Rulemaking:	A.17-01-020 et al
Exhibit No.:	
Witnesses:	Max Baumhefner
	J. Espino
	M. Whited

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of SAN DIEGO GAS & ELECTRIC COMPANY (U902E) for Approval of SB 350 Transportation Electrification Proposals.	Application 17-01-020 (Filed January 20, 2017)
And Related Matters.	Application 17-01-021 Application 17-01-022

OPENING TESTIMONY OF MAX BAUMHEFNER, JOEL ESPINO, AND MELISSA WHITED, SPONSORED BY THE NATURAL RESOURCES DEFENSE COUNCIL, THE GREENLINING INSTITUTE, PLUG IN AMERICA, THE COALITION OF CALIFORNIA UTILITY EMPLOYEES, SIERRA CLUB, AND THE ENVIRONMENTAL DEFENSE FUND ON MEDIUM AND HEAVY-DUTY AND FLEET CHARGING INFRASTRUCTURE AND COMMERCIAL EV RATES

August 1, 2017

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TABLE OF CONTENTS

I. INTRODUCTION AND SUMMARY OF RECOMMENDED MODIFICATIONS

In accordance with the April 13, 2017 "Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judges," (Scoping Memo) the Natural Resources Defense Council (NRDC), the Coalition of California Utility Employees, Plug In America, The Greenlining Institute, Sierra Club, and the Environmental Defense Fund submit the testimony of Max Baumhefner (NRDC), Joel Espino (Greenlining), and Melissa Whited (Synapse Energy Economics, on behalf of NRDC), on medium and heavy-duty and fleet charging infrastructure and commercial EV rates. With the modifications recommended below, Pacific Gas & Electric's (PG&E) "Fleet Ready," Southern California Edison's (SCE) "Medium and Heavy-Duty Vehicle Charging Infrastructure Program," SCE's commercial electric vehicle (EV) rates, and San Diego Gas & Electric's (SDG&E) Commercial GIR would meet the relevant statutory and regulatory criteria and should be approved.

A. With the Following Modifications, PG&E's Fleet Ready, SCE's Medium and Heavy-Duty Vehicle Charging Infrastructure Program, and SCE's Commercial EV Rates Should be Approved

1. SCE's Proposed Commercial EV Rates Should be Modified

We support SCE's efforts to develop commercial rates that are optimized for transportation electrification load and that will ensure such load supports the electrical grid while providing the opportunity for customers to realize fuel cost savings. As detailed in the testimony of Melissa Whited of Synapse Energy Economics in Section IV, we recommend the following improvements to SCE's proposed commercial rates:

- SCE should substantially reduce the large jumps in customer charges between its demand-based classes to avoid inequities between otherwise similar customers
- SCE should prevent customers from paying multiple demand charges when not appropriate
- SCE should use data from commercial circuits to inform commercial time-of-use periods
- SCE should follow the example of SDG&E by offering a purely volumetric "public" charging rate to allow customers who are offering charging services to the public to recover electricity costs volumetrically.

2. PG&E Should Commit to a Timeframe for Proposing Rates Optimized for Commercial, Public, and Direct Current Fast Charging Applications

PG&E should follow the example of SCE and SDG&E by committing to a date certain by which it will propose rates that are optimized for commercial, public, and Direct Current charging applications. Those proposals should be consistent with Public Utilities Code §740.12(a)(1), which specifies:

> *(G) Deploying electric vehicles should assist in grid management, integrating generation from eligible renewable energy resources, and reducing fuel costs for vehicle drivers who charge in a manner consistent with electrical grid conditions*
>
> *(H) Deploying electric vehicle charging infrastructure should facilitate increased sales of electric vehicles by making charging easily accessible and should provide the opportunity to access electricity as a fuel that is cleaner and less costly than gasoline or other fossil fuels in public and private locations.*

3. PG&E and SCE Should Adopt a Guiding Principle Regarding Load Management

PG&E and SCE should adopt the following principle to guide the implementation of their programs:

> *Must facilitate the integration of renewable energy resources, as well as deliver other grid benefits through appropriate rate design and other means of managing load.*

This would align with the directive included in Public Utilities Code §740.12(a)(1)(G) (emphasis added):

> *Deploying electric vehicles should assist in grid management, integrating generation from eligible renewable energy resources, and reducing fuel costs for vehicle drivers who charge in a manner consistent with electrical grid conditions.*

Likewise, this guiding principle is consistent with the relevant statutory standard of review, specified in Public Utilities Code §740.8, which defines "electrical service that is safer, more reliable, or less costly due to either improved use of the electric system or improved integration of renewable energy generation" as being in the interest of ratepayers.

4. PG&E and SCE Should Prioritize Sites that Include Complementary Technologies to Support the Grid and Renewable Energy Integration

PG&E and SCE should ask potential site hosts if they are contemplating installing on-site solar, energy storage, and/or vehicle-to-grid (V2G) capabilities and take the responses into

account when qualifying potential sites. This would better align with the directive included in Public Utilities Code §740.12(a)(1)(G) (emphasis added):

> *Deploying electric vehicles should assist in grid management, integrating generation from eligible renewable energy resources, and reducing fuel costs for vehicle drivers who charge in a manner consistent with electrical grid conditions.*

Likewise, preferential selection of sites that incorporate on-site solar, energy storage, and/or V2G is consistent with the relevant statutory standard of review, specified in Public Utilities Code §740.8, which defines "electrical service that is safer, more reliable, or less costly due to either improved use of the electric system or improved integration of renewable energy generation" as being in the interest of ratepayers.

5. PG&E and SCE Should Commit to Investments in Charging Infrastructure Across All Medium and Heavy-Duty Vehicle Types

PG&E and SCE should recognize that many types of medium and heavy-duty vehicles are ripe for electrification and different communities will benefit from the electrification of different types of vehicles. Accordingly, PG&E and SCE should commit to investments in charging infrastructure across vehicle types, including but not limited to transit buses, school buses, delivery and service trucks, on and off-road port and railyard trucks (including, but not limited to, truck stop electrification and transport refrigeration units), forklifts, power take-off units, airport shuttles, and off-road equipment.

