-free Power Integration and served as project manager for a study around off-shore wind integration into the PJM grid. Additionally, I led a program to install electric vehicle charging stations throughout the state of Delaware to ensure no electric vehicle driver was more than 50 miles from a charging station anywhere in the state. For my Master's thesis, "Improving the Electric Vehicle Driver's Experience," I interviewed electric vehicle drivers to understand the challenges of using public electric vehicle charging stations.

Prior to working for NRDC, I was the Clean Transportation Planner for 4 years at the Delaware Department of Natural Resources and Environmental Control's Division of Climate, Coastal, and Energy. During my tenure there, I managed the state's Clean Vehicle Rebate and Electric Vehicle Charging Equipment Rebate Programs, which provided rebates for alternative fuel vehicles – including electric vehicles – and electric vehicle charging stations. Additionally, I helped the Department intervene in matters with the Delaware Public Service Commission and developed and supported legislation related to transportation electrification. I also served as Delaware's Clean Cities Coordinator, which brought together over 50 stakeholders from around the state to promote clean transportation efforts. My work experience is summarized in my resume, provided as Exhibit KAH-100.

**Q. Have you previously testified before this Board or as an expert in any other proceeding?**

A. Yes, I have provided pre-filed written testimony in the Public Service Electric and Gas Company's ("PSE&G's") Clean Energy Future Electric Vehicle and Energy Storage ("CEF-EVES") Program proceeding (BPU Docket No. EO18101111). Further, I have provided comments to the Board regarding the Electric Vehicle ("EV") Straw Proposal and EV rebate program.

**Q. Are you sponsoring any exhibits?**

A. Yes. I am sponsoring the following exhibits:

KAH-100: Resume of Kathleen Harris

KAH-101: NRDC Comments on Electric Vehicle Straw Proposal (June 17, 2020)

KAH-102: NRDC Comments on New Jersey EV Rebate Program (March 30, 2020)

KAH-103: Synapse Report on Best Practices for Commercial and Industrial EV Rates (updated July 13, 2020)

**Q. Should the proposed Plug-in Vehicle program offered by the Company be approved?**

A. Yes, with the modifications discussed in the following sections of my testimony. The program offerings proposed by the Company in this filing are consistent with New Jersey's ambitious clean energy policy and support EV deployment in the state.

**Q. Please summarize your recommendations.**

A. The Company's proposal is an important first step to helping move its service territory, and thus the state, in a positive direction that will capture the environmental and economic benefits that EVs can provide to New Jersey residents. By helping to increase the number of EV charging stations—especially in a region of New Jersey where lack of EV charging is prevalent—the 13 Offerings proposed by ACE lay the groundwork for individuals and entities to invest with confidence in clean transportation.

New Jersey has ambitious EV goals that need to be met within the next decade—requiring the state to move expeditiously and efficiently. While this proposal is a good start, far more can be done to ensure that the transition to EVs has optimal results for its customers' wallets and the environment. My testimony highlights the importance of utilities' role in supporting and achieving the state's goals, while providing economic and environmental benefits to all

customers and optimizing the electric system and grid. To accomplish this, utilities should take a portfolio approach—such as the offerings proposed by ACE—to address the main barriers to EV adoption for all on-road vehicle classes and types. Such a portfolio approach should include strategic deployment of charging infrastructure; actions that increase access for an equitable EV market and improve local air quality; managing load and maximizing fuel cost savings through strategies including sustainable rate design; fostering competition; and marketing, education, and outreach to customers.

The Company's proposal is heavily focused on the light duty passenger fleet, but regarding the medium- and heavy-duty fleet only discusses specific incentives for school buses and NJ Transit. My testimony goes on to discuss the importance of medium-and heavy-duty vehicle electrification in New Jersey to ensure clean transportation for all, improve air quality, achieve the state's goal, and provide grid-resources through rate design for commercial and industrial customers and make-ready infrastructure programs. I provide additional recommendations to ensure that all New Jersey residents are able to reap the benefits of clean transportation.

Finally, I discuss the importance of the Company's proposal for market, education, and outreach and provide recommendations on how to ensure this effort is successful to maximize the benefits of transportation electrification for all of the Company's customers.

## II. IMPORTANCE OF TRANSPORTATION ELECTRIFICATION

**Q. Why is it important to make investments to support EV deployment in New Jersey?**

A. The transportation sector accounts for 42 percent of greenhouse gas emissions in New Jersey, well above the national average of 28 percent.[1] To achieve the state's climate goals under the Global Warming Response Act ("GWRA") and Zero Emission Vehicle ("ZEV") program, electrifying the state's light-duty vehicles is an important first step.[2] New Jersey has already begun to set itself up as a transportation electrification leader on the East Coast. In early 2020, Governor Murphy signed N.J.S.A. 48:25-3 into law ("PIV Act") which, in part, directs the Board of Public Utilities ("BPU") to develop one of the most robust EV rebate programs in the country, as well as set goals for infrastructure to support these vehicles.

**Q. What is the largest barrier to EV deployment in New Jersey?**

A. I agree with the conclusion reached in the 2019 Energy Master Plan[3] ("EMP") that one of the largest barriers to greater EV adoption is range anxiety,[4] exacerbated by a "chicken-and-egg" problem—where the private sector has not made a business case to install charging infrastructure without a critical mass of EVs on the road, and there will not be a critical mass of EVs on the road until there is sufficient charging infrastructure to eliminate range anxiety. This stated "chicken and egg" issue is most acute in South Jersey and in the coverage of ACE's service area, which has some of the lowest population density in the state and the largest expanse of protected lands—primarily the 1.1 million acres of the New Jersey Pinelands National Reserve. This has created a situation where the private market has not provided extensive needed electric vehicle charging station ("EVSE") coverage throughout the region and especially outside of the major Shore towns in Cape May County and Atlantic City proper.

[1] *See* NJ DEP, NJ's Emission Profile, *available at*: https://www.nj.gov/dep/aqes/oce-ghgei.html; *see also* EPA, Fast Facts on Transportation Greenhouse Gas Emissions, *available at*: https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions.

[2] N.J.S.A. 26:2C-37 et seq.

[3] 2019 New Jersey Energy Mast Plan Pathway to 2050 at 65. Available at https://nj.gov/emp/docs/pdf/2020_NJBPU_EMP.pdf

[4] Range anxiety is the fear of running out of charge before a driver reaches his or her destination.

Notably, there is a clear paucity of Direct Current Fast Charging ("DCFC") EV chargers that are critical for EV drivers making either long commutes or day trips to the Jersey Shore and provide universal charging for all EV drivers.

**Q. How many charging stations are currently located in New Jersey?**

A. There are currently 96 locations with DCFC charging stations in New Jersey, with 407 charging outlets—the majority of which are along the New Jersey Turnpike and major North-South corridors in the state.[5] As discussed in more detail later in my testimony, there are insufficient DCFC EV chargers in ACE's service territory to alleviate range anxiety and support widespread adoption of EVs.

**Q. How many charging stations will New Jersey need to support the State's climate and EV goals?**

A. New Jersey will need more than 600 charging stations to support the state's goal of 330,000 EVs on the road by 2025. According to EVI-Pro Lite[6], the state will need 786 public DCFC and almost 12,000 Level 2 charging stations at workplaces and public locations to achieve the state's clean transportation goals.

**Q. Are the number of chargers proposed by ACE sufficient for New Jersey to meet its climate and EV Goals?**

A. No. New Jersey currently ranks 45th in the country in terms of charging stations per registered vehicle.[7] Witness Grisham references in her testimony a 2019 ChargEVC study that encourages the state to install 600 public DCFC at 300 locations by 2025.[8] The Gabel Study that Ms. Grisham cites indicates that 20% of the state-wide DCFC will need to be located in ACE's

[5] U.S. DOE, Alternative Fuels Data Center, *Alternative Fueling Station Locator*, accessed on Aug. 31 2020.
[6] *See* https://afdc.energy.gov/evi-pro-lite
[7] New Jersey, 2019 Energy Master Plan: Pathway to 2050, at 65. [*hereinafter*, "EMP"].
[8] ACE Verified Amended Petition (December 17, 2019), Direct Testimony of Jennifer M. Grisham at 20-21.

service territory.[9] Based on the EV-Pro Lite analysis, assuming the same ratio of charging stations needed in ACE's service territory recommended by Gabel, approximately 158 DCFC would need to be installed by 2025. In its filing, ACE proposes the installation of 45 DCFC that would be available to all electric vehicle drivers.

**Q. Do you believe investments by third-party providers alone are sufficient for New Jersey to meet its targets?**

A. No. For New Jersey to achieve its climate and zero-emission vehicle goals in the required timeframe, the state will need investments from both the private and the public sector. ACE's proposed programs look holistically at the EV market in the state to help alleviate barriers to widespread deployment and help to support the competitive EV market—through make-ready programs and rebates for charging stations—while also ensuring charging is done at optimal times to maximize benefits and filling in the areas of the market that third-party owners and operators have not, or are unable, to reach.

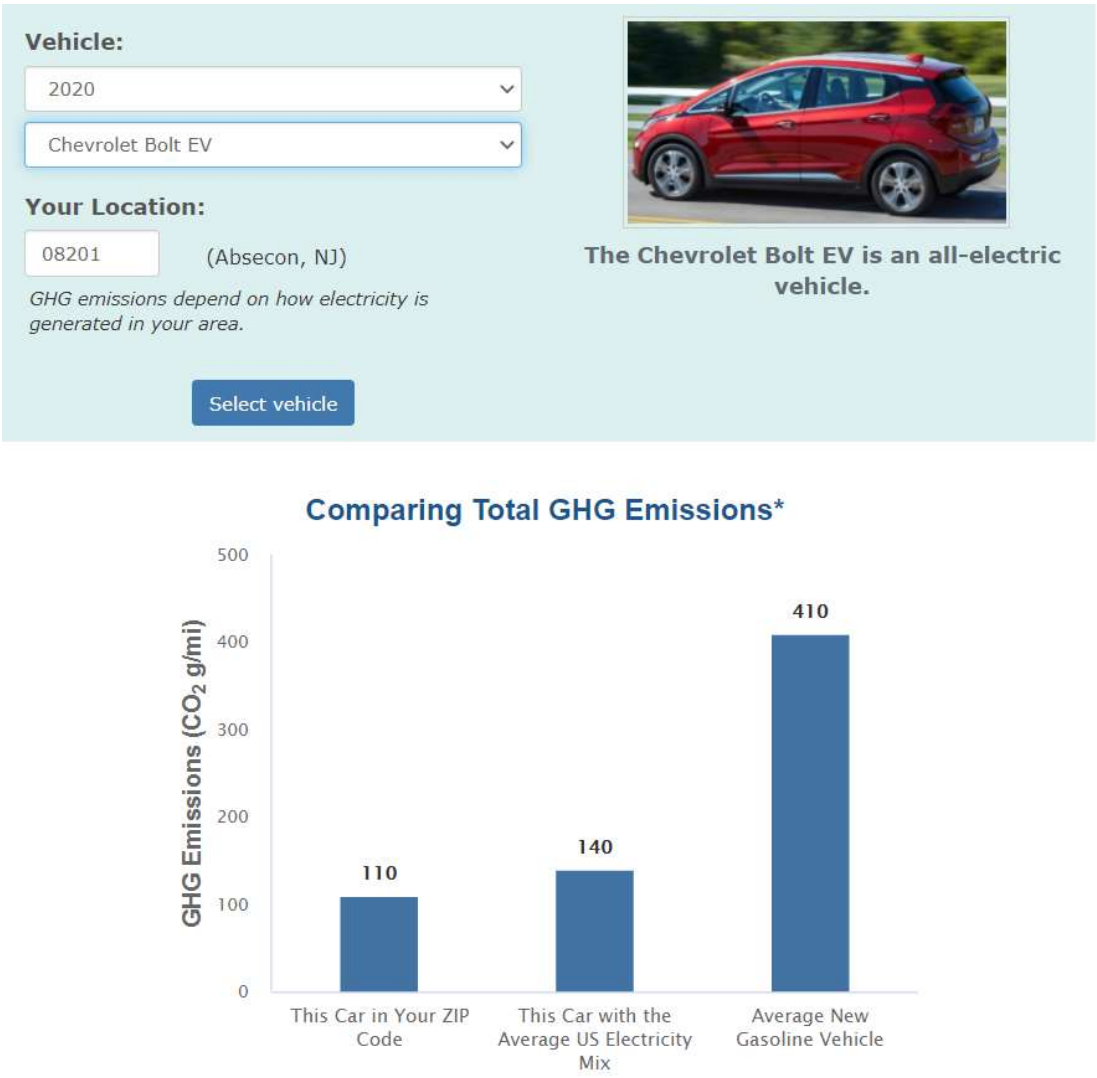
**Q. What are the air quality benefits of transportation electrification?**

A. EVs emit zero tailpipe emissions—therefore reducing ground-level ozone and improving air quality. While it is true that the scale of overall emissions reductions depends on the electricity mix of the regional grid, this does not eradicate the tangible local emissions reductions that occur when zero-emission vehicles are driven. According to the US Department of Energy, one battery electric vehicle in New Jersey reduces greenhouse gas emissions by approximately 7,335 pounds of carbon dioxide equivalent annually.[10] As shown in Figure 1, driving a Chevy Bolt in Absecon, New Jersey emits about 73% less carbon pollution per mile than the average conventional vehicle (providing emissions reductions greater than driving on the average US

[9] *Id.* at 21.
[10] U.S. DOE, *Alternative Fuels Data Center: Emissions from Hybrid and Plug-in Electric Vehicles*.

electricity mix because New Jersey's grid is cleaner than the average US grid). Electric vehicles will emit even less carbon pollution per mile in coming years as New Jersey achieves its 100% clean energy goals.

**Figure 1: Greenhouse Gas Reduction Benefits of a Chevy Bolt in ACE's Service Territory**




*(Source: FuelEconomy.Gov, "Greenhouse Gas Emissions from Electric and Plug-in Hybrid Vehicles.")*

The importance of transportation electrification in ACE's service territory, South Jersey, is also acute because even though the region is less densely populated than other areas of the

state, it still is burdened with air pollution levels that create a public health hazard. Most of this pollution is especially severe in summer months, as ground-level ozone precursor pollutants emitted especially by light-duty vehicles create air quality alert days. According to the American Lung Association's 2020 State of the Air report, Camden, Gloucester, and Ocean Counties all received F grades for air quality on ground-level ozone, including 24, 20, and 17 orange alert days, respectively.[11] Atlantic and Cumberland Counties had significantly better air quality and ranked as high as a B. Cape May and Burlington Counties did not have air monitors to provide air quality data. Camden County had the worst grade in the state for particulate air pollution from PM 2.5, garnering the only C grade in the state. The total number of pediatric and adult asthmatic cases in all of the Southern New Jersey counties in the ACE service area is 38,947 and 120,128, respectively, and the total number of Chronic Obstructive Pulmonary Disease ("COPD") cases is 79,685.[12] The removal of fossil fuel-powered light-duty auto emissions will have a direct positive impact on air quality and public health for all New Jerseyans by reducing these harmful pollutants in the air.

Electric vehicles would improve air quality for the entire state, including across South Jersey, but would be felt most by residents of environmental justice communities in the region. Many New Jerseyans live near highways that are often congested or by ports, freight transfer stations, or bus depots. Fully electrifying the transportation sector, combined with initiatives to reduce overall vehicle miles traveled, would mean vehicles would be zero

[11] American Lung Association, State of the Air 2020, *available at*: http://www.stateoftheair.org/city-rankings/states/new-jersey/.

[12] State of New Jersey Department of Health, *Asthma in New Jersey,* available at: https://www.nj.gov/health/fhs/chronic/asthma/in-nj/#:~:text=In%20New%20Jersey%2C%20more%20than,diagnosed%20with%20asthma%20than%20men.

emission in these areas, conferring enormous health benefits to impacted communities. Reductions in emissions from gasoline- and diesel-powered vehicles as vehicle electrification proceeds would provide important intermediate benefits. The US Environmental Protection Agency considers diesel exhaust to be a dangerous public health risk[13]. According to the New Jersey Department of Environmental Protection, "16,000 asthma attacks and 1,800 emergency-room visits could be prevented each year by reducing diesel soot emissions by 20 percent."[14]

Further, New Jersey's transportation sector accounts for more than forty percent of the state's total emissions, and on-road gasoline consumption accounts for most of that.[15] By reducing and, eventually, eliminating emissions from transportation, New Jersey may slow and potentially reverse the effects of climate change – including extreme heat, flooding, and severe weather events – for New Jerseyans.[16]

**Q. Do EVs provide benefits to other utility customers—including those who do not own an EV?**

A. Yes. EV investments, including those by utilities, can put downward pressure on rates for all utility customers—regardless of whether they own an EV. A recent analysis by Synapse Energy Economics entitled "Electric Vehicles are Driving Electric Rates Down" analyzed real-world data from the two utility service territories with the highest number of EVs in the country, Pacific Gas & Electric ("PG&E") and Southern California Edison ("SCE"), and found that EVs are already putting downward pressure on rates. Accordingly, the

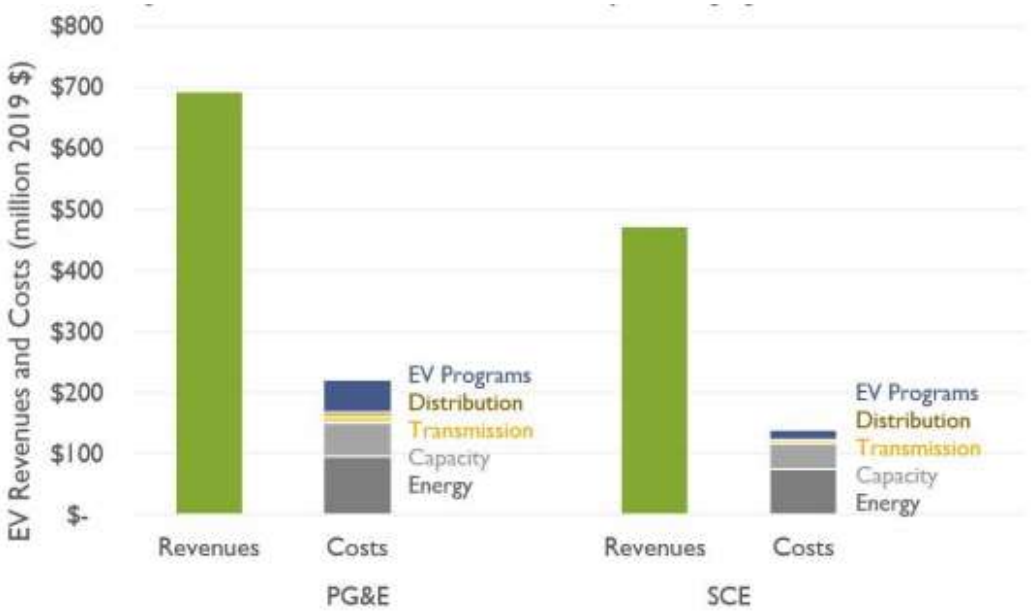
[13] United States Environmental Protection Agency, *"Impacts of Diesel Emissions," available at:* *https://www.epa.gov/dera/learn-about-impacts-diesel-exhaust-and-diesel-emissions-reduction-act-dera#impact*
[14] *See:* https://www.stopthesoot.org/dieselhealthconcerns.htm
[15] *See:* https://www.state.nj.us/dep/aqes/opea-trans-emissions.html.
[16] *See:* https://www.nj.gov/dep/dsr/trends/Climate%20Change.pdf.

benefits of EVs are not just environmental; as that study appropriately concluded: "EVs offer a key opportunity to reduce harmful emissions and save customers money at the same time."[17]

Synapse evaluated the revenues and costs associated with EVs from 2012 through 2019 in PG&E and SCE service territories. They compared the new revenue the utilities collected from EV drivers to the cost of the energy required to charge those vehicles, plus the costs of any associated upgrades to the distribution and transmission grid and the costs of utility EV programs that are deploying charging stations for all types of EVs. In total, EV drivers contributed an estimated $806 million more than the associated costs. And this finding is not merely a result of the fact that most EV drivers in PG&E and SCE's territories remain on default rates and pay high upper-tier prices as a result. Even if three in four were on time-of-use rates designed for EVs, those drivers would still have provided approximately $621 million in net-revenues.