6. PG&E and SCE Should Include Commitments to Supplier Diversity Consistent with the "Charge Smart and Save" and "Charge Ready" Settlement Agreements

PG&E and SCE should include commitments to supplier diversity consistent with the settlement agreements proposed in A.15-02-009 and A.14-10-014, reproduced below for reference:

- *Vendor and Contractor Diversity. The Charge Smart and Save program will be included within PG&E's WMDVBE goal. As such, the Charge Smart and Save program and contracts will request a subcontracting plan that meets PG&E's goal of reflecting the diversity of the communities it serves.*

- *SCE plans for the Charge Ready Program to support SCE's companywide Diversified Business Enterprise ("DBE") 40percent diverse spending goal. Solicitations and contracts will contain a DBE subcontracting plan, which requires the bidder/contractor to list its expected annual DBE*

> *spend with respect to the Charge Ready Pilot and list any subcontractors it plans to use to achieve its DBE goal. Bidders will be requested to provide proposals in support of SCE's goal of achieving at least 40percent diverse spend.*

Specifically, PG&E—to the maximum extent possible—should strive to meet or exceed its 2015 Diverse Business Enterprise spend of 44 percent and SCE—to the maximum extent possible—should strive to meet or exceed its 2015 DBE spend of 43 percent.[1]

7. PG&E and SCE Should Conduct Proactive Outreach to Ensure Community Representation on Program Advisory Councils

Given PG&E and SCE's programs are designed to provide air quality and other benefits to local communities, the advisory boards the utilities intend to convene to guide the implementation of their programs should include representatives from community based organizations familiar with environmental justice issues and goods movement. We recognize participation in the advisory boards is not restricted, but proactive outreach to community organizations will likely be needed to ensure environmental justice issues are adequately represented.

8. PG&E and SCE Should Conduct Customer Outreach Campaigns Targeting Disadvantaged Communities that Account for Barriers to Adoption that May Be Specific to those Communities

PG&E and SCE should strive to enroll as many participants as possible from sites located in (or that greatly benefit) Disadvantaged Community census tracts, pursuant Senate Bill 535 (De León, 2012).[2] To achieve this goal, PG&E and SCE should conduct customer education and outreach campaigns that specifically target those communities and that account for barriers to adoption that may be specific to those communities. For example, warehouses in the Inland Empire will likely require a tailored outreach effort to ensure adequate participation in that critical segment.

It is worth noting that the SCE Charge Ready Pilot has a requirement that at least 10

[1] Beavers, D., Chen, S., *2016 Supplier Diversity Report Card: California's Public Utilities*, The Greenlining Institute, September 2016, p. 13-14.

[2] *See* California Environmental Protection Agency, Office of Environmental Health Hazzard Assessment, *SB 535 Disadvantaged Communities*, at https://oehha.ca.gov/calenviroscreen/sb535. Investments that support the electrification of heavy-duty or medium-duty vehicles that operate a *majority* of the time in Disadvantaged Community census tracts can be deemed as greatly benefitting those census tracts.

percent of its charging stations would be deployed in Disadvantaged Communities pursuant to SB 535 and that PG&E's light-duty EV program has a requirement that at least 15 percent of charging stations be deployed in Disadvantaged Communities (with an additional goal of 20 percent in disadvantaged and/or CARE communities). So far, SCE is far exceeding its requirement; as of the most recent quarterly report, "50% of the 919 committed charge ports are located in disadvantaged communities."[3] Although light-duty and heavy-duty vehicle markets differ, there is great untapped demand for heavy-duty electric vehicles in Disadvantaged Communities. SCE's service territory alone is home to one of the two largest ports in the U.S. (the Port of Long Beach). Moreover, the second largest public transit agency in the country, Los Angeles County Metropolitan Transportation Authority, operates in SCE's service area and recently announced plans to shift its 2,200-bus fleet to electric buses.

9. PG&E and SCE Should Report on Relevant Program Metrics for Five Years After the Completion of Construction

PG&E and SCE both propose five-year programs, including metrics which will be detailed in public reports. They should clarify that the reporting requirements would remain in place for an additional five-years. Absent such an extension of the reporting period, the Commission and stakeholders will have no sustained visibility as to the performance of much of the infrastructure installed toward the end of the five-year construction period. Given the time required to build momentum within such a large program, installations that occur toward the end of that five-year period could account for a very significant portion of total installations. Of course, some metrics (e.g. installation costs) will no longer be relevant after construction, but others (e.g. charging load profiles and station utilization) will be of continued value. Such information could also be needed to comply with Public Utilities Code § 740.12(c) (emphasis added):

> *The commission shall review data concerning current and future electric transportation adoption and charging infrastructure utilization prior to authorizing an electrical corporation to collect new program costs related to transportation electrification in customer rates. If market barriers unrelated to the investment made by an electric corporation prevent electric transportation from adequately utilizing available charging infrastructure, the commission shall not permit additional investments in transportation electrification without a reasonable showing that the investments would not result in long-term stranded*

[3] SCE, *Charge Ready Pilot Program: Q1/2017 Report*, May 2017.

costs recoverable from ratepayers.

To satisfy the first sentence of this sub-section, "data concerning…charging infrastructure utilization" should be available for the charging infrastructure made possible by the PG&E and SCE programs, including infrastructure installed toward the end of the construction period. The Commission should note that the second sentence of this sub-section does not apply unless "market barriers unrelated to the investment made by an electric corporation prevent electric transportation from adequately utilizing available charging infrastructure," but charging infrastructure utilization data would be needed to determine if that clause triggering an additional "reasonable showing" by utilities for future proposals is satisfied.

10. PG&E and SCE Should Allow Customers the Option to Participate in the Program Using their Existing Service Connection

PG&E and SCE propose requiring participating customers to establish new, separately-metered service connections. At some sites, it could be more efficient to allow customers to install the charging stations on their existing service, avoiding duplicative demand charges in the process, and lowering program costs by avoiding the installation of unnecessary equipment. Allowing the option to participate in the program using existing service would also encourage customers to manage EV load such that it does not coincide with existing on-site loads.

B. With the Following Modifications, SDG&E's Commercial Grid Integrated Rate Should be Approved

We support the use of dynamic rates for transportation electrification loads when customers are equipped with the tools needed to allow them to "set-and-forget," letting technology optimize charging in response. Accordingly, we support SDG&E's efforts to develop a "Grid Integrated Rate" for commercial transportation electrification applications. However, consistent with the testimony of Melissa Whited in Section VI, the Commission should require the following modifications to SDG&E's proposed rate:

- The magnitude of the "Grid Integrated Charge" or "GIC" (i.e. demand charge) should be significantly reduced, as distribution demand-related costs are largely driven by coincident demands at the circuit or substation level. More demand-related costs should be recovered through the dynamic adders.
- To better reflect the inherent time-related nature of distribution peak demands and

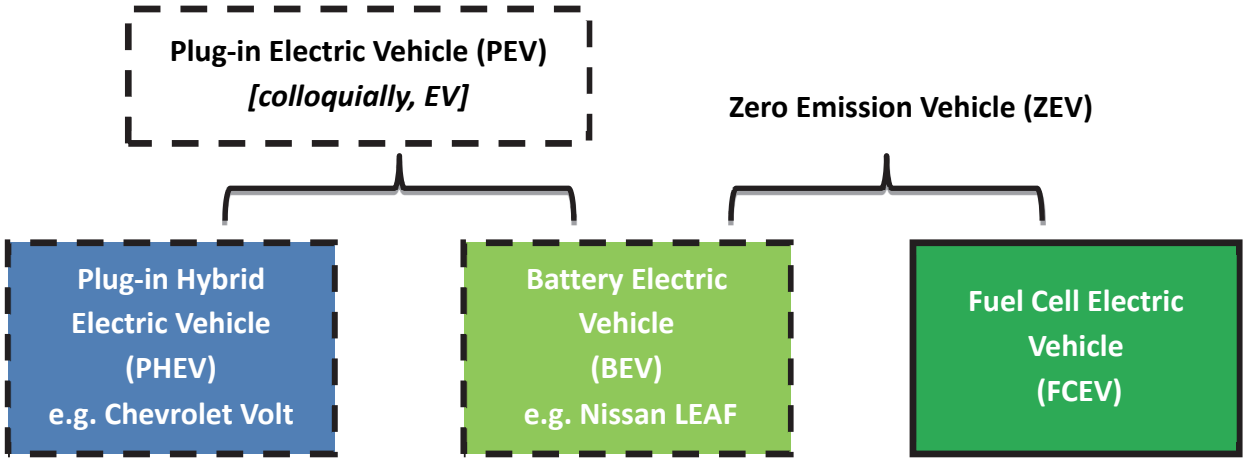
to provide customers a more actionable incentive to reduce demand when it matters most, the GIC be restricted to a smaller number of hours (e.g., 8 am to 5 pm), or be set higher during summer peak hours than during the rest of the year (e.g., $10/kW during summer peak hours, but $5/kW the rest of the year).

- The punitive ratchet feature should be removed and the period over which maximum demand is assessed should be changed. The GIC should be based on a customer's highest monthly hour of demand, rather than a customer's annual 15-minute peak demand.
- Any demand charge should be implemented as a continuous function, rather than in steps, to avoid dramatic and arbitrary differences in bills between otherwise similar customers, resulting from a single, minimal difference in peak usage.

II. VEHICLE TECHNOLOGY AND TERMINOLOGY

Regrettably, the transportation policy space rivals the traditional utility policy world in its use of acronyms. Figure 1 harmonizes the categories of vehicle technology described in sources used in this testimony.

Figure 1: Vehicle Types



The utility proposals made pursuant to Public Utilities Code §740.12 appropriately focus on plug-in electric vehicles (PEVs), commonly referred to as "electric vehicles" or "EVs," which can be charged with electricity from the electric grid. This includes both Battery Electric Vehicles (BEVs) that rely entirely upon electricity and Plug-in Hybrid Electric Vehicles (PHEVs) that rely upon electricity for daily driving needs, but use gasoline for longer trips.

While PHEVs can be driven primarily on electricity, they are not referred to as Zero Emission Vehicles (ZEVs) because they have tailpipe emissions when operating on gasoline.

III. POLICY – WITNESS MAX BAUMHEFNER, NRDC

A. Senate Bill 350 Provides the Commission a Singular Opportunity to Lead the Nation to Electrify the Transportation Sector

1. California's Leadership on Clean Energy is Critical While President Trump Attempts to Perpetuate America's Dependence upon Fossil Fuels

While President Trump attempts to withdraw from the Paris Agreement and while the recently confirmed administrator of the Environmental Protection Agency appears to be focused on protecting the interests of backwards-looking energy companies, California's largest electric utilities are looking forward:[4]

- *Through this Application, Southern California Edison enthusiastically joins the State in supporting a clean energy future. 2030 is only 13 years away, and Southern California Edison feels a sense of tremendous urgency to facilitate widespread transportation electrification—transforming a transportation sector powered primarily by fossil fuels to one fueled by clean electric power—necessary for the state to meet its climate change goals* [5]

- *In order to contribute to achieving the State's climate change and TE policies, SDG&E views its mission in this area as maximizing GHG reductions and minimizing overall costs while enabling the EV market and continuing to provide safe and reliable power at reasonable rates. This mission supports SDG&E's broader overarching mission to be the cleanest, safest and most reliable energy company in America.* [6]

- *Now, more than ever, new and sustained investment to promote clean transportation is critical to ensure that California is positioned to achieve the greenhouse gas (GHG) reduction goals outlined in SB 32 and the Governor's goal for Zero Emission Vehicle (ZEV) growth. Coordinated efforts in state policies and regulations, private investment and innovation, and supportive utility programs will build a sustainable ecosystem for clean transportation that will serve as a model for other states* [7]

[4] Brady Dennis and Steven Mufson ,*Thousands of emails detail EPA head's close ties to fossil fuel industry*, Washington Post, February 22, 2017.
[5] SCE, Application 17-01-021, p.3.
[6] SDG&E, A.17-01-020, p. MMS-5.
[7] PG&E, A. 17-01-022, p. 1-1.