[17] Frost et al., Synapse Energy Economics, ELECTRIC VEHICLES ARE DRIVING ELECTRIC RATES DOWN, at 1 (June 2020), *available at*: https://www.synapse-energy.com/sites/default/files/EV_Impacts_June_2020_18-122.pdf.

**Figure 2: PG&E and SCE Revenues and Costs of EV Charging, 2012-2019**




*(Source: Synapse Energy Economics, ELECTRIC VEHICLES ARE DRIVING ELECTRIC RATES DOWN, at 4)*

Were comparable analysis done in New Jersey, the results would almost certainly be similar. Indeed, EV drivers in New Jersey are likely already putting downward pressure on utility rates to the benefit of all customers. And those benefits will continue to grow in the future as additional electric vehicles connect to the grid.

Another study completed by M.J. Bradley & Associates demonstrates similar benefits on the East Coast. The study found that the EV adoption levels needed to meet New York's climate goals would provide more than $75 billion in net benefits, including $24 billion in reduced utility bills for all utility customers stemming from the same effect already observed in the real world by the Synapse study.[18] The New York analysis also estimates that drivers in the state could realize $34 billion in reduced fuel and maintenance costs. Utility customers in New Jersey deserve to realize the same cost savings.

[18] Electric Vehicle Cost Benefit Analysis, MJ Bradley & Associates, *available at*: https://mjbradley.com/sites/default/files/NY_PEV_CB_Analysis_FINAL.pdf.

The Energy Information Agency tracks "household energy insecurity" and documents that "nearly a third of U.S. households reported facing a challenge in paying energy bills or sustaining adequate heating and cooling in their home in 2015."[19] That number will likely only increase as a result of the current economic crisis. Utility regulators, consumer advocates, and environmentalists have a robust history of working together to reduce utility bills, especially for low-income households. But it is time for utility policy to target the *total* household energy bill. It would be a mistake to focus solely on the average American household's $1,300 annual electric bill while ignoring the $2,000 that the average household spends every year on gasoline.[20] For the last 40 years, driving on electricity has been the cost equivalent of driving on dollar-a-gallon gasoline, and it is projected to stay that way for the next 30 years.[21] In contrast, while gasoline prices are low now, they tend to fluctuate significantly more than the price of electricity.[22] Because electricity is generated from a diverse set of domestic fuels and because it is carefully regulated by state agencies, its price is inherently more stable, delivering energy cost savings households can bank on for the long-term.

**Q. Can you further explain how increased EV use can put downward pressure on rates for all utility customers?**

A. EV drivers increase electricity demand, and if increased demand is met without increasing fixed costs, those additional kWh dilute systemwide fixed costs – meaning rates are lowered. For

[19] EIA, Residential Energy Consumption Surveys, *One in three U.S. households faced challenges in paying energy bills in 2015*, *available at*: https://www.eia.gov/consumption/residential/reports/2015/energybills/.
[20] *See* EIA, *2018 Average Monthly Bill-residential*, *available at*: https://www.eia.gov/electricity/sales_revenue_price/pdf/table5_a.pdf; *see also* U.S. Bureau of Labor Statistics, Economic News Release, Consumer Expenditures (Annual) News Release (Sept. 10, 2019), *available at*: https://www.bls.gov/news.release/cesan.htm, *and* EIA, *U.S. household spending for gasoline is expected to remain below $2,000 in 2017* (Oct. 6, 2017), *available at*: https://www.eia.gov/todayinenergy/detail.php?id=33232
[21] Max Baumhefner, Go Electric to Avoid the Holiday Gas Price Roller Coaster, NRDC, 2018
[22] Jessica Leung and Janet Peace, "Insights on Electric Trucks for Retailers and Trucking Companies." *Center for Climate and Energy Solutions*, 2020, www.c2es.org/site/assets/uploads/2020/02/Insights-On-Electric-Trucks-For-Retailers-And-Trucking-Companies.pdf

utilities with full revenue decoupling,[23] this money is automatically returned to the customers in the form of lower rates and bills. For the utilities who do not implement revenue decoupling, there may be a lag for customers to see this downward pressure on rates until the utility's next rate case.

To ensure that the increased electricity demand does not increase fixed costs, it is important that (1) EV charging, to the extent possible, is done during off-peak hours, when there is excess load available on the grid, and (2) EV drivers see these price signals.

**Q. What are the other economic benefits of EVs?**

A. States have found that transportation electrification has the potential to benefit all utility customers – even those that do not yet have an EV – if charging is integrated properly in a way that benefits the grid. The EMP acknowledges that electrifying the transportation sector can provide benefits such as electric grid distribution, peak load shaving, and providing power back to the grid—benefits and effects that fall squarely in the realm of a regulated utility.[24] EV investments also put downward pressure on rates for all utility customers—the benefits of which are well understood—regardless of whether they own an EV.

Additionally, in the ACE service territory, EV drivers will see benefits from fuel cost savings related to transportation electrification, especially when charging occurs during off-peak hours. For residential customers, charging an EV at home is equivalent to refueling a gasoline vehicle for $1.25 per gallon, while, for 2021, the EIA Annual Energy Outlook projects gasoline costs

[23] Revenue Decoupling is a ratemaking mechanism that "decouples" utility sales from utility revenues. After a utility revenue requirement is determined in a rate case, rates are adjusted upwards or downwards via a true-up mechanism to ensure a utility does not under- or over-earn based on fluctuations in energy consumption. If EV charging increased consumption, rates would automatically decrease under a decoupling mechanism.

[24] *See* EMP at 66.

of $2.64/gallon.[25] Further, since EVs have fewer moving parts, they require less maintenance than a traditional gasoline or diesel vehicle.[26]

**Q. Are EVs expensive to purchase?**

A. EVs are rapidly decreasing in price. Programs such as the ChargeUp New Jersey program that provide rebates for the purchase of EVs further help to reduce the upfront vehicle costs and bring them closer to price parity.[27]

The growing used EV market also provides opportunities for drivers who want to purchase an EV but are unable or don't want to purchase a new vehicle. Drivers can now purchase a used EV at a cost comparable to a used gasoline vehicle. For example, according to Carvana.com, an online used vehicle website, a used 2015 Nissan Leaf costs approximately $10,590—the same price as a 2015 Nissan Versa.[28]

However, even if EVs have a higher up-front cost due to new technology, they have significantly lower life-cycle costs due to less maintenance and lower "fuel" costs on a per-mile basis. They do not require oil, spark plug, or belt changes due to not having an internal combustion engine. EVs that have regenerative braking also have longer times between brake pad replacements.

The reduced vehicle costs and increasingly robust used EV market show that the costs of EV ownership are not the major hurdle to EV adoption; instead, New Jerseyans may be hesitant to

[25] US DOE, *eGallon,* updated (July 11, 2020), *available at*: https://www.energy.gov/maps/egallon.
[26] Union of Concerned Scientists, *Cleaner Cars from Cradle to Grave*, October 2015. Available at: https://www.ucsusa.org/resources/cleaner-cars-cradle-grave
[27] For example, a 2020 Hyundai Kona Electric (before incentives) starts at $36,950 while a 2020 Hyundai Kona that runs on gasoline costs approximately $21,500. With the ChargeUp New Jersey rebate of $5,000 as well as the Federal Tax credit of $7,500—which Hyundai is still eligible for—a driver in New Jersey would pay just $2,950 more to drive an EV Kona. *See:* https://afdc.energy.gov/calc/; *See also:* https://chargeup.njcleanenergy.com/eligible-vehicles.
[28] https://www.carvana.com/cars/nissan-leaf/2009-2015. *See also:* https://www.carvana.com/cars/nissan-versa/2009-2015

purchase these vehicles due to a perceived lack of charging infrastructure in the state and accompanying range anxiety.[29]

**Q. Are there additional equity and environmental justice benefits associated with transportation electrification?**

A. Yes. In order for New Jersey to be a leader in equitable policy, the state must acknowledge systemic injustices and account for the detriments that continued air pollution has on health and quality of life to already overburdened communities. For example, Black Americans are nearly 1.5 times more likely to have asthma, are 5 times more likely to visit the emergency department due to asthma, and 3 times more likely to die from asthma.[30] The Asthma and Allergy Foundation in America outlines public policy strategies that are critical to addressing these health disparities and includes reducing transportation-related emissions and transitioning to a clean energy economy.[31] Replacing gasoline and diesel vehicles with EVs will reduce the particulate matter, NOx, and smog that exacerbate asthma. This is especially important in ACE's service territory where several counties served by the Company are failing to attain the federal National Ambient Air Quality Standard for ground-level ozone, exacerbated by gasoline and diesel vehicles on the road.[32]

While overburdened communities may not be the first adopters of EVs, lower medical bills and improved health are direct social and economic benefits that can close the gap on these disparities. As discussed in more detail below, the proposed Innovation Fund in particular will

[29] *See* https://www.autolist.com/news-and-analysis/survey-electric-vehicles.
[30] Asthma and Allergy Foundation of America, (2020), Asthma Disparities in America: A Roadmap to Reducing Burden on Racial and Ethnic Minorities, available at aafa.org/asthmadisparities.
[31] *Id.*
[32] *See* https://www3.epa.gov/airquality/greenbook/anayo_nj.html; *See also* https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics.

direct tangible benefits to these communities in order to improve mobility and, therefore, access to essential resources, such as healthcare, food, jobs, and new opportunities.

**Q. What programs and policies does NJ currently have to support transportation electrification?**

A. New Jersey has several policies to support transportation electrification that vary in implementation status, agency responsibility, and funding streams. Currently, the Board of Public Utilities administers a plug-in vehicle rebate program that offers up to $5,000 in rebates for qualifying vehicles. Next, the Department of Environmental Protection runs the "It Pay$ to Plug-in Program," the administration of the VW settlement fund, and will be responsible for setting electric medium-and heavy-duty ("M&HD") vehicle goals as required by the PIV Act passed earlier this year. The PIV Act also includes additional language to electrify New Jersey Transit buses by 2032.[33] Bus electrification is also included in the NJ Transit 10-Year Strategic Plan.[34]

Additionally, the Economic Development Authority is currently designing a program that focuses on medium- and heavy-duty vehicle electrification using auction proceeds from the Regional Greenhouse Gas Initiative.

## III.ROLE FOR UTILITIES IN TRANSPORTATION ELECTRIFICATION

**Q. What are utilities' roles in supporting transportation electrification?**

[33] PIV Act at 9(a). "By December 31, 2024, at least 10 percent of the new bus purchases made by the New Jersey Transit Corporation shall be zero emission buses, and (b) the percentage of zero emission bus purchases shall increase to 50 percent by December 31, 2026, and 100 percent by December 31, 2032 and thereafter. Zero emission buses shall not produce any emissions at the tailpipe, and shall be prioritized for low-income, urban, or environmental justice communities."

[34] *See* https://njtplans.com/downloads/strategic-plan/NJT_2030-A_10-YearStrategicPlan.pdf.

A. Regulated electric utilities have several characteristics that make them well-suited to play a central role in EV infrastructure buildout. First is their specific and expert knowledge of the distribution system and the potential impact of vehicle charging on load shape and shifting. It is critical that New Jersey's investment in the distribution system happen in close coordination with its buildout of EV charging infrastructure given the potential load impacts of widespread EV adoption. Moreover, if they are granted regulatory approval for demand response, education programs, and tariffs that allow for managed charging or rate design, utilities are able to optimize the electric grid and ensure that most electric vehicle charging occurs during off-peak hours.

To address the main barriers to EV adoption—cost, charging infrastructure, and lack of awareness—utilities should take a portfolio approach to address these concerns across the board for all on-road vehicle classes and types. NRDC published an issue brief, "Guiding Principles for Utility Transportation Electrification Programs,"[35] which explores these opportunities further. The brief recommends that utilities:

- Deploy Charging Infrastructure Strategically—a lack of access to charging stations is a critical barrier to the expansion of the EV market and utilities should prioritize charging investments in areas that will grow the market. These include residences, workplaces, public fast-charging stations, and public "long dwell time" sites.
- Increase Access for an Equitable EV Market and Improve Local Air Quality—this is especially important in communities where residents are disproportionately burdened by air pollution and transportation fuel costs.

[35] Max Baumhefner, "Guiding Principles for Utility Programs to Accelerate Transportation Electrification" (August 2017), *available at:* https://www.nrdc.org/sites/default/files/utility-transportation-electrification-ib.pdf

- Manage Load and Maximize Fuel Cost Savings—to ensure that the benefits upon which proposed utility transportation electrification investments will materialize, load management practices and innovative rate design are essential. This will ensure that EV drivers realize fuel costs savings, which is one of the most important motivators for EV purchase decisions. Additionally, proper load management, rate design, and ensuring that drivers see these price signals will put downward pressure on rates for all utility customers.
- Foster Competition—utilities should leverage the experience of third-party charging equipment and service providers in the development of charging infrastructure programs.
- Educate Customers—a comprehensive strategy to engage customers is a necessary component of a successful program. To expand the EV market, a general lack of consumer awareness must be overcome and misconceptions about EVs must be corrected. Luckily, utilities are uniquely positioned to conduct this type of broad customer education effort, as they have at least monthly communications with their customers.

The thirteen offerings proposed in ACE's Plug-in Vehicle program take this portfolio approach and look holistically at the EV market and its need for support from many different angles (e.g. time-of-use rate support, rebates for charging stations, limited utility ownership, etc.).

**Q. Have other public service commissions in the United States approved programs similar to the programs that ACE is proposing?**

A. Yes. States across the nation with similar EV targets have also identified utility investments in EVSE, such as those proposed by ACE, as a critical utility service to overcome the barriers to

faster and more widespread EV adoption by their residents. In fact, 26 different state utility regulatory commissions have approved 81 applications submitted by 45 different electrical utilities, representing a collective investment of nearly $2.2 billion in utility customer funds in programs that deploy charging infrastructure and undertake other actions to accelerate the electrification of the transportation sector.[36] $1.6 billion of that collective investment is in programs that prioritize under-served communities and $545 million is allocated directly to disadvantaged communities and low-income customers.

**Q. How does ACE's proposed Plug-in Vehicle Program support the successful implementation and attainment of New Jersey's Climate and Clean Energy Goals?**

A. The Plug-in Vehicle offerings are critical to achieving the main goal of New Jersey's EMP: the reduction of energy consumption and emissions from the transportation sector.[37] The EMP sets the ambitious policy goal that "the transportation sector should be almost entirely decarbonized by 2050."[38] Therefore, the EMP recommends the state take "concrete steps to start to phase out motor gasoline and conventional diesel consumption as quickly as possible."[39] The EMP goes on to identify a goal of 330,000 light-duty electric vehicles on the road by 2025. This target is based on New Jersey's participation in the California Clean Cars program, which requires an aggressive ramp-up of EVs leading up to 2025. New Jersey was the first state in the country to pass legislation to join the California Clean Cars program, which led to eight other states joining the program and ultimately led to the national codification by USEPA and USDOT of clean car and fuel efficiency standards (which the Trump

[36] See (https://www.atlasevhub.com/) Atlashub is a tool that allows users to examine different EV policies across the country.
[37] See EMP.
[38] *Id.* at 59
[39] *Id. at 59*

Administration is working to weaken).[40] To meet this ambitious target, the EMP concludes that New Jersey will require a "comprehensive 'EV Ecosystem' that provides consumers with easy access to charging infrastructure for EVs. . . ," and is done in partnership with New Jersey's public utilities.[41]

## IV. RATE DESIGN TO MAXIMIZE BENEFITS AND MINIMIZE EFFECTS ON THE GRID

**Q. Does rate design have an effect on the deployment of EV charging infrastructure?**

A. Yes, rate design impacts the deployment of EVs in several ways. Rate design is best understood as the structure of customer bills including, volumetric charges for energy, non-bypassable surcharges, and demand charges. Therefore, rate design provides important price signals and incentives for customers on when to consume energy and the quantity of energy consumed. For EVs, volumetric rates and demand charges provide incentives for when a customer may charge an EV, as well as the value proposition for publicly accessible chargers owned by third parties (depending on the structure of the demand charge).

**Q. What is a time-of-use (TOU) rate?**

A. A TOU rate is a type of rate design that varies the cost per kWh based on the time of day and/or the season of the year with the use of an off-peak and on-peak rate. The purpose of the rate is to provide incentives for customers to shift load to off-peak hours when there is less load on the distribution system and energy can be provided by cheaper sources of energy. In the case of EVs, a TOU rate should be structured to incentivize the charging of EVs during off-peak periods – and disincentivize charging during on-peak periods – through price signals seen by EV drivers.

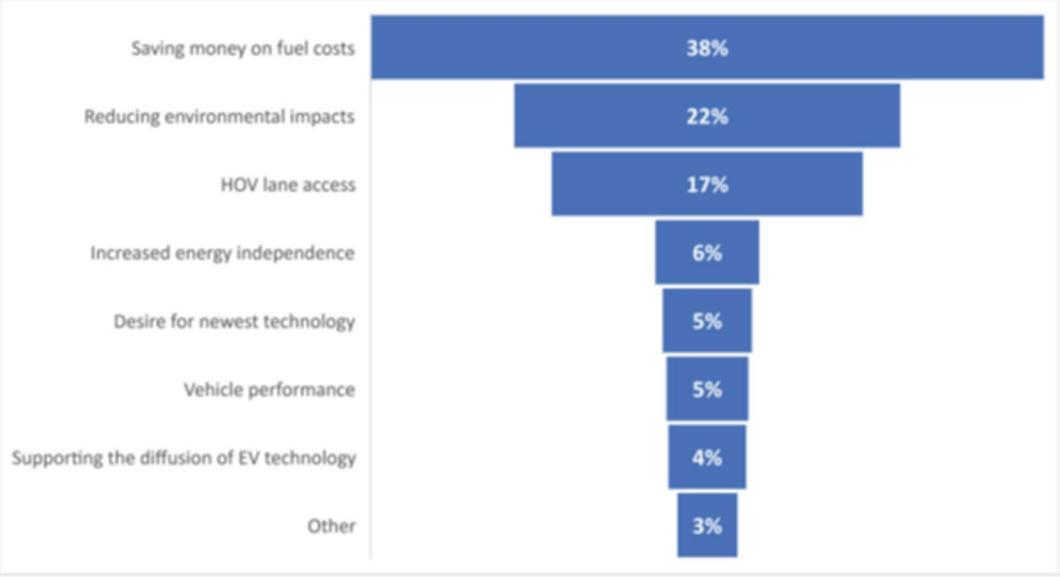
[40] See Clean Cars Law; 2011 Clean Car Standards.
[41] EMP, at 46-65

**Q. What are the benefits of TOU rates designed for EVs?**

A. TOU rates provide numerous benefits for EV users and the grid generally. A well-designed TOU rate can reduce fueling costs for EV owners, put downward pressure on rates for all customers, and shift usage to off-peak hours. Transportation electrification programs that use price signals to encourage drivers to shift charging to off-peak hours will make it more likely that all ACE customers will realize the economic benefits associated with EVs.

Further, shifting charging to off-peak hours can reduce fueling costs for EV drivers, helping to accelerate EV adoption in the state as a survey of nearly 20,000 EV drivers revealed that "saving money on fuel costs" is the single biggest motivator of EV purchase decisions in California (see Figure 3 below).

**Figure 3 Drivers Top Reasons for Purchasing an EV**




*(Source: Center for Sustainable Energy, California Plug-in Electric Vehicle Owner Survey Dashboard)*[42]

[42] *available at:* https://cleanvehiclerebate.org/eng/survey-dashboard/ev.

EV-TOU rates, especially those that have strong price signals that are seen by the end-users, help EV drivers save money on fueling costs and, by doing so, will motivate additional EV purchases.

**Q. How can EV charging help lower the costs of managing the electric grid?**

A. As EVs charge when they are parked, most light-duty vehicle charging occurs at home and can occur when the grid is underutilized. Price signals that direct drivers to charge during off-peak hours, and not when they arrive at their destination, can help to move charging when there is spare capacity on the grid. The billions of dollars in new utility revenue from EV charging in excess of associated costs can put downward pressure on electric rates to the benefit of all customers. Further, EVs can also serve as distributed energy resources and act as additional storage for the grid through technologies such as vehicle-grid-integration.[43]

However, in order to realize the same benefits that PG&E and SCE utility customers have experienced, it is not enough for the Company merely to establish a TOU rate—the existence of the rate must also be communicated to EV drivers and they must actually see price signals intended to encourage them to shift charging to off-peak hours. Drivers that do not see time-variant price signals generally charge as soon as they arrive at their destination regardless of grid conditions or underlying utility rates.

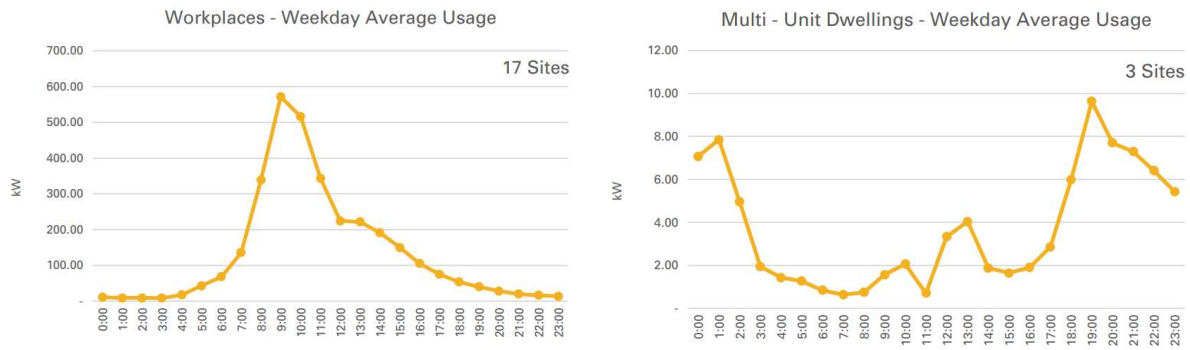
**Q. Can you give an example of a program that has used EV charging to help lower the cost of managing the electric grid?**

A. Yes, SCE's Charge Ready Pilot is one such program. That program observed that drivers at multi-unit dwellings ("MUDs") and workplaces who did not see price signals had no incentive to change their behavior and simply plugged-in their vehicles when they reached their

[43] Pamela MacDougall, *The Missing Piece to Energy Storage Is in Your Driveway,* NRDC, (Aug 2018).

destination. In that pilot, site hosts were required to take service on TOU rates, but there was no requirement that those price signals were passed through to EV drivers. The charging profiles in the Charge Ready pilot program report show that the lack of time-variant price signals seen by EV drivers resulted in those drivers charging immediately upon arrival at their destination with no correlation to grid conditions or time-of-use periods.[44] (see Figure 4 below).

**Figure 4: Load Profiles from Charge Ready Pilot**



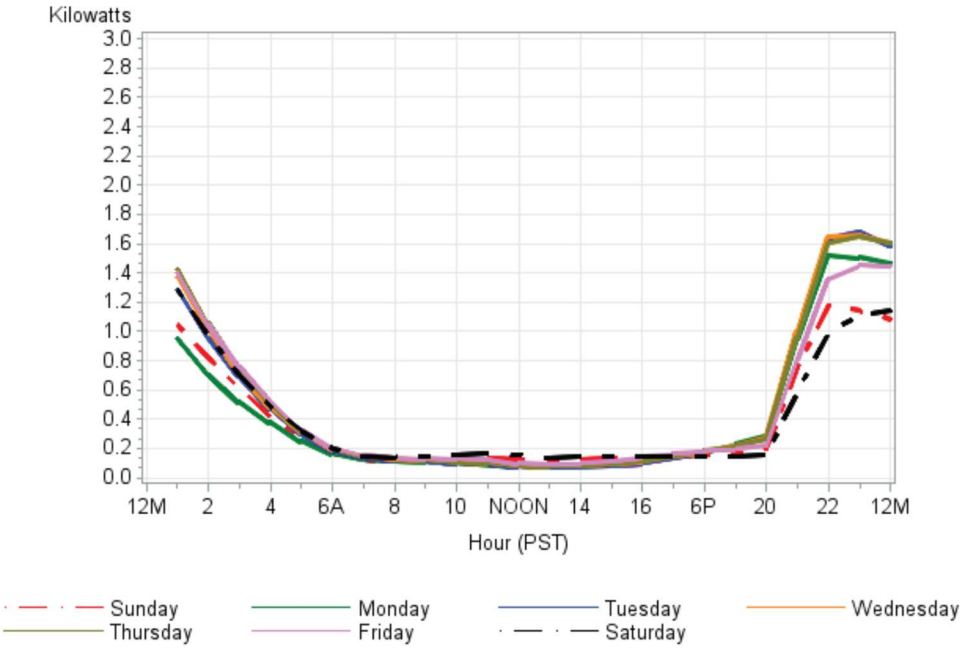

*(Source: SCE Charge Ready Pilot Program Report)*

At workplaces, drivers charged as soon as they arrived at work, with demand peaking at 9 a.m., with the bulk of charging complete before the afternoon, which means those vehicles were not available to absorb solar generation that peaks during afternoon hours. At MUDs, drivers charged as soon as they arrived at home in the evening, with demand peaking at 7 p.m. (exacerbating system-wide peak demand), the bulk of charging complete before 1 a.m., and very little charging occurring in the early morning hours when the system is significantly underutilized. This is unfortunate, but entirely predictable; if given no reason to do otherwise, drivers will charge whenever they arrive at their destination. It is also entirely avoidable;

[44] SCE Charge Ready Pilot Program Report at 23-29 (indicating that charging in many segments was occurring primarily during late afternoon and evening hours). *Available at* https://www.sce.com/sites/default/files/inline-files/Charge%2BReady%2BPilot%2BReport%2BSummary_Amended.pdf

residential customers taking service on SCE's "TOU-EV-1" rate almost certainly arrive home at the same hour as do the drivers participating in the Charge Ready Pilot, but, as SCE noted, they do not charge upon arrival—instead, they "commence charging promptly at the beginning of the off-peak interval at 10:00 p.m.,"[45] as illustrated in Figure *5* below.

**Figure 5: Average Hourly Load Profile for Each Day of the Week on SCE's "TOU-EV-1" Rate**




*[Source: 6th Joint IOU Electric Vehicle Load Research Report, at 61 (Dec. 2017)]*

A simple nudge in the form of a TOU price signal seen by EV drivers is sufficient to push EV charging to hours of the day when it benefits the grid and when fuel cost savings can be maximized. Recognizing this problem, SCE modified its successor program, Charge Ready 2, to make the default arrangement that participating site hosts pass price signals onto drivers. The Company should similarly modify the proposed EV-TOU to incorporate this default

[45] *6th Joint IOU Electric Vehicle Load Research Report* at 60.

arrangement and ensure that EV drivers generally see price signals that encourage them to charge in a manner that both supports the electric grid and maximizes fuel cost savings.

**Q. What are the best practices for utilities to shift charging to off-peak hours?**

A. The Company is right to provide customers with a variety of options to encourage customers to charge during off-peak hours(i.e. Offering 1's whole-house TOU rate, Offering 2's EV-Only TOU rate with in-car submeters, and Offering 3's EV-Only TOU rate with a smart-level 2 charging station). All of these offerings allow the Company to manage load (passively or actively) and shift charging to off-peak hours through price signals while reducing program costs. Without in-car submeters or smart-charging stations to implement EV-TOU rates, the Company would need to install a second meter at a customer's home. According to the Minnesota Public Utilities Commission, this would cost between $1,700 and $3,500 on electrical wiring and metering costs to enroll in Xcel Energy's EV tariff.[46] Submetering is similar to a second meter, but the submeter is located between the primary meter and the EV and allows for only EV load to be on a TOU rate.[47]

**Q. What are your thoughts on Offering 1, a whole-house TOU rate?**

A. As I understand it, all interested ACE customers, regardless of whether they own an EV, are eligible for the whole-house TOU rate. This is something that I am supportive of but am unsure that the goal of the Offering—to shift charging to off-peak hours—will be fully realized with a whole-house TOU rate. Whole-house TOU rates are easier and cheaper to implement than an EV-Only TOU rate, such as that proposed in Offering 2. However, customers may be

[46] Minnesota Public Utilities Commission, Order Approving Pilot Program, Granting Variance, and Requiring Annual Reports. Docket No. E-002/M-17-817, at 2 (May 9, 2018).
[47] *Id.*

hesitant to adopt a whole-house TOU rate if they are unable to shift the majority of their load to off-peak hours.

EV-Only TOU rates were recommended in "Driving Transportation Electrification Forward in Pennsylvania," a report by Synapse that NRDC commissioned in 2018.[48] EV-Only TOUs limit the risk of having a larger bill due to TOU rates not aligning with their non-EV base load and therefore can provide significant benefits to customers. EV drivers with separate meters and EV-Only TOU rates only consume 5 to 10 percent of their energy during on-peak time periods compared to customers on whole-house TOU rates, who use about 15 to 20 percent of their energy during on-peak times.[49]

To be clear, I encourage the Board to approve both Offering 1 and 2, but recommend that ACE educate its customers on the benefits of Offering 2 vs. Offering 1.

**Q. Is the $0.05/kWh rebate proposed in Offerings 2 and 3 enough of an incentive to shift charging to off-peak hours?**

A. The proposed off-peak period does not depend on the day of the week or on the season, with an emphasis on simplicity over maximization of the peak to off-peak ratio. For a more effective price signal, ACE could also design a rate that has more variation—which will be less simple—but has a higher peak to off-peak ratio. ACE should also look to best practices from other jurisdictions when considering the appropriate and most successful price ratios, as well as the optimal time periods for off-peak, shoulder, and peak rates. The larger the peak to off-peak price ratio, the larger the price signal to encourage drivers to charge during off-peak hours. For example, San Diego Gas and Electric (SDG&E) found that a peak to off-peak ratio of 6:1

[48] Whited et al, *Driving Transportation Forward in Pennsylvania,* (Sept. 2018), *available at*: www.synapse-energy.com/sites/default/files/PA-EV-Rates-Report-18-021.pdf.
[49] Allison, A. and Whited, M., *Electric Vehicles are not Crashing the Grid,* (Nov. 2017), *available at*: www.synapse-energy.com/sites/default/files/EVs-Not-Crashing-Grid-17-025_0.pdf.

shifted an additional 10 percent of all charging (around 90 percent total) to off-peak hours compared to a ratio of 2:1.[50]

**Q. What are your thoughts on the proposed nameplate capacity discount to reduce demand charges at MUDs, workplaces, and fleets and the demand charge credit for Direct Current Fast Charging Stations?**

A. The Company is right to consider ways to reduce fueling costs and make the economics of charging viable for customers and charging station owners, but should implement long-term, sustainable solutions rather than short-term "fixes" that rely upon explicit subsidies or discounts (like the nameplate capacity discount). Instead of explicit discounts, it is critical to develop rates that more accurately reflect the unique characteristics and costs of EV charging, rather than forcing stations to take service on commercial and industrial rates designed for large buildings and factories. Rate designs for high-powered transportation electrification use cases should impose demand charges only to the extent absolutely necessary and, instead, recover costs through more predictable rates where possible.

Demand charge costs can be prohibitively high for DCFC stations in the nascent EV market—making it difficult for the private market to justify investments in infrastructure in locations that may not be highly utilized in the near term. Therefore, I appreciate the Company's efforts to address this major barrier to widespread DCFC deployment. However, instead of implementing a temporary solution to small subsets of transportation electrification, ACE should follow the lead of utilities such as PG&E, which recently received approval to implement a suite of new cost-based rates designed to improve the long-term economics of public fast charging, multi-family charging, and medium- and heavy-duty vehicle

[50] Nexant, FINAL EVALUATION OF SDG&E PLUG-IN ELECTRIC VEHICLE TOU PRICING AND TECHNOLOGY STUDY (2017).

electrification.[51] The Board should require the utilities under its jurisdiction to propose comparable long-term, comprehensive rate design solutions.

Synapse Energy Economics recently released a report on best practices for commercial and industrial (C&I) EV rate reform.[52] In its report, Synapse notes that "[t]raditional C&I rates were generally designed for large buildings, rather than for public fast charging of passenger vehicles or for depot charging of truck and bus fleets" and those rates "do not reflect the unique costs or flexibility of EV charging and can charge commercial EV customers much more than their true cost of service."[53] Time-limited discounts are not a sustainable solution and utilities and regulators should develop new C&I rates designed with EV use cases in mind that are cost-reflective and take advantage of the unique characteristics and flexibilities of EV load. Synapse offers the following principles for C&I rates:

- Rates should promote efficient use of fixed system resources, which will reduce rates for all utility customers;
- Rates should be easy to understand and predictable;
- Rates should be designed with end users in mind;
- Time-varying volumetric rates are generally preferable to demand charges;
- Non-coincident peak demand charges should generally be avoided;
- It may be appropriate to set rates to recover marginal costs rather than embedded costs; and

[51]Miles Muller, *Agreement Proposed to Reform San Diego Commercial EV Rates*, NRDC (Jul. 1, 2020), *available at*: https://www.nrdc.org/experts/miles-muller/agreement-proposed-reform-san-diego-commercial-ev-rates.
[52]M. Whited *et. al.*, BEST PRACTICES FOR COMMERCIAL AND INDUSTRIAL EV RATES, Synapse Energy Economics, Inc. (Jul. 13, 2020), *available at*: https://www.synapse-energy.com/sites/default/files/Best_Practices_for_Commercial_and_Industrial_EV_Rates_18-122.pdf.
[53] *Id.* at 1.

- Programs that rely on price signals inherent in rate design to deliver grid and user benefits should ensure users actually see those price signals.[54]

Synapse recommends time-of-use energy charges or critical peak pricing over coincident demand charges for recovering the costs of shared infrastructure, since energy charges better capture the duration of time that a customer is using that infrastructure. And Synapse cautions that, while limited non-coincident demand charges may be appropriate for recovering distribution infrastructure costs sized to meet the maximum demand of a single customer, "non-coincident demand charges are often set too high and recover costs that are not truly driven by individual customer peaks."[55] I urge the Board to consider Synapse's recommendations in moving forward with new C&I rate design, including the prioritization of time-varying volumetric rates over demand charges and avoiding non-coincident peak demand charges altogether.

**Q. Should ACE also consider other C&I customers when looking at comprehensive solutions to demand charges for EV charging?**

A. Yes. As I discuss in more detail later in my testimony, one of the major gaps missing in ACE's filing is widespread support for commercial and industrial customers. M&HD vehicle electrification will be vital to helping the state achieve its greenhouse gas reduction goals while also helping to improve air quality—especially in environmental justice ("EJ") and low- and moderate-income ("LMI") communities. As this market is anticipated to grow rapidly in the near-term, it is important that utilities begin to consider and implement programs and rates that

[54] *Id.* at 1.
[55] *Id.* at 9.

will support these high-load vehicles, as described in the Synapse "Best Practices for Commercial and Industrial EV Rates" report.[56]

**Q. Should MUDs, workplaces, and customers be eligible for TOU rates?**

A. Yes. In the Company's proposal, it does not appear that MUDs, workplaces, or fleets are eligible for a TOU rate. I strongly encourage the Company to expand Offerings 1-3 to these customers as well, as it is important to maximize the number of EVs charging during off-peak hours, no matter where they are parked. To be effective, as previously described using examples from SCE's Charge Ready Program Pilot in California, EV drivers (the end users) need to see the price signals to encourage charging during off-peak times.

**Q. Should the proposed Green Adder (Offering 13) be approved?**

A. Yes—allowing customers the option to purchase zero-emission energy to charge their electric vehicles will help to further reduce emissions and increase the benefits of transportation electrification.

## V. INCREASING CUSTOMER ACCESS TO TRANSPORTATION ELECTRIFICATION

**Q. Will ACE's programs to support the expansion of charging stations oversaturate the charging station network in New Jersey?**

A. No. I agree with Witness Grishman's statement that ACE's proposed programs to support the expanding EV market in New Jersey will not oversaturate the market.[57] As discussed previously in my testimony, New Jersey still needs a significant number of EV charging stations on its roads to support the state's ZEV goals. Providing rebates for charging stations—

[56] *Id.*

[57] ACE Verified Amended Petition (December 17, 2019), Direct Testimony of Jennifer M. Grisham at 22-23.

as long as they are smart, networked stations—is appropriate as it will allow the Company to manage load when needed, help shift charging to off-peak hours, and collect data on charging behaviors of customers for future EV programs. It is important that utilities support the expansion of this market through make-ready infrastructure programs and, in some cases, utility ownership of charging stations.

**Q. ACE proposes owning and operating 45 DCFC and 200 Level 2 charging stations. Is utility ownership of charging stations appropriate?**

A. Yes, in certain use-cases. Utility ownership of charging stations may be particularly valuable in certain segments, such as MUDs and in LMI and EJ communities. LMI communities still face significant barriers to EV adoption. In addition to the upfront cost of purchasing an EV, access to charging infrastructure and lack of awareness have inhibited EV adoption in these communities. In many cases, low-income drivers face heightened barriers relative to other drivers, with diminished access to financing, less access to information on EVs, and a lack of public charging infrastructure in their neighborhoods. When considering investments in electric vehicle charging infrastructure, especially in LMI and EJ communities, it is important to look at examples and lessons learned from other utilities, such as PG&E's widely supported and approved LMI program. PG&E's *Empower Electric Vehicle Charger Incentive and Education Program* was designed to address all of these barriers and could serve as a model program for expanding the benefits of transportation electrification to historically underserved households in New Jersey.

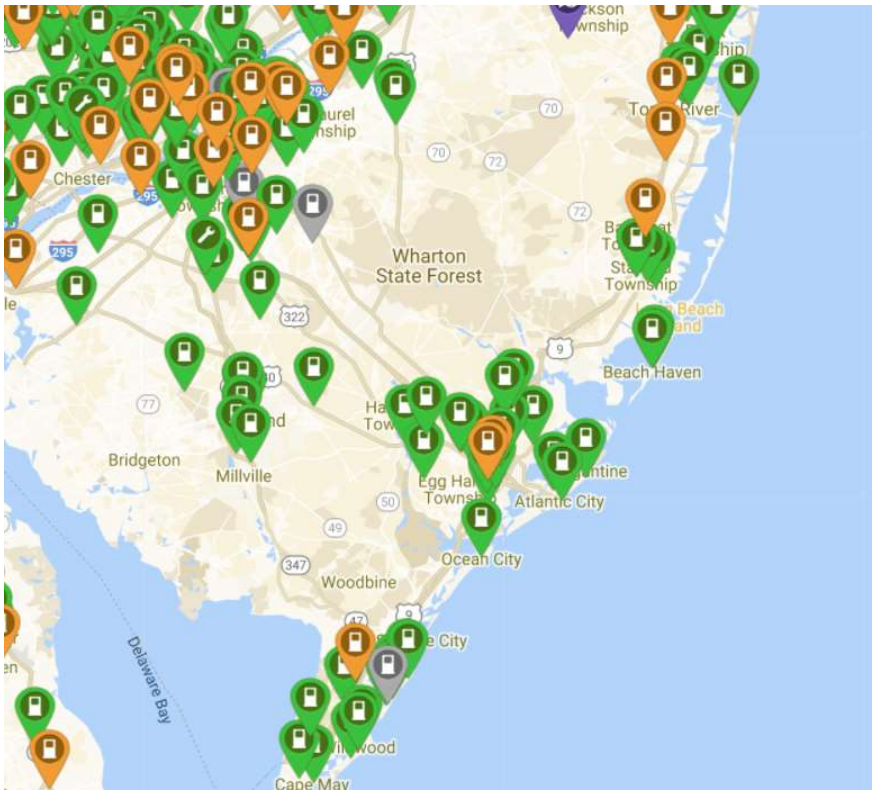
It is also important that BPU consider how to get transportation electrification investments in underserved communities, including rural communities, whose charging needs have not been

met by the competitive market. We do not need to wait and see where these communities are—charging station maps already show where the major gaps are and where investment is needed.