Senate Bill (SB) 350 (De León, 2015) granted the Commission extensive authority to harness the enthusiasm and power of the electric utilities under its jurisdiction to advance California's leadership at a time when such leadership is desperately needed.

SB 350 amended Public Utilities Code §701.1 to change the mission of the electric industry, making "widespread transportation electrification" a "principal goal of utility resource planning and investment," on par with investments in renewable energy and energy efficiency. Utility investments in those other critical clean energy areas dwarf the collective investment proposed in the three transportation electrification applications.

Likewise, SB 350 directed the Commission to order the utilities under its jurisdiction to "accelerate widespread transportation electrification to reduce dependence on petroleum, meet air quality standards, achieve the goals set forth in the Charge Ahead California Initiative, and reduce emissions of greenhouse gases to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050."[8] While SB 350 did not specify a quantity of transportation electrification to be procured by the electric industry analogous to the requirement they procure at least half their electricity from renewable resources by 2030, examination of the relevant science and analysis reveals that, to meet the goals established by SB 350, California needs to electrify almost everything that moves.

It is estimated nearly twice as many Californians die from dirty air due to traffic pollution as from motor vehicle accidents.[9] Analysis conducted by the Air Resources Board (ARB), the South Coast Air Quality Management District, and the San Joaquin Valley Air Pollution Control District demonstrates there is no alternative to the widespread use of electricity as a transportation fuel if California is to comply with the 2023 and 2032 federal air quality standards referenced in Public Utilities Code §740.12.[10] More recent analysis conducted by ARB, which combines strategies for meeting air quality standards with strategies for meeting climate goals, confirms this finding, concluding that the vast majority of the on-road fleet must be Zero

[8] Public Utilities Code 740.12.

[9] 5,726 annual premature deaths in California due to PM 2.5 and 209 from ozone (Fabio Caiazzo et al., *Air pollution and early deaths in the United States*, Atmospheric Environment, 2013) compared to 3,081 traffic fatalities (*Selected Detail Within Leading Causes Of Death By Sex And Race/Ethnic*, California Department of Public Health.)

[10] *Vision for Clean Air: A Framework for Air Quality and Climate Planning*, June 27, 2012.

Emission Vehicles (ZEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) by 2050. ARB's analysis demonstrates that California's *Advanced Clean Car Regulation* will result in 1.7 million combined ZEVs and PHEVs statewide in 2025, increasing to 3.0 million in 2030, and 5.6 million in 2050. However, ARB's modelling shows that to meet the air quality standards and state climate goals included in Public Utilities Code §740.12, a much more aggressive deployment is required that would result in 1.7 million ZEVs and PHEVs in 2025, 4.2 million in 2030, and 24 million by 2050.[11]

ARB's analysis is confirmed by independent studies that have come to the same conclusion—meeting the greenhouse gas (GHG) emission reduction targets specified in Public Utilities Code §740.12 will require the widespread use of zero emission vehicles powered by low-carbon electricity.[12] In the words of one report published in *Science*:

> *The most important finding of this research is that, after other emission reduction measures were employed to the maximum feasible extent, there was no alternative to widespread switching of direct fuel uses (e.g., gasoline in cars) to electricity in order to achieve (California's GHG) reduction target.*[13]

The "carbon wedge" analysis from the same *Science* article is reproduced below, underscoring the critical role of the yellow "Electrification" wedge.[14]

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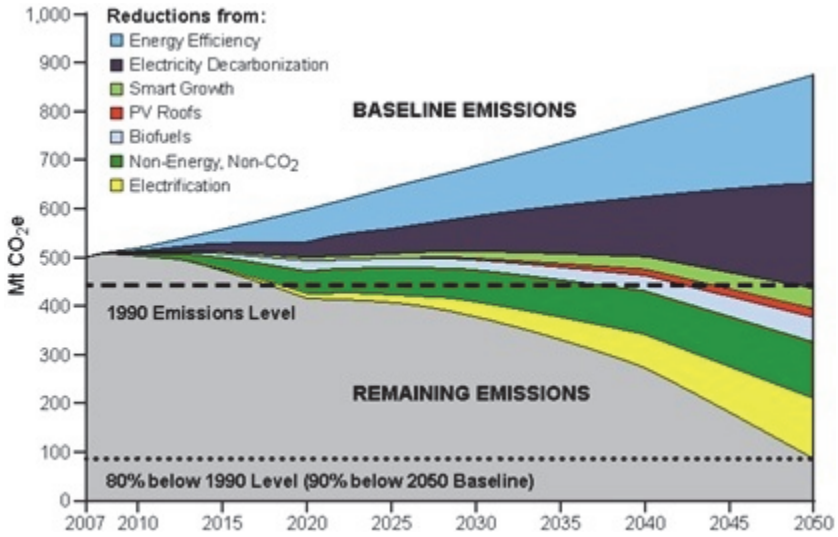
[11] Air Resources Board, *Mobile Source Strategy*, May, 2016, p. 66. Note: "Zero Emission Vehicle" includes both plug-in "Battery Electric Vehicles" (BEVs) and "Fuel Cell Electric Vehicles" (FCEVs), which could gain significant market share and play an important role in meeting 2050 climate goals, but plug-in electric vehicles (BEVs and PHEVs) remain the dominant advanced vehicle technology. Hydrogen fuel cell technology faces significant obstacles in terms of technology costs and a near-complete lack of re-fueling infrastructure. At this point, only two fuel cell models are available and only in very limited numbers. U.S. sales of fuel cell vehicles are forecast to total less than 8,000 through the end of this decade. (Baum and Associates, *U.S. Electric Vehicle Sales Forecast; Detail by Type by Company by Segment by Calendar Year*, Monday, March 09, 2015.) In sum, fuel cell electric vehicle technology lags significantly behind PEV technology, which will remain the dominant advanced vehicle technology beyond the useful life of the investments proposed in the current applications.