**Q. Are there currently gaps in ACE's service territory where the private market hasn't yet invested in charging station infrastructure to support EVs?**

A. Yes. Plugshare.com, an electric vehicle charging station website and app that is crowdsourced by EV drivers, highlights the gaps in charging infrastructure in ACE's service territory. As Figure 6 below shows, the private market has not yet heavily invested in infrastructure to support EV charging in ACE's service territory outside of clusters around some of the major shore destinations, the Delaware and Pennsylvania borders, and major interstate corridors.

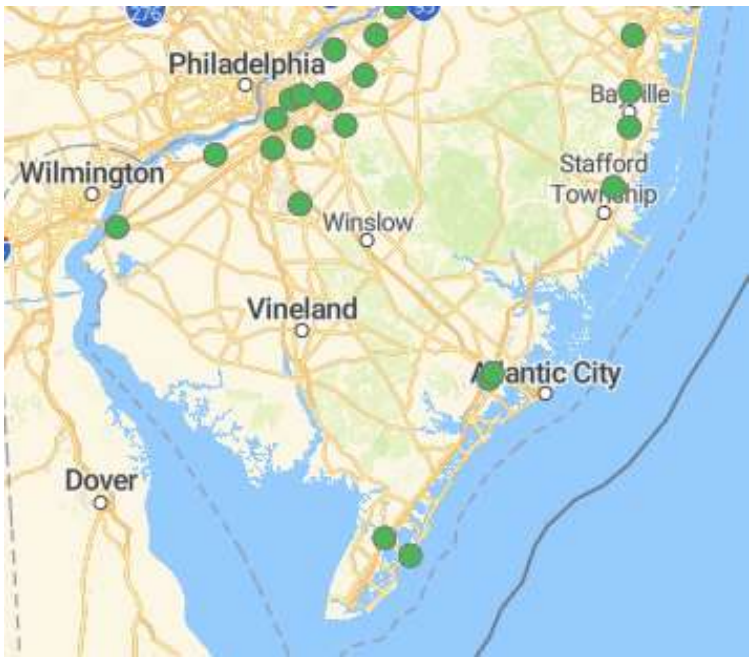
**Figure 6: Charging Stations in ACE's Service Territory. Green indicates a Level 2 charging station, Orange indicates at DCFC, and Grey indicates a station that is currently in use or offline.**



*(Source: www.PlugShare.com)*

Removing Level 2 charging stations to just highlight the DCFC, this gap is further widened (as shown in Figure 7 below).

**Figure 7: DCFC in ACE's Service Territory**




*(Source: U.S. DOE, Alternative Fueling Station Locators)*[58]

Based on the lack of private market investments in the needed charging infrastructure thus far, there is a role for ACE to play in supporting the buildout of the charging station market, including, in some cases, utility ownership and operation of charging stations. The Company does not need to wait to determine where these gaps are—it is already abundantly clear that more needs to be done in ACE's service territory to support DCFCs.

[58] *available at*: https://afdc.energy.gov/stations/#/analyze?region=US-NJ&fuel=ELEC&ev_levels=dc_fast&show_map=true.

**Q. Should the Company be given the flexibility to own and operate charging stations at MUDs?**

A. Yes. Offering 3 provides rebates for Level 2 charging stations. While the private market providers have a key role to play in the buildout of infrastructure across the state, utilities' expertise and status as regulated entities make them uniquely well-positioned to play a central role in EV infrastructure buildout both statewide as well as in the MUD space in particular. Landlords at MUDs are not generally in the business of procuring, operating, and maintaining charging stations and, therefore, may be deterred from participating in programs without utility involvement. This has been clearly evidenced by previous pilots implemented by "SCE" and "SDG&E." In SCE's Charge Ready pilot, which included no ownership option and provided a rebate to cover 100% of the make-ready costs for participating sites, only three percent of all deployments were in MUDs. In the SDG&E Power Your Drive pilot, which included utility ownership of charging stations, over forty percent of all deployments were in MUDs—suggesting that landlords would rather have the utility procure, operate, and maintain charging stations. Incorporating the lessons learned in those pilots and building upon the success of SDG&E's pilot, SCE redesigned its successor Charge Ready 2 Program to include a turnkey utility-ownership solution, providing MUDs with both the make-ready infrastructure and the electric vehicle charging station.[59] BPU should use the lessons learned and best practices from other utilities as guidelines when designing its programs to improve participation at MUDs and support more equitable and widespread transportation electrification.

[59] M. Baumhefner, Opening Testimony on Application of Southern California Edison Company for Approval of its Charge Ready 2 Infrastructure and Market Education Programs (Nov. 30, 2018), *available at*: https://docs.cpuc.ca.gov/PublishedDocs/SupDoc/A1806015/1826/247318458.pdf.

**Q. Should the Company own and operate equipment behind the customer meter (i.e. "make-ready infrastructure"), as proposed in Offering 9?**

A. Yes. Utility-side make-ready is a core utility function that has been repeatedly authorized by regulatory commissions across the country. EV charging infrastructure is expensive to install and by installing and owning all of the behind-the-meter portions of charging infrastructure, costs to developers can be significantly reduced. Utility provision of this necessary infrastructure can increase the speed of installation of charging stations, while also reducing costs for site hosts and EV charging station developers. Over $2.2 billion has already been approved by commissions across the nation for the provision of such infrastructure for light, medium, and heavy-duty vehicles.[60] In New York, the Public Service Commission released a $701 million make-ready infrastructure program that would help the state achieve its 2025 zero-emission vehicle goals by installing over 50,000 EV charging stations.[61]

Rather than seeking repeated, individual authorizations for the provision of utility-side electrical infrastructure, the Company should also consider simply adopting new rules or tariffs that make the provision of such necessary infrastructure part of the normal course of utility business.

Offering 9 is limited to DCFC stations. I encourage the Board and the Company to expand this program to Level 2 charging stations as well. As highlighted in the New York make-ready program, make-ready costs for Level 2 charging stations – while lower than DCFC – can still

[60] Atlas Public Policy, EV Hub, *Utility Filings,* accessed on August 31, 2020. Available at https://www.atlasevhub.com/materials/electric-utility-filings/

[61] New York Department of Public Service Case 18-E-0138, *"Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs"* July 16, 2020.

cost upwards of $16,000 per site.[62] Utility support to reduce these costs will help to expand the availability of charging stations, thereby accelerating EV adoption in the state.

## VI. SUPPORTING TRANSPORTATION ELECTRIFICATION BY OTHER MEANS

**Q. What are your thoughts on the Company's proposed Innovation Fund?**

A. The innovation fund proposed by ACE is similar to the NYSERDA EJ Prize component recently approved in New York. These prizes are specifically designed to help increase access to clean transportation in New York and a similarly-designed program in New Jersey should be considered.

**Q. What types of projects should this Innovation Fund focus on?**

A. Selected projects for the Innovation Fund should focus on efforts that help to improve access to clean transportation and mobility in environmental justice and low-and-moderate income communities. This could include emobility – such as ebikes, escooters, electric vanpools, and electric rideshares – and support for medium- and heavy-duty vehicle electrification.

## VII. MEDIUM- AND HEAVY-DUTY VEHICLE ELECTRIFICATION

**Q. Why is it important that the Company support the electrification of NJ Transit?**

A. Support from the state's utility providers is essential for NJ Transit compliance with the PIV Act and is consistent with the Murphy Administration's emission goals under the EMP.[63] South Jersey and the ACE service area have notably fewer NJ Transit bus routes and buses that service

[62] Case 18-E-0138, *Joint Utilities Initial Comments on the Department of Public Service EV Whitepaper* (April 27, 2020) at 8.

[63] EMP at Goal 1.1.6 (identifying as a goal to "continue to improve NJ TRANSIT's environmental performance," which includes a commitment to reduce carbon emissions from both bus and locomotive fleets).

passengers than the more populated regions of the state.[64] This provides an impetus to work to invest in bus electrification and charging technology at bus depots to provide a broader regional pilot for electrification.

**Q. Should the Company consider supporting additional medium- and heavy-duty vehicle electrification, besides just school buses and NJ Transit?**

A. Yes. Although light-duty vehicles are the largest source of pollution on the roads, electrifying M&HD vehicles provides vital opportunities for clean transportation of goods and people – especially those who may not have access to a personal vehicle – as well as measurable environmental and health benefits for EJ and LMI Communities. Consequently, it will not be possible to achieve deep or equitable decarbonization without aggressive action to address M&HD vehicles. I encourage the Company to develop additional guidance on steps to electrify M&HD vehicles as soon as possible to further reduce emissions in these vulnerable communities.

**Q. Why is it important that New Jersey support M&HD vehicle electrification in the near-term?**

A.. M&HD vehicles are ripe for electrification. The technology is market-ready for most fleet applications and, over the coming years, vehicle manufacturers will continue to increase the number of electrified models available for medium- and heavy-duty fleet uses. Moreover, electrification of such vehicles will reduce transportation-related air pollution, including toxic pollutants, nitrogen oxide (NOx), and greenhouse gases. Diesel emissions from medium- and heavy-duty vehicles are toxic and dangerous to those breathing closest to the source of pollution; exposure to significant amounts of diesel exhaust can lead to premature death and

[64] *See* https://mybusnow.njtransit.com/bustime/map/displaymap.jsp.

other devastating health impacts, including asthma and respiratory impacts,[65] pregnancy complications and adverse reproductive outcomes,[66] cardiac and vascular impairments,[67] and heightened cancer risk.[68] Additionally, the combustion of fossil fuels by medium- and heavy-duty vehicles emit large quantities of NOx pollution, which contribute to the formation of both particulate matter pollution and ozone (i.e., smog).[69] Finally, medium- and heavy-duty vehicles generate GHG emissions that contribute to global climate change, which exacerbates local air quality issues through various means. Climate-driven increases in ozone are predicted to cause premature deaths, hospital visits, lost school days, and acute respiratory symptoms.[70] In addition, wildfires, made more frequent and more severe by climate change, further increase emissions of particulate matter and ozone precursors – resulting in additional adverse local health outcomes.[71] This "triple threat" disproportionately impacts low-income communities and communities of color that often live near freeways, ports, railyards, warehouses, and other facilities that generate significant levels of localized diesel exhaust.[72] Electrifying M&HD

[65] S.J. Brandt et al, *Costs of Childhood Asthma Due to Traffic-Related Pollution in Two California Communities*, 40 Euro. Respiratory J. 363–70 (2012), available at <http://doi.org/10.1183/09031936.00157811>.

[66] Jun Wu et al, *Association Between Local Traffic-Generated Air Pollution and Preeclampsia and Preterm Delivery in the South Coast Air Basin*, 117 Envtl. Health Persp. 1773, 1773-1779 (Nov. 2009), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801174/>; Ex MEC-103 (R. Basu et al, *Effects of Fine Particulate Matter and Its Constituents on Low Birth Weight Among Full-Term Infants in California*, 128 Envtl. Research 42–51 (2014)).

[67] J.E. Hart et al, *Ischaemic Heart Disease Mortality and Years of Work in Trucking Industry Workers*, 70 Occupational and Envtl. Medicine 523–528 (2013).

[68] *Air Res. Bd., Supplement to the June 2010 Staff Report on Proposed Actions to Further Reduce Diesel Particulate Matter at High-Priority California Railyards* (July 2010), *available at* :<http://www.arb.ca.gov/railyard/commitments/suppcomceqa070511.pdf>; Ex MEC-105 (*IARC: Diesel Engine Exhaust Carcinogenic,* 20 *Cent. Eur. J. Public Health 120, 138* (June 2012)); L. Benbrahim-Tallaa et al, *Carcinogenicity of Diesel-Engine and Gasoline-Engine Exhausts and Some Nitroarenes*, 13 The Lancet Oncology 663–664 (2012), available at <http://doi.org/10.1016/S1470-2045(12)70280-2>.

[69] *Nitrogen Dioxide*, U.S. Envtl. Protection Agency, https://www.epa.gov/no2-pollution.

[70] U.S. Global Change Research Program, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*, chapter 3, "Air Quality Impacts" (2016), available at <https://health2016.globalchange.gov/air-quality-impacts>.

[71] *Id*.

[72] Arlene Rosenbaum et al, *Analysis of Diesel Particulate Matter Health Risk Disparities in Selected US Harbor Areas*, Am. J. Pub. Health S217, S221 (2011), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3222501/>.

vehicles provides important ancillary savings for communities that are burdened by the worst of pollution. An electric bus analysis by Columbia University suggests one electric bus can save $150,000 in healthcare costs for communities due to reductions in air pollution and resulting emergency room visits.[73] If well-targeted, M&HD electrification can ensure that LMI and EJ Communities capture the benefits and economic savings of clean air and better transportation options.

**Q. Does the Company's proposed PIV program do what is necessary to ensure New Jersey reduces greenhouse gas emissions with respect to M&HD vehicles?**

A. No. While the Company's proposal will help to support electric school buses and transit buses, it lacks the needed investments to support other M&HD vehicles in New Jersey. The proposed $2.5 million to support the electrification of an NJ Transit bus depot is a good first step as it will help to ensure that all New Jerseyans have access to clean transportation, regardless of whether they own a personal vehicle—but it does not address the other M&HD vehicles that drive through EJ and LMI communities and spew toxic pollutants into the air.

**Q. What should the Company do to support M&HD vehicle electrification?**

A. The Company should expand the proposed make-ready program in Offering 9 to include infrastructure that will further support M&HD vehicle electrification beyond NJ Transit. New York State recently announced a make-ready program to support EV infrastructure buildout in the state which includes a $15M make-ready pilot program for M&HD vehicle electrification

[73] Judah Aber, ELECTRIC BUS ANALYSIS FOR NYC TRANSIT (May 2016), *available at*: http://www.columbia.edu/~ja3041/Electric%20Bus%20Analysis%20for%20NYC%20Transit%20by%20J%20Aber%20Columbia%20University%20-%20May%202016.pdf.

in disadvantaged communities.[74] The Company should implement a similar program, but consider the scale of investments needed to support these vehicles.

## VIII. EDUCATION AND OUTREACH

**Q. Should the education and outreach components be approved?**

A. Yes. Despite the EV market evolving dramatically in the past decade, misconceptions about EVs or a lack of awareness about the technology are still commonplace. So long as this lack of awareness is present, it will be difficult to increase transportation electrification and achieve the benefits associated with it. Providing customers information on transportation electrification could accelerate EV adoption, improve air quality, and put downward pressure on rates to the benefit of all customers. The Company already has experience with alleviating misconceptions and providing education to its customers regarding new technologies and program offerings from its work on renewable energy and energy efficiency programs.

**Q. Have other utility commissions approved education and outreach components of EV filings?**

A. Yes. Almost $69 million of investments from 22 utilities have been approved by utility commissions for education and outreach programs on the benefits of EVs and the relevant program offerings.[75]

**Q. Who should the target audience be in the Company's education and outreach efforts?**

[74] R. Walton, *New York investor-owned utilities to fund $701M make-ready EV infrastructure* program (Jul. 21,2020), *available* at: https://www.utilitydive.com/news/new-york-investor-owned-utilities-to-fund-701m-make-ready-ev-infrastructur/581975/

[75] Atlas EV Hub, *Electric Utility Filings Dashboard*. Available at https://www.atlasevhub.com/materials/electric-utility-filings/

A. The Company's education and outreach programs should not only target customers who already own EVs but should also extend to all utility customers, as education and outreach targeted to potential EV adopters will ultimately save customers money by increasing the number of EVs on the road and putting additional downward pressure on rates. Utilities should take advantage of existing account relationships to provide education to their customers on the benefits of transportation electrification, locations of charging stations, program offerings, etc.

Utilities throughout the country have received approval to develop and implement education and outreach programs. For example, in Maryland, the PSC approved a Statewide EV Portfolio with a dedicated education and outreach component. The PSC stated in its order that "…customer education and outreach is a vital component of a viable strategy to increase EV penetration in Maryland..."[76] In Michigan, the PowerMIDrive program provides education and outreach to residential and commercial customers through a variety of means, including social media and direct mail.[77] Furthermore, some utilities have conducted specific outreach to communities; PG&E, for example, has an innovative model of education and outreach for LMI communities that leverages partnerships with local community-based organizations.[78]

**Q. Is it important for the Company to be proactive in its education and outreach efforts?**

A. Yes. If customers are unaware of the program offerings available to them, they are unlikely to take service on the new rates or apply for the incentives offered by the Company's PIV

[76] Order No. 88997 Case No. 9478. (ML 223588)
[77] Michigan Public Service Commission Issue Brief, *Utility Electric Vehicle Pilot Programs*, *available at*: https://www.michigan.gov/documents/mpsc/EV_Pilot_Issue_Brief_05-02-2019_653974_7.pdf.
[78] Miles Muller, *California Approves Novel Low-Income EV Charger Program*, NRDC, September 2019.

program. Therefore, it is important that education and outreach efforts by the Company be approved by BPU.

As previously discussed, additional EV charging that occurs during off-peak hours can put downward pressure on rates for all utility customers. Therefore, the Company should promote the opportunities for and benefits of EV adoption in its education and outreach efforts.

## IX.CONCLUSION

**Q. Does this conclude your testimony?**

A. Yes.

# Exhibit

# KAH-100

# KATHLEEN HARRIS

**Work address—40 W 20th Street, New York, NY 10011 | 646.889.1465 | Email: kharris@nrdc.org**

## EXPERIENCE

**JUNE 2019 – PRESENT**

### EASTERN CLEAN VEHICLES AND FUELS ADVOCATE, NATURAL RESOURCES DEFENSE COUNCIL

- Leads advocacy efforts in Northeast and Mid-Atlantic regions to reduce greenhouse gas emissions from the transportation sector.

**JUNE 2015 – JUNE 2019**

### CLEAN TRANSPORTATION PLANNER, STATE OF DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

- Managed $2.7 million Delaware Clean Transportation Incentive Program for electric, propane, and natural gas vehicle rebates; commercial, residential, and workplace electric vehicle charger rebates; and large-scale infrastructure grants— processing over 1,100 rebate applications
- Researched, analyzed, and developed policies and programs to expand clean transportation and in disadvantaged communities
- Provided written testimony in regulatory hearings related to clean transportation
- Engaged stakeholders and community groups at workshops and public hearings
- Served as the primary point of contact for national and state reporting on the status and deployment of alternative fuel vehicles in the state of Delaware
- Worked with the Public Service Commission, large-scale public utilities, and private businesses to develop legislation to promote widespread electric vehicle deployment
- Represented Delaware on regional and national working groups and Coalition
- Collaborated across departments to create, develop, and implement comprehensive environmental and transportation policies for the state
- Led the Delaware Clean Cities Coalition, served as Coordinator, and act as key liaison between the state and the US Department of Energy; responsible for annual and quarterly reporting on fuel usage and vehicle deployment; represent the state at national meetings; manage the budget and contracting process for the state's participation in the Clean Cities Program

**AUGUST 2013 – JUNE 2015**

### RESEARCH ASSISTANT, UNIVERSTIY OF DELAWARE

- Consulted with site owners and municipalities to facilitate installation of electric vehicle charging stations across the state of Delaware
- Gained experienced in qualitative and quantitative research methods

## EDUCATION

**MAY 2017**

**MASTER OF MARINE POLICY,** UNIVERSITY OF DELAWARE

- Masters research—"Improving the Electric Vehicle Driver's Experience"
- Interdisciplinary program that focused on the intersection of environmental science and policy
- Coursework included: Electric Vehicles and the Grid, Climate Change Policy and Equity, and Electricity Policy and Planning

**MAY 2013**

**BACHELOR OF SCIENCE, ENVIRONMENTAL SCIENCE,** UNIVERSITY OF DELAWARE

- Minors: Marine Science; Political Science

## VOLUNTEER EXPERIENCE

- Board member, Empire Clean Cities

## SELECTED PUBLICATIONS AND PRESENTATIONS

- NESCAUM, "Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018-2021," May 16, 2018, available at: http://www.nescaum.org/documents/northeast-regional-charging-strategy-2018.pdf/view

- Frequent blogger on transportation electrification news in the mid-Atlantic/ north east regions, available at: https://www.nrdc.org/experts/kathy-harris

- New York State Technical Conference on electric vehicle make-ready program. Recording available at http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=18-e-0138&submit=Search

# Exhibit

# KAH-101

Submitted *Via* Email

June 17, 2020

Aida Camacho-Welch,
Secretary New Jersey Board of Public Utilities
Post Office Box 350
Trenton, New Jersey 08625

**RE: Straw Proposal on Electric Vehicle Infrastructure Build Out Docket No. QO20050357**

Dear Secretary Camacho-Welch:

Please find enclosed the comments of the undersigned organizations submitted in response to the Board of Public Utilities' Straw Proposal on Electric Vehicle Infrastructure Build Out. We appreciate the opportunity to provide input on this important topic, and look forward to continuing the conversation as the Board further develops its Straw Proposal

Sincerely,

Kathy Harris,
Clean Vehicles and Fuels Advocate
NRDC

Eric Miller
New Jersey Energy Policy Directory
NRDC

On behalf of:

Environment New Jersey
Isles, Inc.
The Natural Resource Defense Council
The Nature Conservancy- NJ Chapter
New Jersey Conservation Foundation
New Jersey League of Conservation Voters
New Jersey Sustainable Business Council
Sierra Club
Tri-State Transportation Campaign

## I. Introduction

The undersigned organizations ("Commenters") appreciate the opportunity to provide input on the Board of Public Utilities' ("BPU, or Board") New Jersey Electric Vehicles Infrastructure Ecosystem 2020 Straw Proposal (*hereinafter*, "Straw Proposal"). The Straw Proposal is an important step to support the growing electric vehicle ("EV") market by increasing infrastructure investment in the Garden State, particularly the "make ready" or "charger ready" aspect of the EV Ecosystem. However, we believe there is an opportunity to strengthen the Straw Proposal to ensure that it provides clean transportation opportunities to all residents, helps to optimally integrate EVs onto the electric grid, and develops this infrastructure in a deliberate and flexible manner that will allow New Jersey to achieve its transportation electrification goals.

The transportation sector accounts for 42% of greenhouse gas emissions in New Jersey, and to achieve the state's climate goals under the Global Warming Response Act ("GWRA")[1] and Zero Emission Vehicle ("ZEV") program, electrifying the state's light-duty vehicles is an important first step.[2] New Jersey has already begun to set itself up as a transportation electrification leader on the East Coast. In early 2020, Governor Murphy signed N.J.S.A. 48:25-3 into law ("PIV Act") which, in part, directed the BPU to develop one of the most robust EV rebate programs in the country, as well as set goals for infrastructure to support these vehicles.

Moreover, New Jersey's 2019 Energy Master Plan ("EMP") states that "the transportation sector should be almost entirely decarbonized by 2050."[3] It also recommends that the state take "concrete steps to start to phase out motor gasoline and convention diesel consumption as *quickly as possible*."[4] One of the largest barriers to widespread and rapid EV adoption is range anxiety[5], and the "chicken-and-egg problem"—where the private sector has not made a business case to install a robust network of charging infrastructure absent a critical mass of EV's on the road, and there will not be a critical mass of EV's on the road until there is sufficient charging infrastructure available. If properly designed, the Straw Proposal can serve as the first step to solve this dilemma.

We applaud the BPU for advancing the goal transportation electrification in New Jersey. Our ensuing comments provide suggestions for modifications to strengthen the Straw Proposal and set New Jersey up to be an EV and transportation electrification leader throughout the country.

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[1] N.J.S.A. 26:2C-37 et seq.
[2] https://www.nj.gov/dep/aqes/oce-ghgei.html
[3] EMP at 59.
[4] *Id.*
[5] Range Anxiety is the fear of running out of charge before a driver reaches their destination due to a perceived lack of charging infrastructure.

## II. Comments

### 1. The BPU Should Clarify the Scope and Purpose of the Straw Proposal

Commenters urge the Board to clarify whether the Straw Proposal is intended to be a comprehensive document aimed at setting the policy guidelines for EV goals in the state, or whether it is a more narrowly tailored document aimed squarely at achieving the state's ambitious charging infrastructure goals. The Plug-In Vehicle Act ("PIV Act") includes ten specific EV related goals for the state:

1. At least 330,000 of the total number of registered light duty vehicles in the State shall be plug-in electric vehicles by December 31, 2025;
2. At least 2 million of the total number of registered light duty vehicles in the State shall be plug-in electric vehicles by December 31, 2035;
3. At least 85 percent of all new light duty vehicles sold or leased in the State shall be plug-in electric vehicles by December 31, 2040;
4. At least 400 Direct Current Fast Chargers shall be available for public use at no fewer than 200 charging locations in the State;
5. At least 1,000 Level Two chargers shall be available for public use across the State by December 31, 2025, and after initial installation, those EVSE may be upgraded to higher power or DC Fast Chargers as appropriate by the owner or operator of the EVSE;
6. Aggressive goals for charging infrastructure build-out at multi-family residential properties;
7. Aggressive goals for charging infrastructure build-out at franchised overnight lodging establishments;
8. The electrification of state-owned non-emergency light duty vehicles, with the electrification of 25 percent of the state fleet by 2025 and full electrification by 2035.
9. A rapid transition to electrify NJ Transit buses with all purchases being full electric in 2032 and a mandate that 10 percent of bus purchases made by the NJ Transit Corporation are electric by 2024, 50 percent by 2026 and 100 percent by 2032, with an initial priority for routes in low-income, urban or environmental justice communities.
10. Other goals for medium-and heavy-duty vehicle electrification and infrastructure adopted by the NJDEP by December 31, 2020.

N.J.S.A. 48:25-3 (a)(1)-(10).

Based on the foregoing, there are four near-term goals the state needs to achieve by the end of 2025: (1) 330,000 registered light duty vehicles; (2) 1,000 Level Two chargers; (3) electrification of 25 percent of the state fleet; and, (4) 10 percent of bus purchases made by the

NJ Transit Corporation are electric by 2024. Importantly, the pace of change does not slow down after 2025, with goals becoming more ambitious into the 2030s and beyond.

Given the ambitious nature of the goals, and the short timeline in which to achieve them, the Commenters recommend that the Straw Proposal provide further guidance on programs and policies that will support the other goals enumerated in the PIV ACT through a flexible approach that will prioritize the rapid achievement of these goals, rather than a rigid framework designed only to meet one or two of the goals.

**2. The BPU Should Further Iterate that its Straw Proposal Would Not Delay Current Utility Filings in front of the Board**

In 2018, both Atlantic City Electric ("ACE") and Public Service Electric and Gas ("PSEG") filed petitions for approval of electric vehicle programs.[6] Both filings contain a number of incentives, rebates, and other utility activities to support EVs and transportation electrification. Some of those activities are discussed in the Straw Proposal; however, others are not. For example, both utility filings provide customer incentives for charging equipment at the residential, multi-unit dwellings ("MUDs"), and commercial sectors.

While Commenters agree that both utilities and the Board should endeavor to avoid duplicative incentive offerings, we do not believe that means the door should be shut for utility incentives at this time. Instead, the Commenters urge the Board to clarify that both active filings will not be delayed by the Straw Proposal or any changes to the Minimum Filing Requirements ("MFRs"). The Board should look to utility programs to "gap fill" in areas where there are no currently existing programs, or where the state would like to increase available funding for existing programs.

The utility filings contain many additional program offerings not currently provided by the Board or other entities. For example, PSEG proposes incentives for 2,200 Level 2 mixed used chargers, 450 DC Fast Chargers, and incentives for electric school buses, charging equipment, and open solicitation for customized electrification processes. ACE proposes similar programs that would speed up the deployment of this infrastructure while providing the basis for other programs related to clean transit *via* school buses, NJ Transit, and other potential medium-, and heavy-duty fleet electrification.

Given that many of the active parties in this proceeding are also active parties in the PSEG and ACE proceeding, the Commenters recommend that the BPU further clarify that the

[6] *See* In The Matter of Atlantic City Electric Company for Approval of a Voluntary Program for Plug-In Vehicle Charging. BPU Docket No. EO18020190, *and* In the Matter of the Petition of Public Service Electric and Gas Company for Approval of its Clean Energy Future-Electric Vehicle and Energy Storage ("CEF-EVES") Program on a Regulated Basis BPU Docket No. EO18101111.

ongoing straw proposal will not impact the already-set procedural schedule of the utility filings given their importance to New Jersey's achievement of the PIV Act goals. The Commenters discuss the potential impacts and design of MFRs in greater detail in Section 3 of these Comments.

### 3. The BPU Should be Flexible in its Approach to the Role of Regulated Utilities in the EV Space

There are three primary barriers to EV adoption: 1) incremental vehicle cost; 2) the lack of charging infrastructure; and 3) the lack of consumer awareness. EDCs are uniquely situated to help overcome these barriers and meaningfully accelerate the adoption of light-, medium-, and heavy-duty EVs. New Jersey's EDCs should develop programs and rate options that increase fuel cost savings, speed the deployment of EV charging infrastructure, increase consumer awareness of the benefits of EVs, and improve the utilization of the electric grid to the benefit of all customers.

Regulated electric utilities have several characteristics that make them well-suited to play a central role in EV infrastructure buildout. First, their specific and expert knowledge of the distribution system and the potential impact of vehicle charging on load shape and shifting. It is critical that New Jersey's investment in the distribution system happen in close coordination with its build out of EV charging infrastructure ("EVSE") given the potential load impacts of widespread EV adoption. Moreover, utilities are able to optimize the electric grid and ensure that most electric vehicle charging occurs during off-peak hours, if granted regulatory approval for demand response, education programs, programs and tariffs that allow for managed charging or rate design.

While the Commenters support the Straw Proposal's identification of the key role that utilities play in make-ready—or "charger-ready" as defined in the Straw Proposal—activities, we strongly encourage the BPU to not discount EDC ownership of EV charging stations at this time, as EDC ownership is a valuable tool to expand initial deployment of charging stations both in certain sectors such as environmental justice, underserved communities and public, affordable housing MUDs, as well as more broadly statewide. While the Straw Proposal proposes an avenue for utility ownership of charging stations, that role is narrowly defined and includes a waiting period that would likely prevent New Jersey from meeting its ambitious targets contained in the EMP and PIV Act.

We also urge the BPU to consider avoiding specific MFRs, but instead focus on goals and objectives of the individual programs. Program design should not be litigated in the abstract or hypothetical, but rather in the context of actual programmatic proposals supported by robust applications. The determination of whether the utilities' proposals satisfy the statutory criteria

cannot be made in the abstract but must be evaluated with full information and in the context of a complete portfolio of transportation electrification investments. Utility transportation electrification applications should be assessed on their ability to: 1) increase charging station deployment; 2) maximize fuel cost savings (relative to a fixed forecast of gasoline prices); and 3) optimize EV load, for instance by shifting it to off-peak hours.

Additionally, given that rapidly approaching deadline of the PIV Act goals, as wells as the Board's stated preference for utility programs to begin in April of 2021, the Commenters recommend that to the extent the Board modify or adopt MFRs, it not apply to active filings that are already in front of the Board. Instead, the Commenters recommend adopting principles that could, if needed, be propounded in discovery so as not to delay the proceedings.

Furthermore, the Board should provide additional flexibility on "duplicative" program offerings. The Board identifies it has an intention to provide residential charging incentive programs. However, in areas where the Board is currently silent on its intention, or other programs do not already provide incentives, utilities should be permitted to propose programs or incentives. Additionally, even if there is an existing state program, utilities should be free to propose additional incentives so long as the proposal includes an explanation of how the program will create synergies or complimentary incentives.

For example, the PIV Act provides that the BPU may establish a residential charging program incentive of $500.00. An EDC should be permitted to make a showing as to whether a $500.00 incentive level is sufficient to induce action, and whether it should provide additional incentives to customers to leverage capital from multiple sources of funding. Such a structure would foster more innovation in EDC plan filings, as well as a more rapid build-out of charging infrastructure.

While the private market providers ("EVSE Companies") have a key role to play in the build out of infrastructure across the state, utilities' expertise and status as regulated entities make them uniquely well-positioned to play a central role in EV infrastructure build-out both statewide as well as in the MUD space in particular. Landlords at MUDs are not generally in the business of procuring, operating, and maintaining charging stations, and therefore without utility involvement, may be deterred from participating in programs. This has been clearly evidenced by previous pilots implemented by Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E). In SCE's Charge Ready pilot, which included no ownership option and provided a rebate to cover 100% of the make-ready costs for participating sites, only three percent of all deployments were in MUDs. In the SDG&E Power Your Drive pilot which included utility ownership of charging stations, over forty percent of all deployments were in MUDs—suggesting landlords would rather have the utility procure, operate, and maintain charging stations. Incorporating the lessons learned in those pilots and building upon the success

of SDG&E's pilot, SCE redesigned its successor Charge Ready 2 Program to include a turnkey utility-ownership solution, providing MUDs with both the make-ready infrastructure and the electric vehicle charging station.[7] The BPU should use the lessons learned and best practices from other utilities as guidelines when designing their programs to improve participation at MUDs and support more equitable and widespread transportation electrification.

**4. BPU Should Ensure the Straw Proposal Provides a Pathway for all Residents to have Access to Clean Transportation**

The state should take a multi-sector, multi-technological approach to ensure that all NJ residents have access to clean transportation. This includes, but is certainly not limited to, equitable access to charging infrastructure, light-duty vehicles, medium- and heavy-duty ("M&HD") vehicles, identification of low- and moderate- income ("LMI") and Environmental Justice ("EJ") communities, transit, rates that reduce fueling costs, and multi-modal transportation options. As discussed elsewhere in these comments, it's important that investments are made in these communities in the near term, and not after a waiting period to determine who should be able to enter this space.

Utility ownership of charging stations may be particularly valuable in certain segments, such as MUDs. Therefore, we recommend utility turn-key solutions for charging infrastructure located at MUDs in LMI and EJ communities. Low- and moderate-income communities still face significant barriers to EV adoption. In addition to the upfront cost of purchasing an EV, access to charging infrastructure and lack of awareness have inhibited EV adoption in these communities. In many cases low-income drivers face heightened barriers relative to other drivers, with diminished access to financing, less access to information on EVs, and a lack of public charging infrastructure in their neighborhoods. When considering investments in electric vehicle charging infrastructure, especially in LMI and EJ communities, it's important to look at examples and lessons learned from other utilities, such as Pacific Gas and Electric's ("PG&E") widely supported, approved LMI program.[8] PG&E's *Empower Electric Vehicle Charger Incentive and Education Program* was designed to address all of these barriers and could serve as a model program for expanding the benefits of transportation electrification to historically underserved households in New Jersey.

It's also important that the BPU consider how to get investments in underserved communities, including rural communities, whose charging needs have not been met by the competitive market. We don't need to wait and see where these communities are—charging station maps already show where the major gaps are, and where investment is needed.[9]

[7] http://docs.cpuc.ca.gov/PublishedDocs/SupDoc/A1806015/1826/247318458.pdf
[8] Miles Muller, *California Approves Novel Low-Income EV Charger Program*, NRDC, September 2019; https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M314/K145/314145047.PDF
[9] E.g. Plugshare.com; https://afdc.energy.gov/stations/

### a. Ensure benefits of Clean Transportation for All

In February 2020, the Edison Electric Institute, Illinois Citizens Utility Board, National Consumer Law Center, NRDC, and Sierra Club issued a joint statement highlighting a shared recognition that electrifying cars, trucks, and buses can benefit everyone—especially those in disadvantaged communities.[10] This statement underscores the importance of thoughtful utility investments and programs to ensure equitable access to clean transportation. The Straw Proposal takes a step in the right direction towards this equitable access by considering how to make MUD charging accessible to customers, but we offer some recommendations to increase transportation electrification in LMI and EJ communities.

Since these communities are often disproportionately burdened by transportation emissions—as a result of more polluting and health-harming vehicles and heavy traffic—it is important that clean transportation solutions are made available within these communities and to residents of these disadvantaged areas. Accordingly, the Board should direct utilities to:

- Lower household expenditures by increasing access to the use of clean and affordable electricity as a transportation fuel, support the electrification of buses, medium and heavy-duty trucks, and other vehicles and equipment to improve local air quality;
- Improve the utilization of the electric grid through intelligent rate design and accelerated EV adoption, putting downward pressure on rates to the benefit of all customers;
- Take advantage of the flexibility and energy storage inherent in electric vehicles to facilitate the integration of renewable generation; and
- Install charging infrastructure in LMI and EJ communities, with increased incentives for multi-unit dwellings to ensure those residents can also charge at home.

Utilities should also consider and develop additional programs that bring the benefits of transportation electrification to all citizens, regardless if they own or have access to a personal vehicle. This could include innovative programs such as electric vanpools or carshares for drivers or electric transit and other clean transportation options. One model for such a program is the Trenton E-Mobility project that is being spearheaded by Isles, Inc., ChargEVC, Environment New Jersey, and NJ Clean Cities Coalition. The project consists of an electric vehicle car- and rideshare program that will work to improve residents' mobility in and out the city with the goal of increasing access to jobs, healthcare, and other resources. The program plans to partner with community-based organizations whose clientele are challenged with transportation to ensure that

[10] Joint Statement Supporting Electric Transportation (February 2020) *available at* https://www.nrdc.org/sites/default/files/media-uploads/joint_statement_supporting_electric_transportation_0.pdf

it serves residents in need. A similar community-driven approach can be developed in other underserved communities in the state.

**b. Set guidance on fleet and medium- and heavy- duty vehicle electrification**

Fleet electrification is a way to ensure LMI and EJ communities are able to realize the benefits of clean air and transportation options. Electrifying transit buses would provide a clean alternative for those who do not own a personal vehicle; electric school buses clean up the air while driving through communities and transporting children to school; electric delivery and heavy-duty vehicles reduce pollution on New Jersey's roads, especially those around the ports, industrial sites, and in urban areas. This can lead to ancillary savings for communities that are burdened by the worst of pollution, as an Electric Bus Analysis by Columbia University suggests one-electric bus can save $150,000 in healthcare costs for communities due to reductions in air pollution and resulting emergency room visits.[11]

While light-duty vehicles are the largest source of pollution on the roads, M&HD vehicles are significant sources of criteria air pollutants including $NO_x$, SOx and PM 2.5, therefore the electrification of these vehicle types provide vital opportunities for clean transportation of goods and people, especially for those who may not have access to a personal vehicle. The board should release guidance on fleet electrification as soon as possible, especially for M&HD vehicles. M&HD electrification is a triple-win: it is good for the environment, good for fleets' bottom lines, and can provide jobs and economic growth.[12] In addition to the environmental and health benefits, supporting the electrification of M&HD vehicles provides economic benefits to New Jersey businesses. According to a recent analysis conducted by CalETC, electric trucks and buses will have the lowest total cost of ownership in 2030, even without purchase incentives in California. We expect a similar total cost of ownership nationwide, including in New Jersey.[13]

Many fleet vehicles "return home" to charge overnight. Therefore, it's important that fleets have the necessary infrastructure available. As this can be expensive, the BPU should provide similar make-ready programs to support fleet electrification. Other M&HD vehicles—such as long-distance delivery trucks and transit buses—may need to charge throughout the day or along their routes. Therefore, it's important that infrastructure for these vehicles is available across major thoroughfares and delivery routes. For transit buses, charging should be available en-route or at bus stations to ensure vehicles are able to complete their routes without fear of running out of charge.