[12] *See* California Council on Science and Technology, *California's Energy Future*, May 2011; Williams et al., *The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity*, Science, January, 2012; Fred Silver and Tom Brotherton, *Research and Market Transformation Roadmap to 2020 for Medium- and Heavy-Duty Trucks*, California Energy Commission, February, 2013.

[13] Williams et al., *The Technology Path to Deep Greenhouse Gas Emission Cuts by 2050: The Pivotal Role of Electricity*, Science, January 2012.

[14] *See* California Council on Science and Technology, *California's Energy Future*, May 2011; Williams et al., *The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity*, Science, January, 2012.

Figure 2: Emission Reduction Wedges for California in 2050



Accelerating widepread transportation electrification as required by SB 350 is an essential component of a feasible strategy to meet the state's air quality standards and climate goals. SB 350 codified this fact:

> *Reducing emissions of greenhouse gases to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050 will require widespread transportation electrification* [15]

Likewise, SB 350 found:

- *Widespread transportation electrification is needed to achieve the goals of the Charge Ahead California Initiative.*[16]
- *Widespread transportation electrification requires increased access for disadvantaged communities, low- and moderate-income communities, and other consumers of zero-emission and near-zero-emission vehicles, and increased use of those vehicles in those communities and by other consumers to enhance air quality, lower greenhouse gases emissions, and promote overall benefits to those communities and other consumers.* [17]
- *Widespread transportation electrification requires electrical corporations to increase access to the use of electricity as a transportation fuel.* [18]

[15] Public Utilities Code §740.12(a)(1)(B).
[16] Public Utilities Code §740.12(a)(1)(C).
[17] Public Utilities Code §740.12(a)(1)(D).
[18] Public Utilities Code §740.12(a)(1)(E).

SB 350 further directed the Commission to take these findings into account in reviewing program such as those proposed in the three applications.[19]

The utilities have put forward transportation electrifications proposals based on scenarios designed to help California meet the climate, equity, and air quality goals specified in Public Utilities Code §740.12. The required investment is significant, but the Commission should also note that risk of stranded assets is minimized by the fact the programs are designed such that investments will generally only be made when there are willing partners in the form of site-hosts, fleet managers, and others who will be making matching investments, especially in the vehicles themselves. As PG&E notes, if demand for their standard review projects "is less than the approved revenue requirements during the 5-year period of the respective program, PG&E will return in rates any unspent funds to customers pursuant to guidance from the Commission."[20]

2. The Widespread Transportation Electrification that Would Result from Robust Implementation of SB 350 Should Benefit All Utility Customers

In an era of modest or declining load growth due to energy efficiency gains, growing customer investment in distributed generation, and increasing costs to maintain and modernize the grid, there is a growing concern about a dramatically-termed "death spiral," whereby increasing costs borne by a decreasing pool of customers causes rate increases that drive away more customers. This phenomenon will likely not result in the death of the electric industry or render the grid irrelevant, but it could result in increasing bills for those who can least afford to invest in distributed generation and home energy storage. Efficient transportation electrification could mitigate this adverse outcome.

Analysis conducted by researchers at the Pacific Northwest National Laboratory concludes there is sufficient spare generation capacity in the nation's electric grid to power virtually the entire light-duty passenger vehicle fleet without necessitating the construction of any new power plants, if vehicle charging load is integrated during off-peak hours and at lower power levels.[21] The same researchers also modelled impacts on the marginal price of electricity

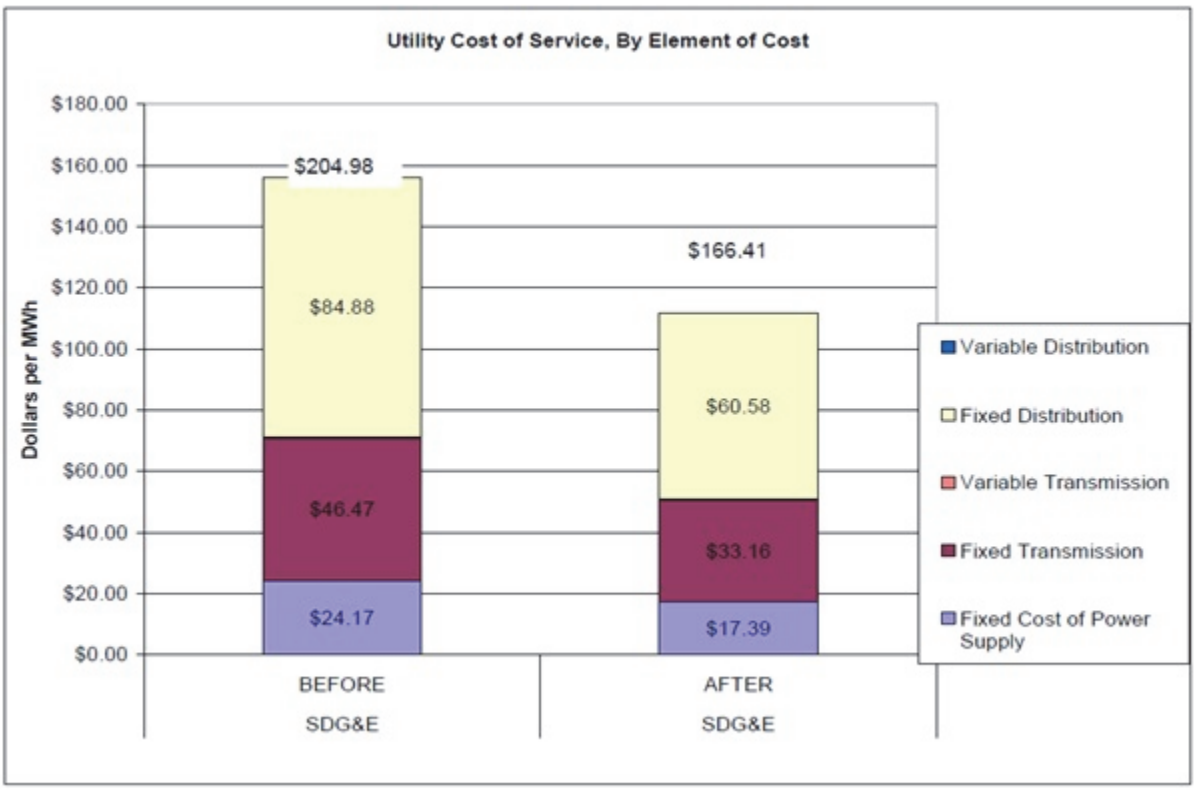
[19] Public Utilities Code §740.12(a)(2): "Agencies designing and implementing regulations, guidelines, plans, and funding programs to reduce greenhouse gas emissions shall take the findings described in (1) into account".