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[11] Judah Aber, *Electric Bus Analysis for NYC Transit* (May 2016) *available at*, http://www.columbia.edu/~ja3041/Electric%20Bus%20Analysis%20for%20NYC%20Transit%20by%20J%20Aber%20Columbia%20University%20-%20May%202016.pdf

[12] ICF, Comparison of Medium- and Heavy- Duty Technologies in California, December 2019.

[13] *Id.*

### c. The BPU should develop criteria to identify EJ and LMI communities

As disadvantaged communities are often subject to the brunt of transportation emissions, it is important for clean transportation investments in these communities. For the sake of this question, the term "disadvantaged communities" is assumed to encompass both EJ and LMI communities. Therefore, when determining locations of disadvantaged communities, BPU must consider both LMI and EJ components and metrics. We encourage the Board to also consider programs that can support supplementary clean transportation opportunities, such as transit and delivery trucks, that will allow for LMI and EJ communities to realize the benefits of transportation electrification.

Unfortunately, there is no consensus in the literature on the definition of a disadvantaged community. However, we encourage the board to convene with environmental justice organizations in New Jersey to most accurately define "disadvantaged" or other synonymous language. Additionally, the Board can consider other state and federal examples and tools to identify these communities. For example, California's "Greenhouse Gas Reduction Fund Investment Plan and Communities Revitalization Act" directs the California Environmental Protection Agency to identify disadvantaged communities based on geographic, socioeconomic, public health, and environmental hazard criteria, and may include, but are not limited to, either of the following:

(1) Areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure, or environmental degradation.

(2) Areas with concentrations of people that are of low income, high unemployment, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment.[14]

The American Public Health Association provides additional guidance and defines environmental justice communities as: "…[C]ommunities [that] are composed of marginalized racial/ethnic, low-income/poor, rural, immigrant/refugee, and indigenous populations that live in areas disproportionately burdened by environmental hazards, unhealthy land uses, psychosocial stressors, and historical traumas, all of which drive environmental health disparities. EJ communities are underserved by public and private entities that create and enforce environmental hazards and are underrepresented in decision-making processes."[15]

[14] California Health and Safety Code § 39711.

[15] American Public Health Association, Addressing Environmental Justice to Achieve Health Equity, Policy Number 20197, November 2019.

The US Environmental Protection Agency has a publicly available tool, EPA EJ Screen, that the BPU and utilities may use to locate disadvantaged communities.[16] This tool allows users to map environmental justice criteria, such as ozone levels, traffic proximity, Superfund proximity, amongst others. Additionally, NRDC has developed a method to develop cumulative scores that can be used to identify overburdened communities—those areas that appear to be disproportionately affected by pollution burdens and well as social vulnerabilities that can make them more susceptible to the impacts of pollution—in other cities and states, such as Chicago, which may be replicated in New Jersey.[17] It is important that consistent definitions of "burdened communities" or "environmental justice communities" be used in all comprehensive statewide policy.

However, it's important to note that designating and identifying priority communities (e.g. LMI, EJ, and underserved communities) is just the first step—the BPU and utilities also need to have a dialogue with community members about their specific transportation needs.

### 5. A Well-Designed EV Program Will Provide Benefits to All NJ Customers, Regardless of Whether They Themselves Own an Electric Vehicle

EV investments, including those by utilities, can put downward pressure on rates for all utility customers-- regardless of whether they own an EV. A recent analysis by Synapse Energy Economics entitled Electric Vehicles are Driving Electric Rates Down analyzed real world data from the two utility service territories with the highest number of EVs in the country (PG&E and SCE) and found that EVs are already putting downward pressure on rates—with EV drivers in PG&E and SCE territory contributing nearly $600 million more than associated costs to serve them. Accordingly, the benefits of EVs are not just environmental; as that study appropriately concluded: "EVs offer a key opportunity to reduce harmful emissions and save customers money at the same time."[18]

Synapse evaluated the revenues and costs associated with EVs from 2012 through 2018 in PG&E and SCE service territories. They compared the new revenue the utilities collected from EV drivers to the cost of the energy required to charge those vehicles, plus the costs of any associated upgrades to the distribution and transmission grid and the costs of utility EV programs that are deploying charging stations for all types of EVs. In total, EV drivers contributed an estimated $584 million more than the associated costs. And this finding is not merely a result of

[16] United States Environmental Protection Agency Environmental Justice Screening and Mapping Tool, Version 2019, *available at* https://ejscreen.epa.gov/mapper/

[17] Meleah Geertsma, New Map Shows Chicago Needs Environmental Justice Reforms, NRDC, October 2018, *available at* https://www.nrdc.org/experts/meleah-geertsma/new-map-shows-chicago-needs-environmental-justice-reforms

[18] Frost *et al.*Synapse Energy Economics, Electric Vehicles are Driving Electric Rates Down, at 1 (June 2019), *available at* https://www.synapse-energy.com/sites/default/files/EV-Impacts-June-2019-18-122.pdf.

the fact most EV drivers in PG&E and SCE territory remain on default rates and pay high upper-tier prices as a result. Even if three in four were on time-of-use rates designed for EVs, those drivers would still have provided approximately $450 million in net-revenues.

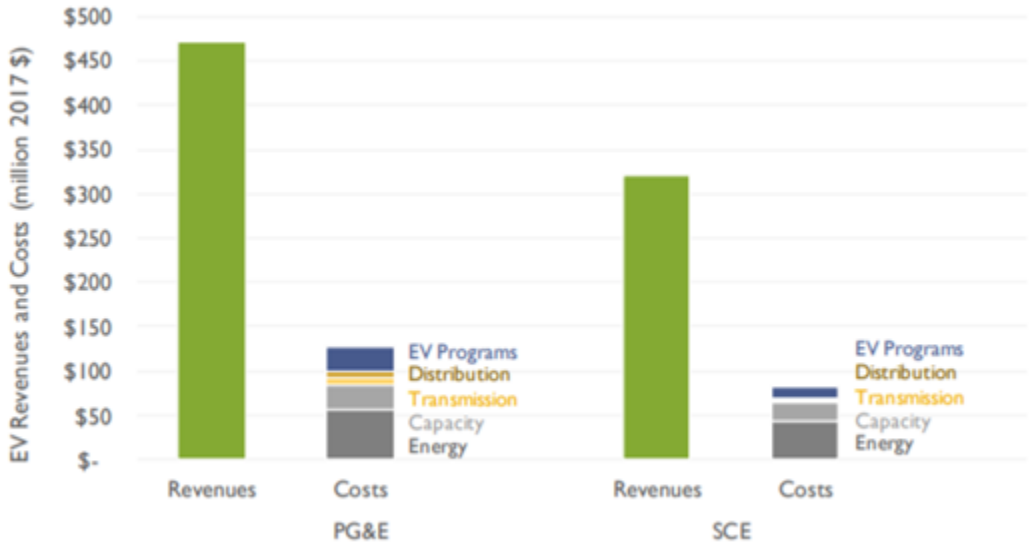


Figure 1: PG&E and SCE Revenues and Costs of EV Charging, 2012-2018

Were comparable analysis done in New Jersey, the results would almost certainly be similar, though the net revenue would be smaller given the lower number of EVs in New Jersey. EV drivers in New Jersey are likely already putting downward pressure on utility rates to the benefit of all customers. And those benefits will continue to grow in the future as additional vehicles are added to the grid.

Another study completed by M.J. Bradley & Associates demonstrates similar benefits on the East Coast. The study found that the EV adoption levels needed to meet New York's climate goals would provide more than $75 billion in net benefits, including $24 billion in reduced utility bills for all utility customers stemming from the same effect already observed in the real world by the Synapse study.[19] The New York analysis also estimates that drivers in the state could realize $34 billion in reduced fuel and maintenance costs. Utility customers in New Jersey deserve to realize the same cost savings.

The Energy Information Agency tracks "household energy insecurity" and documents that "nearly a third of U.S. households reported facing a challenge in paying energy bills or sustaining adequate heating and cooling in their home in 2015.[20]" That number will likely only

[19] Electric Vehicle CostBenefit Analysis, MJ Bradley & Associates, *available at* https://mjbradley.com/sites/default/files/NY_PEV_CB_Analysis_FINAL.pdf
[20] https://www.eia.gov/consumption/residential/reports/2015/energybills/

increase as a result of the current economic crisis. Utility regulators, consumer advocates, and environmentalists have a robust history of working together to reduce utility bills, especially for low-income households. But it's time for utility policy to target the total household energy bill. It would be a mistake to focus solely on the average American household's $1,300 annual electric bill while ignoring the $2,000 to $3,000 that the average household spends every year on gasoline. For the last 40 years, driving on electricity has been the cost equivalent of driving on dollar-a-gallon gasoline, and it is projected to stay that way for the next 30 years.[21] In contrast, while gasoline prices are low now, they tend to fluctuate significantly more than the price of electricity. Because electricity is generated from a diverse set of domestic fuels and because it is carefully regulated by state agencies, its price is inherently more stable, delivering energy cost savings households can bank on for the long-term.

### 6. The Board Should Ensure Public Charging Stations Funded Under this Program are Truly Open to *All* EV Drivers

Currently, the proposal requires that the sites be "available to the public on either a subscription or per-use basis, at the customer's election." However, this is not sufficient to ensure equitable public access to charging stations funded under utility programs. While the Board has appropriately recognized the importance of ensuring that drivers—rather than the EVSPs—are given a choice of payment options at these stations, more specificity regarding minimum payment standards for "per-use" access is necessary. As currently drafted, only requiring that sites be available to the public on a "per-use" basis could still allow payment by proprietary phone apps, 1-800 numbers, or contactless cards—all of which many drivers pulling up to those stations may lack. To not specify minimum consistent payment standards would be to risk leaving drivers stranded at these sites simply because they lack the right proprietary key fob or mobile payment app, and to leave them guessing about what payment options will be available at each new location they pull up to.

For stations that are deployed with the help of state and utility customer funds, it is imperative that drivers have consistent and equitable payment options that allow them to access these stations as easily as they can access gas pumps. Accordingly, we strongly encourage the Board to instead require that all utility funded charging stations comply with minimum payment standards—mirroring those recently adopted by the California Air Resources Board—ensuring that drivers can pay for charging at these stations as easily as they pay for gasoline.[22] Further, only non-proprietary charging stations should be eligible for make-ready incentives or utility owned stations. This will ensure that all EV drivers, no matter what type of vehicle they drive, will be able to use a utility supported or owned charging station when driving in New Jersey.

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[21] Max Baumhefner, Go Electric to Avoid the Holiday Gas Price Roller Coaster, NRDC, 2018.
[22] https://ww2.arb.ca.gov/sites/default/files/2020-06/evse_fro_ac.pdf. *See also* https://www.nrdc.org/experts/miles-muller/california-moves-make-paying-charging-easier

## 7. The Straw Proposal Should Ensure EV's and Associated Infrastructure are Integrated into the Grid

New Jersey's goal of getting 330,000 EVs on the road by 2025 will cause an increase in load on the electric grid. However, if EVs are integrated onto the grid properly, EVs can actually provide benefits to the grid and put downward pressure on rates for all customers, as previously discussed. Real world data shows, however, that unless drivers see price signals to shift charging to off-peak hours when there is more space on the grid, they will continue to charge when they get home, regardless of the time-of day.

Rate design is one of the most important components that the Board should address to ensure the rapid and equitable adoption of EV's within the state. Broadly speaking, rate design refers to the price that customers experience on their energy bills based on their energy usage. Rate design includes both the $/kWh (volumetric), any fixed charges (such as demand charges or distribution charges) as well as non-avoidable surcharges that do not vary with the amount of energy consumed. Taken together, these comprise a customer's bill and send price signals to customers about how and when to consume energy. Therefore, smart rate design is one of the strongest tools regulators have to influence customer behavior by sending clear price signals and providing either incentives or disincentives for certain types of consumption patterns. There are two primary functions of rate design as it relates to EVs: (1) helping to effectively manage EV load to maximize benefits to customers, drivers, and the grid; and (2) developing rate structures that reflect the unique characteristics of EV load in order to support the sustainable development of a robust EV charging ecosystem and to ensure that assets developed under this program are used and useful.

We appreciate the BPU's efforts to address rate design in this straw proposal, however, we offer modifications to the proposal, based on real-world best practices, that will help to strengthen the rate design efforts and provide long-term, sustainable solutions.

First, to maximize the benefits of proper EV integration and minimize upgrades required to support EV deployment (e.g. additional transformers and capacity), effective management of new EV load will be needed.[23] We urge the BPU to require utilities to develop and submit for approval strategic plans to integrate EV load in a manner that facilitates the use of renewable generation, improves the utilization of the grid, and provides drivers and fleet operators who charge in a manner consistent with grid conditions the opportunity to realize significant fuel cost savings relative to gasoline or diesel.

[23] Pamela MacDougall, Steering EV Integration Forward, NRDC, June 2019, *available at* https://www.nrdc.org/experts/pamela-macdougall/steering-ev-integration-forward.

Further, EV owners should have the option to sell electricity to the utility during high peak demand events, through vehicle-grid-integration (VGI). When the utility buys energy from distributed energy storage owners at a lower price than the marginal price in the PJM market, all ratepayers save money. While VGI currently has a more prominent role in the M&HD vehicle electrification, especially for electric school buses, in 2016, San Diego Gas and Electric Company (SDG&E) developed a VGI pilot program, "Power Your Drive," which a goal of installing 3,500 EV charging stations at MUDs and workplaces. As part of this program, a VGI rate was developed and has shown success in influencing pricing behavior to optimize the grid.[24]

There are a variety of ways for utilities to manage EV load and ensure charging benefits the grid, including time-of-use ("TOU") rates. In addition to optimizing EV charging, whole-house TOU rates can support energy efficiency initiatives and shift an even larger portion of the load to load to off-peak hours. Whole house TOU rates should be proposed by utilities to support these energy efficiency programs, which the Board should address in a separate proceeding to help to achieve additional goals outlined in the EMP. When the Board evaluates with whole-home TOU rates or EV-specific TOU rates, it should ensure that both rate structures work together to maximize load-shifting

The Straw Proposal recommends EV-only TOU rates, which we support as they can "limit the risk of having a larger bill due to TOU rates' not aligning with their non-EV base load," and therefore can provide significant benefits to customers.[25] Although EV load currently represents a small fraction of total system load, this has the potential to change rapidly with the large number of charging stations slated to be installed under the EV Law. Consequently, it is prudent for utilities to develop and test plans now for managing EV load, and we urge the BPU to require the utilities to submit plans that describe what strategies they intend to employ to ensure New Jersey realizes the benefits of transportation electrification. Expanding advanced metering infrastructure ("AMI") in tandem with EV charging infrastructure can help inform grid load shifts and monitor and evaluate any demand response programs employed due to increased data sharing.

For ratepayer-supported stations in these settings (i.e., those receiving incentives through a utility make-ready program), it may be appropriate to require that price signals intended to incentivize load management be passed through from site hosts to drivers utilizing those stations. Data collection and reporting requirements on site host rates to drivers will be critical in evaluating whether rates to drivers at stations supported by utilities are encouraging effective load management and fuel cost savings. To facilitate load management, all charging stations supported under utility programs should be "smart" charging stations that allow for the utility to

[24] https://www.sdge.com/sites/default/files/regulatory/Corrected%20Seventh%20Semi-annual%20%20PYD%20Report.pdf
[25] http://www.synapse-energy.com/sites/default/files/PA-EV-Rates-Report-18-021.pdf

actively manage load and collect data on customer charging behaviors. While rate design is a valuable tool to manage load and keep rates down, smart charging technology can significantly increase those benefits. Smart charging stations should be required as part of any utility incentive program, and further should be encouraged for any utility owned and operated programs.

a. Residential Customers

There are two types of residential customers that the Board should consider in putting forward its own, or evaluating utility, rate design proposals: residential single-family homes, and MUDs that contain residential customers but are classified as C&I at the building level.

With regard to customer-owned residential chargers, the Straw Proposal provides important guidance directing each EDC to develop EV-TOU rates. We agree that utilities should consider EV-only TOU rates, which will allow for customers to shift their charging to off-peak hours, without affecting those customers who are unable to shift all of their charging to off-peak times.

Alternatively, the residential customers who reside in MUDs face a different set of considerations, as the BPU notes. Currently, MUDs are placed on C&I rates, which can drastically increase charging costs for residents. As one of the major benefits of transportation electrification is reduced fueling costs, utilities need to consider ways in which to secure these reduced fueling costs, regardless of their home type. However, we caution the Board and utilities from subscribing to the notion that MUD customers must be at perfect "price parity" to single-family home customers, which would be complicated and nearly impossible to implement without violating core rate design principles. Instead, we encourage the Board to look at the recent examples of long-term, sustainable C&I EV rate reform put forth by PG&E and SDG&E, which both proposed new cost-based rates designed to improve the economics of public charging, multi-unit-dwelling charging, and M&HD vehicle charging.[26] The Board should follow the lead of PG&E and SDG&E to put similarly sustainable solutions in place through new cost-based rates that reflect the unique characteristics of EV load, improve the economics of transportation electrification, and encourage charging behavior that supports the operation of the electric grid.

b. C&I rates

The Straw Proposal rightly notes concerns with demand charges, especially at public charging stations. As was noted during the technical conference, demand charges can be extremely costly, and make charging stations economically infeasible, especially during the nascent EV market when stations may be underutilized. While we agree with the notion that demand charges need to be addressed as they relate to charging stations, we differ as to the

[26] https://www.nrdc.org/experts/miles-muller/reforming-rates-electric-trucks-buses-fast-chargers; https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M318/K552/318552527.PDF

appropriate approach. The Straw Proposal recommends that EDCs should "either waive demand charges associated with EV charging or develop a rebate methodology that ensures that the effective $/kW-hour rate… remains below a specified 'set-point.'"[27] However, this is a blunt and short-term solution that does not address the larger issues concerned with demand charges and placing charging stations in the same rate class as commercial and industrial buildings. The Board should look to implement long-term, sustainable solutions in lieu of open-ended subsidies and band-aid approaches.

It is important to note that even with high EV penetration, some societally beneficial charging locations will never experience the high levels of utilization that would enable the site host or fleet operator to assimilate current demand charges and build a viable business model. Consequently, time-limited demand charge relief is not a viable long-term solution to overcoming the issues demand charges pose to site-hosts and fleet operators.

It is critical to develop rates that more accurately reflect the unique characteristics and costs of EV charging, rather than forcing stations to take service on commercial and industrial rates designed for large buildings and factories. Rate designs for high-powered transportation electrification use cases should impose demand charges only to the extent absolutely necessary, and instead recover costs through more predictable rates where possible.

Synapse Energy Economics recently released a report on best practices for C&I EV rate reform. In its report, Synapse notes that "[t]raditional C&I rates were generally designed for large buildings, rather than for public fast charging of passenger vehicles or for depot charging of truck and bus fleets" and those rates ``do not reflect the unique costs or flexibility of EV charging and can charge commercial EV customers much more than their true cost of service." Time-limited discounts are not a sustainable solution, and utilities and regulators should develop new C&I rates designed with EV use cases in mind that are both cost-reflective and take advantage of the unique characteristics and flexibilities of EV load. Synapse offers the following principles for C&I rates:

- Rates should promote efficient use of fixed system resources, which will reduce rates for all utility customers;
- Rates should be easy to understand and predictable;
- Rates should be designed with end users in mind;
- Time-varying volumetric rates are generally preferable to demand charges;
- Non-coincident peak demand charges should generally be avoided;
- It may be appropriate to set rates to recover marginal costs rather than embedded costs; and

[27] Straw Proposal at 12-13.

- Programs that rely on price signals inherent in rate design to deliver grid and user benefits should ensure users actually see those price signals.

Synapse recommends time-of-use energy charges or critical peak pricing over coincident demand charges for recovering the costs of shared infrastructure, since energy charges better capture the duration of time that a customer is using that infrastructure. And Synapse cautions that, while limited non-coincident demand charges may be appropriate for recovering distribution infrastructure costs sized to meet the maximum demand of a single customer, "non-coincident demand charges are often set too high and recover costs that are not truly driven by individual customer peaks." We urge the Board to consider Synapse's recommendations in moving forward with new C&I rate design, including the prioritization of time-varying volumetric rates over demand charges and to avoid non-coincident peak demand charges altogether.

## 8. Interoperability

To prevent against stranded assets and ensure the Make-Ready Program stays up to date on standards and technology, the BPU should require that *"qualifying EVSEs <u>actively utilize</u> open access standards for communication of data between the EVSE and the back-end network."*[28][1] This would align with language and requirements recently adopted by the California Public Utilities.[29]

This is essential because EV charging companies could potentially install EVSEs with software that technically has or uses (i.e. is compatible with) open communications protocols such as the Open Charge Point Protocol (OCPP), but which still require proprietary extensions that close these EVSEs off from other networks. Alternatively, they could install EVSEs with these capabilities, but have this functionality turned off or disabled. In such cases, a charging company could potentially leave the market and abandon the EVSE without activating the open standards, and other companies would not be able to assume operation of the station. Accordingly, the Board should require that the EVSEs not merely be compatible with open access standards for communication of data between the EVSE and the back-end network, but that they have those open access standards installed and utilized on the EVSE at the time of deployment.

[28] California A. 18-07-020
[29] *Id.*

## III. **Conclusion**

The Commenters appreciated the opportunity to provide input on the Straw Proposal and applaud the Board for moving forward on a program to rapidly expand New Jersey's EVSE infrastructure. The state, EDCs, and EVSE companies all have critical roles to play for New Jersey to meet the ambitious targets contained in the EMP, GWRA and PIV Law. As the Board further develops its Straw Proposal, the Commenters urge the Board to act with an open-mind and prioritize the principle of flexibility that will allow New Jersey to electrify its transportation sector rapidly and equitably.

Sincerely,

Environment New Jersey
Isles, Inc.
The Natural Resource Defense Council
The Nature Conservancy- NJ Chapter
New Jersey Conservation Foundation
New Jersey League of Conservation Voters
New Jersey Sustainable Business Council
Sierra Club
Tri-State Transportation Campaign

# Exhibit

# KAH-102

*Submitted via E-Mail*
March 30, 2020

State of New Jersey, Board of Public Utilities
44 S Clinton Ave, 3rd Floor, Suite 314
P.O. Box 350
Trenton, NJ
08625-0350

**RE: Draft FY20 "Charge Up New Jersey" Compliance Filing**

Secretary Camacho-Welch:

The Natural Resources Defense Council ("NRDC") is pleased to submit these comments on the New Jersey Board of Public Utilities ("BPU" or "Board") Draft FY20 "Charge Up New Jersey" Compliance Filing ("Compliance Filing").

Respectfully Submitted,

Kathy Harris
Clean Vehicles and Fuels Advocate
NRDC
kharris@nrdc.org

Eric Miller
Director, New Jersey Energy Policy
NRDC
emiller@nrdc.org

NRDC applauds the BPU for issuing its first Compliance Filing to implement New Jersey's landmark electric vehicle ("EV") legislation signed into law earlier this year.[1] As the primary agency charged with implementing New Jersey's ambitious EV goals, the BPU has broad discretion to establish programs and promulgate regulations to expand the number of EV's on the road as well as increase the state's charging infrastructure. As such, this rebate program will set the state up as the east coast leader for transportation electrification. The rebate program created by the BPU will jump-start the EV market and help New Jersey meet its climate, zero-emission vehicle, and clean air goals.

After reviewing the Compliance Filing, NRDC has several recommendations that it believes will strengthen and improve both the "Stage 1" post-purchases rebate program, as well as the "Stage 2" point-of-purchase rebate program currently being designed by the Board and hired consultant, Center for Sustainable Energy ("CSE").

1. **The BPU Should Continue its Stage 1's "Post-Purchase" Incentive Program Indefinitely, Even After the Stage 2 "Point-of-Purchase" Program Once is Launched in July**

Although the EV law rightly highlights the importance of point-of-sale rebates, which will begin in Stage 2, NRDC recommends the Board continue to offer the option for individuals to apply for post-purchase rebates, as outlined in Stage 1. Some drivers may prefer to complete the paperwork individually and allowing this flexibility will strengthen the program. Several other states throughout the country have both point-of-sale and individual rebates including Delaware and Vermont.[2][3] Connecticut's CHEAPR rebate application is completed by the dealership, but the driver is able to determine if the rebate is applied to the purchase or lease or received directly via a check.[4]

2. **The BPU Should Shorten the Time Period Between When an Applicant Submits Their Application to When an Applicant Receives Their Rebate to Well Under 120 Days.**

The Compliance Filing states that applicants will receive their rebate within 120 days of submitting their EV purchase documentation, subject to availability. NRDC believes that a four-month period is too long, and that BPU should endeavor to provide rebate checks within one month after receiving a completed application. Since drivers will most likely rely on the rebate when considering purchasing or leasing an EV, 120 days is a long time to wait for up to $5,000, especially for low- or moderate-income drivers who may not be able to front that money for four months. Additionally, the Commission should release guidance on how drivers will know whether there is enough funding left when they purchase the vehicle.

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[1] P.L. 2019, c. 362, codified at N.J.S.A. 48:25-1 to 11.

[2] State of Delaware Clean Transportation Incentive Program (https://de.gov/cleantransportation)

[3] Drive Electric Vermont Program (https://www.driveelectricvt.com/why-go-electric/purchase-incentives)

[4] Connecticut CHEAPR Program (https://portal.ct.gov/DEEP/Air/Mobile-Sources/CHEAPR/CHEAPR---FAQ#faq9)

### 3. The BPU Should Require Eligible Vehicles to be leased for 3 years/ 36 months.

The BPU should require that eligible vehicles be leased for a minimum of 3 years/ 36 months rather than 2 years/ 24 months, as other states have done.[5] The goal of the rebate program is to increase—and keep—electric vehicles on the road to improve air quality and mitigate the effects of climate change. Increasing the length of the lease requirements to three years will ensure this, while also more equitably distributing funds and preventing one driver from getting a new $5,000 incentive up to five-times throughout the length of this program.

### 4. The BPU Should Extend rebate eligibility to businesses, fleets, non-profits, and government agencies.

The rebate program should incentivize not only personal light-duty vehicles to electrify, but also vehicles owned by public and private entities. This will help fleets and organizations clean up their fleet vehicles, while also reducing the upfront costs and making electric vehicles viable options. As the law requires the New Jersey state fleet to completely electrify light duty vehicles by 2035, allowing state agencies to apply for the rebates will help to reduce costs and ease the transition.

### 5. The BPU Should Make Rebate Program Data Publicly Available, and Update Information Monthly.

To ensure transparency, the BPU should monthly update an online website and data portal that allows the public to access data—that is not personally identifiable information—on the rebate program. This data should include at minimum, rebate funds spent and remaining, rebate amounts by zip code, and number of rebates by vehicle makes and models.

### Conclusion

The above suggestions and recommendations will help to create a robust, simple, and used rebate program to support the electric vehicle program in New Jersey. Pulling from examples from rebate programs in other states, New Jersey can implement the lessons learned to ensure the programs development is smooth and implemented quickly to achieve the goals outlined in the EV Law.

We again thank the Board for this opportunity to provide comments on Stage 1 of the EV Rebate Program. If you have any questions or would like any additional information, please do not hesitate to reach out. We look forward to reviewing the final Stage 1 guidance and continuing to support New Jersey as the state works to reduce greenhouse gas emissions in the transportation sector.

Sincerely,

Kathy Harris
Clean Vehicles and Fuels Advocate
NRDC
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[5] Delaware, Massachusetts, and New York are just a few examples of states that utilize the 3 year/36 months lease terms.

Eric Miller
Director, New Jersey Energy Policy
NRDC
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# Exhibit

# KAH-103

# BEST PRACTICES FOR COMMERCIAL AND INDUSTRIAL EV RATES

*Synapse Energy Economics, Inc.: Melissa Whited, Jason Frost, Ben Havumaki*

*Updated July 13, 2020*

## INTRODUCTION

Electric vehicles (EVs) are an essential tool in reducing transportation sector greenhouse gas emissions, while also potentially lowering electricity costs for all customers. The key to unlocking these benefits lies in thoughtful rate design, which can foster greater EV adoption and encourage EV charging during hours when the grid's capacity is underutilized.

Unfortunately, traditional commercial and industrial (C&I) electricity rates can present a barrier to EV adoption by erasing the EV fuel cost savings relative to gasoline or diesel. Traditional C&I rates were generally designed for large buildings, rather than for public fast charging of passenger vehicles or for depot charging of truck and bus fleets. Accordingly, those rates do not reflect the unique costs or flexibility of EV charging and can charge commercial EV customers much more than their true cost of service.

This paper discusses strategies that can be used to design EV rates for the C&I sector that balance multiple objectives:

- Provide appropriate price signals to maximize benefits for the wider grid;
- Encourage EV adoption by ensuring the economics of transportation electrification are not artificially undermined; and
- Provide rate options that work for multiple types of customers, recognizing that the ability to shift charging load varies across use cases.

Subsidizing EV customers on existing C&I rates through "discounts" is not a sustainable solution. Instead, utilities and their regulators should develop new C&I rates designed with EV use cases in mind that are cost-reflective and take advantage of the unique characteristics and flexible nature of EV charging.

In summary, we recommend the principles to the right for rate design for EV customers in the C&I sector:

1. Rates should be designed to promote efficient use of fixed system resources, which will lead to reduced costs for all utility customers.
2. Rates should be easy to understand and predictable.
3. Rates should be designed with end users in mind.
4. Time-varying volumetric rates are generally preferable to demand charges.
5. Non-coincident peak demand charges should generally be avoided.
6. It may be appropriate to set rates to recover marginal costs rather than embedded costs; rates that recover marginal costs prevent new EV load from increasing costs for other customers, while promoting adoption of EVs.
7. Programs that rely on the price signals inherent in rate design to deliver grid and user benefits should ensure users actually see those price signals. If signals are not passed through to the drivers who decide when to charge, then charging behavior will not be affected and neither grid nor user will benefit.

## EMBEDDED VS. MARGINAL COSTS

Embedded costs reflect the historical expenditures already made to construct the existing grid that are slowly depreciated over time, while marginal costs are the incremental costs associated with serving additional load.[1] On the whole, the revenue collected from all customers through rates must equal the utility's total cost of providing service, which includes the undepreciated embedded costs.

The standard approach is to recover embedded costs from all customers based on each customer class's contribution to costs. However, there are several important reasons that regulators may choose to set rates at marginal cost (or somewhere below embedded costs) for EV customers in the near term.

Aligning rates with the marginal cost of serving new commercial EV load provides customers with fuel cost savings that help encourage greater EV adoption. Greater commercial EV adoption not only promotes emissions reductions and the achievement of state climate, equity, and air quality goals—but also the integration of incremental load which can help put downward pressure on rates to the benefit of all electricity customers. Commercial EV charging is generally a new type of load on the system. Incentivizing fuel switching from historically gasoline- or diesel-powered vehicles presents an opportunity to bring incremental load onto the grid and spread the fixed costs of the system over a greater volume of electricity sales. This puts downward pressure on rates for all electricity customers. However, significant levels of fuel switching and the resulting downward pressure on rates will not materialize unless the rates available to commercial EV drivers are cost-competitive with gasoline or diesel.

Setting rates at marginal cost, as has historically been done for economic development and business attraction rates, would incentivize greater commercial EV adoption and recruitment of incremental load during the critical developing years of the commercial EV market. It would also better reflect the true cost of serving new commercial EV load on the system during those years. Since utility revenue requirements are largely reflective of historical expenditures, rates are typically set to recover embedded costs. However, the historical investments in the grid (embedded costs) exist regardless of this new EV charging load and were not incurred because of it, so setting rates at marginal cost better reflects the actual cost new commercial EV load imposes on the system during the initial years. Over the long term, however, marginal costs become embedded costs, and it is appropriate to gradually transition to recovering embedded costs from EV customers. As long as rates are set to recover at least marginal costs, existing customers will bear no additional costs from bringing this new load onto the system, while benefitting in the long term from downward pressure on rates due to the addition of incremental commercial EV load onto the grid.

This recognition served as the basis for a widely-supported settlement agreement reforming San Diego Gas & Electric's proposed C&I EV rate—with express support from the state's official consumer advocate, the utility, organized labor, environmental organizations, and EV charging companies. As noted in that settlement, this approach "aligns with the Commission's treatment of Economic Development Rate load as retained or incremental load, helps avoid rate shock and customer confusion, and provides a more predictable estimate of the future cost of electricity as a fuel for customers."[2] That settlement further recognized that by aligning rates with marginal costs while

[1] In some jurisdictions, individual customers are required to bear the costs of interconnection and/or distribution system upgrades associated with new EV load. In such instances, care must be taken in rate design to ensure that these customers are not being charged twice for the same infrastructure costs.

[2] *See* A.19-07-006, Application of San Diego Gas & Electric Company for Approval of Electric Vehicle High Power Charging Rate, *Joint Motion of Settling Parties for Commission Adoption of Settlement Agreement*. The parties to the settlement agreement include San Diego Gas & Electric, the California Public Advocates Office, the Natural Resources Defense Council, the Coalition of California Utility Employees, Environmental Defense Fund, Sierra Club, the Union of Concerned Scientists, ChargePoint, Enel X, EVBox, Greenlots, Plug In America, Siemens, Tesla, and EVgo.

providing a predictable phase-in of embedded costs, this approach would promote "greater commercial EV adoption," "the achievement of state climate, equity, and air quality goals," and "the integration of incremental load which [can] help put downward pressure on rates to the benefit of all electricity customers in the long term."[3]

Downward pressure on rates from widespread EV adoption has already been observed in the real world. Between 2012 and 2019, EV customers in the two utility service territories with the most EVs in the United States contributed $800 million in excess of associated costs, putting downward pressure on electricity rates for all customers. This has long been the primary justification for economic development rates, which offer temporary pricing below embedded costs to attract new load. As explained by Professor Phillips in *The Regulation of Public Utilities*, such pricing strategies are often socially desirable. By allowing a utility to "expand its sales and utilize its facilities more fully, average costs are reduced as fixed costs are spread over more units of output… [which] may result in lower prices for *all* customers and in wider use of the utility's services."[4]

## TYPES OF CHARGES IN AN ELECTRIC BILL

Electric utilities can recover the costs of maintaining the grid and generating or purchasing power through a variety of different charges. In this section, we provide a brief review of several common billing elements. In the following sections, we discuss how these elements can be most effectively deployed to maximize benefits from C&I EV load.

### VOLUMETRIC CHARGES

Volumetric charges are assessed based on the amount of energy a customer consumes. These rates can be flat, or they can vary by hour and day of the week. The most common form of time-varying rates is the time-of-use (TOU) rate. TOU rates reflect the approximate cost of providing energy in different hours of the day, with higher prices for "on-peak" hours and lower prices for "off-peak" hours. By disincentivizing electricity consumption during peak hours, TOU rates help to reduce overall system costs. Many existing C&I rates are TOU rates, but they were not designed with EV users in mind.

### DEMAND CHARGES

Demand charges are common for C&I customers. These charges are typically based on a customer's maximum usage (peak demand) during a month and are intended to recover costs associated with equipment that is sized based on peak demand.

There are two types of demand charges: coincident and non-coincident. Coincident demand charges are assessed based on customer peak demand during time periods when the system tends to encounter its highest demand. These charges are most appropriate for recovering the costs of equipment that serve many customers and must be sized to meet the aggregate demand for a large area. Non-coincident demand charges are based on the customer's highest recorded demand in any hour. These types of demand charges are most appropriate for recovering the costs of equipment sized to meet the specific customer's peak demand, regardless of when that occurs.

### CRITICAL PEAK PRICING

Critical peak pricing (CPP) assesses an extremely high price during only a small number of event hours per year when the system is most stressed. Customers are typically notified the day before an event. For example, a utility may call five CPP events during the year, each of which lasts between two and four hours. During the events, electricity might be priced 10 times higher than the average rate. CPP can be easily layered on top of a standard TOU rate.

CPP serves a function that is similar to demand charges. Some large grid costs, such as generation capacity and transmission costs, are primarily driven by only a few hours of the year during which load is highest. As a result, charging

[3] *Id.* at 4-5.

[4] Charles Phillips, *The Regulation of Public Utilities: Theory and Practice*, 3rd ed. (Public Utilities Reports, 1993), 438.

very high prices for each unit of energy consumed during system-wide peaks can accurately reflect the costs that customers impose on the grid. In exchange, electric rates at all other hours are a little lower.

### FIXED CHARGES

Fixed charges, or customer charges, do not depend on a customer's electricity consumption patterns at all. Instead, they appear as a constant charge each month. These charges seek to recover costs that are independent of consumption, such as metering expenses.

## DESIGNING RATES FOR C&I EV CUSTOMERS

A core purpose of rate design is to promote efficient use of the system. Rates promote efficient use by sending *effective* price signals – that is, signals that are cost-reflective, simple, and actionable. In other words, to promote efficient use of the system, customers should be charged accurately for the costs that they impose, while ensuring that rates remain simple and structured in a fashion that enables behavioral response. Additionally, rates for C&I EV customers should consider the impacts on transportation electrification to ensure that the economics of EV charging are not artificially undermined. In practice, these principles mean that rates should take into account the sophistication of the users and the ability of users to respond, as well as the extent to which price signals accurately convey system costs. Overly complicated or volatile rates may provide confusing incentives or otherwise provide price signals that are not actionable. Therefore:

- Simple TOU rates may be more effective than more volatile hourly pricing for many customers, since they are predictable and easy to understand.
- TOU rates can also be used in lieu of demand charges, particularly for those costs on the system that are driven by coincident demand. In fact, TOU rates can improve cost reflectivity of rates, since they better capture the duration of time that a customer is using shared infrastructure during peak periods instead of only focusing on a customer's single hour of maximum demand. As public utility economists have long recognized, "the longer the period of time that customers pre-empt the use of capacity [by other customers], the more they should pay for the use of that capacity."[5] A time-varying energy rate charges a customer more for using the distribution system more extensively during peak hours, but a demand charge – even a coincident demand charge, cannot capture this.
- TOU rates facilitate public charging stations' ability to convey price signals to drivers using the station far better than demand charges.
- Demand charges should be avoided for customers with low load factors, as they represent a disproportionate share of these customers' bills and can present an obstacle to transportation electrification.

In the next section, we describe important considerations for two common types of C&I EV customers –public DC fast charging stations and fleet vehicles. These descriptions are not meant to be exhaustive; rather, they are meant to provide examples of the different characteristics of the EV customers that utilities seek to serve. Utilities will need to work with the customers in their service territories to learn more about their operations and how rate structures can be designed to be both cost-reflective and actionable.

### PUBLIC DC FAST CHARGING STATIONS

Public EV charging stations represent one important category of new C&I EV load. Here, we focus particularly on public DC fast charging stations, though our observations are likely to apply to all public charging installations. Fast charging stations operate somewhat similarly to gas stations – they provide a quick recharge when drivers are on the road or have limited access to charging at home and work. DC fast chargers need to be able to provide large amounts of power, with the newest stations charging vehicles at up to 350 kW. As EVs capable of charging at these

[5] Garfield, Paul J. and Lovejoy, Wallace F. (1964) Public Utility Economics at 163.

fast stations become more common, more of these high-powered stations will be needed.

Public DC fast charging stations may have particular difficulty responding to dynamic rates – those that fluctuate on an hourly basis rather than varying according to a predictable preset schedule. Examples of such rates include hourly pricing (in which the hourly prices are not known until a day in advance), and critical peak pricing (in which a critical peak event is not announced until a day in advance).