[20] *Pacific Gas& Electric Company Transportation Electrification SB 350 Prepared Testimony*, January 20, 2017, p. 1-3-1-4.

[21] Michael Kintner-Meyer Kevin Schneider Robert Pratt, *Impacts Assessment of Plug-in Hybrid Vehicles*

associated with transformative transportation electrification on two utilities, Cincinnati Gas & Electric and SDG&E. The results of a 60 percent EV penetration scenario in SDG&E territory are illustrated in Figure 3.

Figure 3: Theoretical San Diego Gas & Electric Cost of Service Before and After the Integration of Plug-in Vehicle Load (60 Percent Penetration Scenario)



These results should not be construed as a forecast, but the directional shift (~20 percent reduction in the cost of electricity) is significant. Non-EV customers would benefit from such efficient transportation electrification in the form of lower electricity bills. The current applications alone will not be sufficient to facilitate this level of transportation electrification, but they could play a critical role in accelerating adoption early in the market, placing California on a path to achieve significant net-benefits for the body of utility customers.

Transportation electrification load is unique in its potential to facilitate such a reduction in the cost of energy. There is no other load of comparable magnitude that is flexible enough to

on Electric Utilities and Regional U.S. Power Grids, November, 2007.

be pushed to hours of the day when the system is underutilized or when there is over-generation of renewable resources. In many ways, efficient transportation electrification is the most visible and scalable application to demonstrate the productive role utilities could play in managing a "smart grid" to provide reliable, environmentally responsible, and cost-effective energy services in a manner that does not leave the responsibility of paying for the electrical grid with those who are least able to do so.

IV. WIDESPREAD TRANSPORTATION ELECTRIFCATION REQUIRES PRIORITIZATION OF DISADVANTAGED AND LOW-INCOME COMMUNITIES– WITNESS JOEL ESPINO, THE GREENLINING INSTITUTE

A. Disadvantaged Communities are Critical to Widespread Transportation Electrification

1. Communities of Color are Necessary to Meeting State Greenhouse Gas Reduction Targets and Federal Air Quality Standards.

a. Exponential Adoption of Plug-in Electric Vehicles (PEVs) is Required to Meet Climate and Air Quality targets

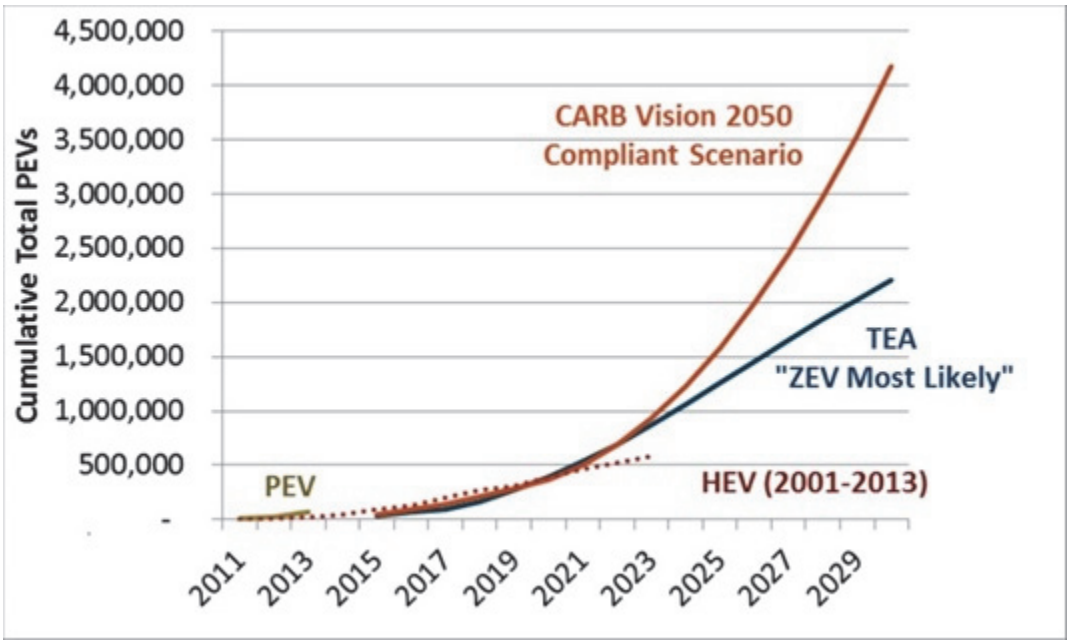
California is trailblazing a clean transportation future by setting the ambitious goals of getting 1.5 million zero-emission vehicles (ZEVs) on the road by 2025,[22] cutting California's greenhouse gas (GHG) emissions to 40 percent below 1990 levels by 2030[23] and 80 percent below 1990 levels by 2050.[24] As discussed above, many studies conclude that meeting California's mid- and long-term GHG emission reduction targets requires widespread transportation electrification.[25] Additionally, analysis conducted by the CARB, the South Coast Air Quality Management District, and the San Joaquin Valley Air Pollution Control District shows there is no alternative to the widespread transportation electrification if California is to