Public DC fast charging stations are generally reluctant to charge their customers (the EV drivers) dynamic rates, since EV drivers prefer predictable and relatively stable electricity prices. Since DC fast charging customers may be traveling, it is difficult to warn them ahead of time in the event of a

critical peak period, as they may live outside of the utility's service territory. Thus, dynamic rates are less likely to be translated into prices that EV drivers will see when using the charging station, thereby erasing the effectiveness of the price signal.

Similarly, DC fast charging stations may have difficulty throttling load to reduce demand charges, since EV drivers expect to be able to charge their vehicles as quickly as possible. Sensitivity to demand charges is likely to be even greater for fast charging stations with low load factors, such as those on more remote corridors. Investment in such stations, essential though it may be to make transportation electrification viable, could be disincentivized by a demand-based rate design that imposed disproportionate costs on these low load factor stations.

In some cases, it may be possible for fast charging stations to install stationary battery storage to shift load. Battery storage may be particularly effective at avoiding critical peak pricing and demand charges by powering the charging station from the battery instead of the grid for a few hours. However, battery storage is very expensive and the locations in which it can be installed are limited due to space constraints.

In light of these challenges, rate designs for EV fast charging stations should impose demand charges and critical peak prices only to the extent absolutely necessary, and instead recover costs through more predictable rates where possible. TOU energy rates may be a good alternative approach, since these rates are highly predictable and can be clearly communicated to drivers.

## FLEET VEHICLES

Another category of new commercial EV load is vehicle fleets such as bus fleets and delivery vehicles. FedEx recently invested in 1000 new electric delivery vehicles,[6] while government and public transit authorities are increasingly seeking to substitute EVs for traditional gasoline or diesel vehicles.

Fleet vehicles may have greater ability to shift load and respond to price signals than DC fast charging stations, since fleets may have flexibility in their operations that enable them to schedule charging for particular times of day. For example, fleets may have the option to charge overnight, or to charge while parked over the course of the day. Fleet managers may also elect to purchase vehicles with longer ranges to avoid having to charge during more expensive peak hours. This flexibility tends to make TOU rates highly effective for fleets. Charging optimization software can help fleet managers take advantage of these rates and reduce the effort required to oversee charging.

Since fleet operators have more control over when their vehicles charge, some may be better able to effectively respond to critical peak pricing. If they have enough available charging infrastructure and flexibility in when the vehicles can be taken off the road for charging, fleet operators may be able to shift charging to off-peak periods when warned of a critical peak price in advance.

[6] See https://www.wsj.com/artiles/fedex-to-add-1-000-electric-vehicles-to-parcel-fleet-1542736194.

## CASE STUDIES

Various jurisdictions have introduced electricity rates specifically for C&I EV customers. Some rate changes are temporary, or include temporary provisions, to encourage EV adoption over the next several years while there are still relatively few EVs on the road. Others instead try to make charges more reflective of the costs associated with EV charging by permanently modifying rate designs to increase the use of TOU energy rates and other time-varying features over demand charges. Such rate design modifications are an important mechanism for supporting the development of EV charging infrastructure and EV fleets.

Below we present specific examples of EV rates from different jurisdictions and discuss the merits and shortcomings of these approaches to the extent relevant.

### DEMAND CHARGE DISCOUNTS

Demand charges are particularly burdensome to EV customers, particularly during the early years when EV charging results in high electrical demand but relatively low energy use. For example, empirical analysis by Rocky Mountain Institute has shown that demand charges can drive over 90 percent of the costs of operating public fast charging stations during summer months in California, making it extremely challenging to recoup costs while EV penetration and station utilization are still low.[7] To address this issue, numerous utilities are now providing temporary demand charge discounts for commercial EV customers, especially for DC fast charging stations.

For example, in New York, Con Edison's Business Incentive Rate offers rate discounts to public DC fast charging customers until 2025. [8] In Oregon, Pacific Power implemented a rate adjustment for DC fast chargers that temporarily reduces demand charges and increases on-peak energy charges. Within a decade, the demand charge will be phased back in.[9] While these temporary discounts may be appealing as EV adoption is still in its early stages, utilities should strongly consider focusing instead on more sustainable long-term solutions that provide proper price signals to EV charging customers.

Explicit discounts also raise questions of equity and access. For example, Tesla, which operates the largest fast charging network in the United States, was originally excluded from an order that adopted a "Consensus Proposal" developed by stakeholders in New York to address issues with demand charges on the grounds that the Tesla network is not "technologically accessible" to non-Tesla drivers. The Commission ruled that Tesla could receive the "per-plug" rebate if Tesla stations were made accessible to all EV drivers (i.e., included non-Tesla plugs), leading the automaker to file suit against the New York Public Service Commission.[10] If, rather than developing a "discount" on an existing C&I rate that was only made available to certain customers, Con Edison and the other parties had instead proposed a new, cost-based rate available to all C&I EV customers, this dispute might have been avoided and a more durable solution achieved.

### XCEL ENERGY

In Colorado, Xcel Energy proposed a new rate structure for C&I EV charging in 2019. Xcel's standard C&I rate, Schedule SG, recovers most costs through demand charges. There are demand charges for summer and winter generation capacity and transmission as well as year-round demand charges for distribution.[11] In contrast, the new EV charging rate, Schedule S-EV, which is reflected in a settlement agreement pending final Commission approval, eliminates the generation and transmission demand charges and replaces them with time-varying energy charges. In addition to the new energy charges, S-EV contains a critical peak

[7] Garrett Fitzgerald and Chris Nelder, "EVgo Fleet and Tariff Analysis" (Rocky Mountain Institute, April 2017), https://www.rmi.org/wp-content/uploads/2017/04/eLab_EVgo_Fleet_and_Tariff_Analysis_2017.pdf.

[8] Consolidated Edison Company of New York, Inc., Tariff Book, Revision 5, Leaf 201, Rider J, issued February 7, 2019.

[9] Max St. Brown, "Staff Report Re: Schedule 45- Public DC Fast Charger Delivery Service Optional Transitional Rate," Docket No. ADV 485/Advice No. 16-020, May 8, 2017.

[10] New York Public Service Commission, Order Establishing Framework for Direct Current Fast Charging Infrastructure Program, February 7, 2019; Verified Article 78 Petition and Complaint, Tesla, Inc., vs New York State Public Service Commission, filed August 2, 2019.

[11] Public Service Company of Colorado, Electric Tariff Index, Sheet No. 43, issued January 1, 2017.

price of $1.50/kWh that is permitted to occur for a maximum of 60 hours each year.[12]

Xcel's proposed rate reduces costs for some EV charging customers by reducing demand charges. However, the critical peak price creates substantial uncertainty for customers with limited ability to shift load, such as DC fast charging stations. The remaining non-coincident distribution demand charge, at $5.63/kW, also continues to be a burden for low load factor EV charging customers. To improve this rate, any distribution costs that are caused by a local peak rather than by a single customer's peak demand should be recovered through a time-varying energy charge or a coincident peak demand charge that only applies during certain hours. The rate may work well for fleet customers with predictable duty-cycles and an ability to respond to critical peak price events. But because it largely fails to address the issues hampering the deployment of DC fast charging stations, Xcel has committed to proposing a new rate in 2021.[13]

### PACIFIC GAS & ELECTRIC

Pacific Gas and Electric Company (PG&E), one of the nation's largest utilities, took a ground-up approach in designing new C&I EV rates for various use cases. The utility partnered with the Electric Power Research Institute to conduct customer and stakeholder outreach in advance that was used to inform the resulting rate design. The company recently received approval for the resulting rates that combine a subscription charge with a time-varying energy charge.[14] The subscription charge replaces fixed and demand charges with a per-kilowatt charge based on peak demand. Unlike conventional demand charges, the subscription charge requires a prospective commitment, in which the customer *subscribes* to a specific level of peak demand in advance. The final approved rate provides customers with a grace period of three billing cycles for monthly peak demand exceeding subscription levels. In addition, the rate uses TOU rates for energy costs with an on-peak to off-peak price ratio of approximately 2.5:1.

Of note, the Commission ruled that no distribution costs beyond marginal distribution costs should be recovered through the subscription charge, since the rate would apply to a new rate class without a full revenue allocation study and any revenue collected from the new class beyond the marginal cost to serve them would be an overcollection.[15] This had the effect of substantially reducing the subscription charge below the level originally proposed by PG&E (by around 40 percent), and means that customers on the commercial EV rate will only pay marginal costs until new rates go into effect in 2025 at the conclusion of the next General Rate Case.[16]

Although the primary rationale for maintaining rates at marginal costs was the absence of a revenue allocation study, an argument could also be made that marginal cost pricing is appropriate from the standpoint of encouraging greater EV adoption, which is akin to the rationale behind economic development rates. As long as rates for new load are set to recover marginal costs, existing customers will not see any increase in their rates. Meanwhile, the additional revenue from residential EV charging, where the vast majority of EV charging occurs, is likely to continue to result in net revenue in excess of associated costs.

The final approved commercial EV rate creates strong incentives to shift electricity consumption to off-peak hours without penalizing low load factor customers. While we note that the subscription format may present new challenges for customers, the reduction in subscription cost (and in the penalties for undersubscribing) and the opportunity for low-cost off-peak charging provide good incentive for transportation electrification for commercial fleets. These rate design modifications will mean substantial savings for C&I EV customers – especially for those with low load factors, for whom demand-charge weighted rate

[12] Recommended Decision, Proceeding No. 19AL-0290E. October 8, 2019.

[13] Unopposed Comprehensive Settlement Agreement, Proceeding No. 19AL-0290E.

[14] Decision Approving Application for Pacific Gas and Electric Company's Commercial Electric Vehicle Rates, D.19-10-055, in A.18-11-003. October 28, 2019.

[15] In order to allocate embedded costs, a revenue allocation study must be performed in which costs are allocated based on class billing determinants (peak demand, energy sales, number of customers, etc.). Such a study has not yet been performed for the new commercial EV customers in PG&E's territory. *See:* Decision Approving Application for Pacific Gas and Electric Company's Commercial Electric Vehicle Rates, D.19-10-055, in A.18-11-003. October 28, 2019.

[16] SDG&E has proposed to take a similar approach for its Electric Vehicle High-Power (EV-HP) Rate, initially collecting only marginal costs in its subscription charge and phasing embedded costs in over a period of ten years. While not yet approved, this signals a growing endorsement of marginal-cost based rate design for commercial EV rate reform.

designs can produce onerous bills. Customers on the new rate will save an estimated 30 percent to 50 percent or more on their current monthly bills and would pay roughly *half* the price they would have if they used gas or diesel.[17]

Time of Use

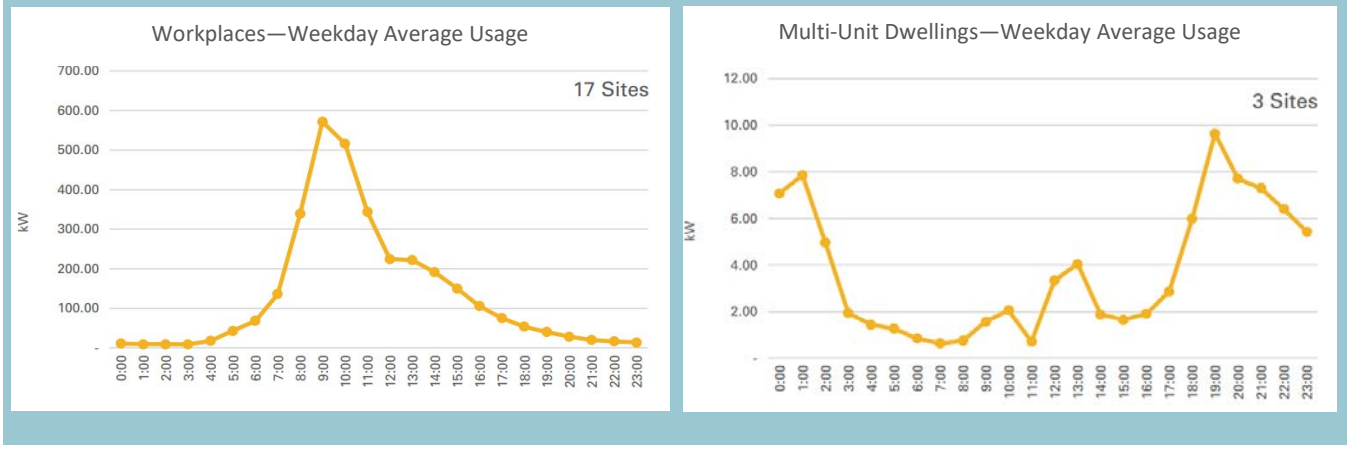
## SOUTHERN CALIFORNIA EDISON

Southern California Edison (SCE) established an EV rate that temporarily eliminates demand charges for EV charging through 2023 and instead recovers costs through a TOU energy charge and a small fixed charge. By recovering all costs through energy charges that vary depending on the cost of providing electricity, SCE's new rate strongly incentivizes charging at low-cost hours for the grid. Demand charges will be phased back in starting in 2024 unless otherwise dictated by the Commission, at which point it is expected that many DC fast charging stations will have higher load factors and be able to spread demand charges over more total electricity sales. However, there may still be charging stations that have low utilization at that point both because EV adoption is still at an early stage and because stations will be needed in relatively remote places to allow for longer-distance trips. Indeed, certain stations may never have high load factors.[18] It is incumbent on SCE, other stakeholders, and state regulators and policymakers to formulate solutions, through rate design or other supportive policies (promoting storage that can assist in improving load factor, for example), that will enable investment in these necessary charging stations.

SCE has also grappled with how to ensure that efficient price signals are conveyed to the end user (i.e., the driver). Even the most efficient price signals lose their effectiveness if the driver does not see these signals. This often occurs when the customer-of-record who is billed for the electricity is different than the EV driver, such as at many workplace and public charging stations. In these situations, the driver may receive free charging, or be charged a fee based on the number of minutes the vehicle is plugged in, rather than based on the timing and quantity of electricity consumed.

In SCE's Charge Ready Program Pilot, site hosts were required to take service on TOU rates, but there was no requirement that those price signals be passed through to EV drivers. The charging profiles in the Charge Ready pilot program report, presented below in Figure 1, show that the lack of time-varying price signals facing EV drivers resulted in those drivers charging immediately upon arrival at their destination with no correlation to grid conditions or time-of-use periods.[19]

**Figure 1. Load Profiles from Charge Ready Pilot**




[17] Exhibit PGE-1, Pacific Gas and Electric Company Commercial Electric Vehicle Rate Proposal Prepared Testimony, November 5, 2018, p. 1-27.

[18] SCE Schedule TOU-EV-7. July 26, 2019. Available at https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/schedules/general-service-&-industrial-rates/ELECTRIC_SCHEDULES_TOU-EV-7.pdf.

[19] *See* SCE Charge Ready Pilot Program Report at 21-22 (indicating that charging in many segments was occurring primarily during late afternoon and evening hours).

This result is unfortunate, but entirely predictable; if given no reason to do otherwise, drivers will charge whenever they arrive at their destination. Thankfully, SCE has recognized this problem and taken steps to address it going forward. In its Charge Ready 2, full-scale program that is currently pending regulatory approval, SCE has committed to ensuring that the default arrangement will be that drivers see TOU price signals.

## CONCLUSIONS

### TOU RATES PROVIDE EFFICIENT AND EFFECTIVE PRICE SIGNALS

Jurisdictions are increasingly turning to TOU rates to provide simple but efficient price signals to EV drivers. These rates have been shown to be highly effective at encouraging EV customers to charge during off-peak hours, while maintaining simplicity and predictability. These attributes allow customers to schedule and optimize their charging with relative ease, unlike more volatile rate designs.

### TRADITIONAL DEMAND CHARGES PRESENT AN UNNECESSARY BARRIER TO TRANSPORTATION ELECTRIFICATION

It is widely recognized that demand charges can undermine the economics of EVs for many customers. Non-coincident demand charges tend to be particularly harmful to a range of C&I EV customers, including fleets that charge mostly during off-peak hours and DC fast charging stations with low load factors. While customers may take steps to avoid coincident peak demand charges, non-coincident charges are much harder to mitigate. However, even coincident demand charges generally fail to provide accurate price signals. These charges fail to capture the duration of a customer's usage during peak hours, and thus the extent to which the customer is driving the need for grid investments on shared infrastructure.

For these reasons, TOU energy charges or critical peak pricing are generally preferable to coincident demand charges for recovering the costs of shared infrastructure, since energy charges better capture the duration of time that a customer is using that infrastructure. A time-varying energy rate charges a customer more for using the distribution system more extensively during peak hours, while a demand charge is assessed only based on the customer's monthly maximum usage.

Limited non-coincident demand charges may be appropriate for recovering distribution infrastructure costs that are sized to meet the maximum demand of a single customer. However, we caution that non-coincident demand charges are often set too high and recover costs that are not truly driven by individual customer peaks. Care should be taken that only costs for components that are sized to serve customer's individual peak should be recovered through noncoincident demand charges. In addition, if the customer already paid for a line extension through interconnection fees, the remaining customer-specific distribution costs to be recovered should be minimal.

### CRITICAL PEAK PRICING AND DYNAMIC PRICING MAY BE APPROPRIATE FOR SOME CUSTOMERS

Critical peak pricing sends the strongest price signals during peak hours, but it also shifts large amounts of uncertainty onto customers. Certain types of EV customers, particularly public charging stations, may not be able to respond to these incentives and will suffer from this rate structure. For this reason, we recommend that critical peak pricing be provided as one option for C&I EV customers, but not the only option. This will allow customers to opt in if they believe that they will be able to adequately respond to the price signal and save money on their bill by reducing grid costs.

Dynamic pricing also provides strong signals to customers and vary hour by hour to reflect evolving supply and demand conditions – particularly those related to variable renewable generation. As with critical peak pricing, dynamic rates are most efficient when deployed to customers with the ability to respond to the signal. Customers most suited to dynamic rates are those with the flexibility, technology, and sophistication to automate their consumption behavior to minimize costs.

## SETTING RATES TO RECOVER MARGINAL COSTS CAN HELP ATTRACT BENEFICIAL LOAD

EVs have enormous potential to reduce air pollution and lower electricity rates for all customers. Rate design can help accelerate the deployment of EVs to maximize these benefits. To accomplish this, it is essential that fueling with electricity be more cost effective than fueling with gasoline or diesel. Setting prices below embedded costs in the near term can help drive transportation electrification during the early years, leading to greater long-term benefits. As long as rates are set to recover at least the marginal costs of serving EV load, existing customers will see no increase in rates.

Setting rates below embedded costs also recognizes that EVs are a new load that did not drive historical grid investments. If EVs were to be charged for previously incurred fixed costs, EV adoption may be held back. As EV adoption grows and marginal costs become embedded costs, it may be appropriate to gradually include a larger portion of embedded costs in EV rates.

## PRICE SIGNALS SHOULD BE CONVEYED TO THE END USER

Even the most efficient price signals lose their effectiveness if the end-user (driver) does not see these signals. To the extent that customers-of-record are not identical to end users, utilities and policymakers should aim to equip the former with the tools and guidance necessary to transmit price information on to EV drivers. Especially if the customers-of-record receive rebates or other forms of utility support to install EV charging infrastructure, the receipt of that customer-funded support should generally be made contingent upon terms of participation. Such terms could include making the pass-through of TOU price signals the default arrangement. They can ensure drivers realize the fuel cost savings that motivate EV purchases and are motivated to charge in a manner that does not strain, but supports the electric grid.

*Image Sources:*
*Page 2: Traffic-Related Air Pollution. Photo by Alexander Popov on Unsplash.*
*Page 5: Car charging. Photo by Vlad Tchompalov on Unsplash.*

Synapse Energy Economics, Inc. performed this analysis on behalf of the Natural Resources Defense Council. Synapse is a research and consulting firm specializing in energy, economic, and environmental topics. Since its inception in 1996, Synapse has grown to become a leader in providing rigorous analysis of the electric power sector for public interest and governmental clients. For more information, go to www.synapse-energy.com.