[22] Governor Edmund G. Brown, *Executive Order B-16-2012,* at https://www.gov.ca.gov/news.php?id=17472.
[23] Senate Bill 32 (Pavley, 2016); Governor Edmund G. Brown, *Executive Order B-30-15*, at https://www.gov.ca.gov/news.php?id=18938.
[24] Governor Arnold Schwarzenegger, *Executive Order* S-3-05, at https://www.gov.ca.gov/news.php?id=1861.
[25] *See* California Council on Science and Technology, California's Energy Future, May 2011; Williams et al., The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity, Science, January, 2012; Joshua Cunningham (Air Resources Board), Achieving an 80percent GHG Reduction by 2050 in California's Passenger Vehicle Fleet, SAE International Journal of Passenger Cars, December, 2010; Silver, Fred, and Brotherton, Tom. (CalHEAT). Research and Market Transformation Roadmap to 2020 for Medium- and Heavy-Duty Trucks. California Energy Commission.

comply with 2023 and 2032 federal air quality standards.[26]

Figure 4 below presents research conducted by ICF International and Energy and Environmental Economics (E3) comparing different PEV adoption rates. It shows California needs at least 4 million PEVs by 2030 to meet the 2050 GHG reduction goal ("CARB Vision 2050 Compliant Scenario").[27] The dotted line shows the historical pace of PEV adoption ("HEV"). The "TEA" line is based on ICF International and E3's research that shows the most likely rate of adoption.

Figure 4: Plug-in Electric Vehicles (PEV) Adoption Scenarios[28]



The conclusion is clear, there is no way to meet the 2050 goal at current adoption rates; we must bend the adoption curve dramatically upwards now. In California, exponential growth means

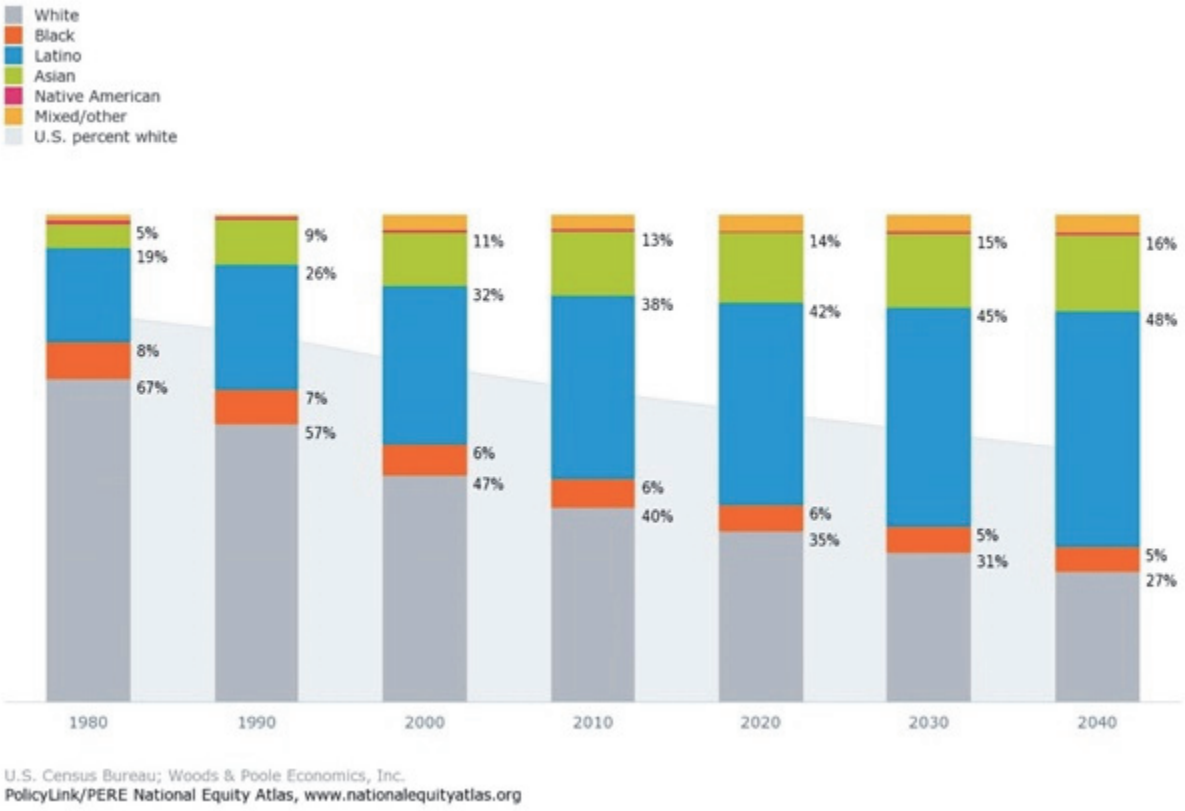
[26] *Vision for Clean Air: A Framework for Air Quality and Climate Planning*, June 27, 2012.
[27] *See, California Transportation Electrification Assessment*, prepared by ICF International and E3, October 23, 2014, p. 21, at http://www.caletc.com/wp-content/uploads/2014/10/CalETC_TEA_Phase_2_Final_10-23-14.pdf; *see also*, Espino, J., *EVs Need Equity: California is Ditching Big Oil to Charge Ahead with Clean Cars for All*, The Greenlining Institute – Blog, posted October 28, 2015.
[28] *See, California Transportation Electrification Assessment*, prepared by ICF International and E3, October 23, 2014, p. 21, at http://www.caletc.com/wp-content/uploads/2014/10/CalETC_TEA_Phase_2_Final_10-23-14.pdf; *see also*, Espino, J., *EVs Need Equity: California is Ditching Big Oil to Charge Ahead with Clean Cars for All*, The Greenlining Institute – Blog, posted October 28, 2015.

accelerated adoption *and use* of PEVs by communities of color.

b. Communities of Color are the Majority in California and Must Adopt and Use PEVs Now to Enable Exponential Growth

People of color are the fastest-growing consumer segment in California. Figure 5 below shows that from 1980-2010, people of color went from 33.4 percent of California's population to 59.8 percent, heading toward 73.1 percent by 2040. As people of color become a bigger part of California's workforce and population, the state's success and prosperity will depend on the social and economic well-being of these communities.[29]

Figure 5: Racial/ethnic composition - California, 1980-2040



In short, people of color need to purchase, lease, and use PEVs, for California to reach its climate and air quality goals. However, communities of color lack consumer awareness and familiarity with PEV technology, and have historically lacked the financial resources to access "early

[29] PolicyLink, *National Equity Atlas: Indicators – California*, at http://nationalequityatlas.org/indicators/Race~ethnicity/32756/California/false.

adopter" technology like PEVs.

Moving forward prioritization of transportation electrification investments—along with targeted marketing, outreach, and education that is relatable and accessible to low-income communities of color—will be critical to moving the PEV market beyond the early-adopter segment. Whether PEVs are purchased, leased, or shared by individuals (e.g. carsharing, vanpooling, etc.); or used in public transit (e.g. electric bus rapid transit), or for delivery of consumer goods—the underlying truth is that, because of demographic trends, people of color will have to use PEVs at exponential rates, in one form or another, to meet the state's climate and air quality goals.

c. Communities of Color Overwhelmining Support Climate Action and Clean Transportation and Are an Untapped Market for PEVs

There is pent up demand for PEVs in communities of color, which are concerned about air pollution and interested in solutions.[30] Greenlining partnered with Latino Decisions, Presente.org, Communities for a Better Environment, the California Environmental Justice Alliance, and Physicians for Social Responsibility-Los Angeles to conduct a poll of California Latino voters. According to the poll, over 90 percent demanded climate action, 81 percent agreed that more money should go to fight pollution in black and Latino communities, and 75 percent agreed that California should provide financial assistance for low-income families to buy clean cars.[31]

To make meaningful progress toward state and federal climate and air quality goals, public and private investments in PEV infrastructure should capitalize on the most environmentally supportive, and largest and fastest growing consumer segment in California by prioritizing investments in low-income communities of color.

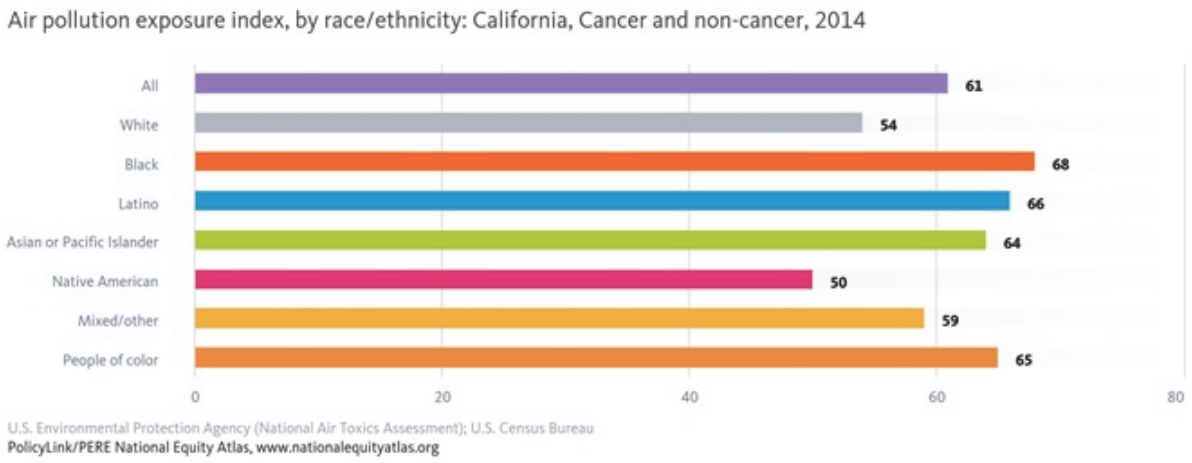
2. Poor Air Quality from Transportation Emissions Hits Low-Income Communities of Color First and Worst Due to Historical Racial Segregation and Structural Racism in Land-Use Planning and Government Policy.

The transportation sector creates nearly 40 percent of California's greenhouse gas pollution (the largest source of pollution in the state) and hits low-income communities of color

[30] C.C. Song, *Electric Vehicles; Who's Left Stranded*, The Greenlining Institute, August 2011, p. 4.
[31] *See*, My Home Sin Polucion – Poll Results, at http://www.myhomesinpolucion.org/.

hardest.[32] Dirty air from vehicles makes tens of thousands of Californians sick, costs us billions in avoidable health costs, and causes twice as many deaths as traffic related accidents.[33] The impacts of this pollution are far worse for lower income people of color.[34] In fact, "[g]reater exposure to dirty air is tied to race even more closely than to income: nearly 90 percent of residents in the most polluted regions of California are people of color, although they make up only about 60 percent of the state's population."[35] Greater exposure to transportation pollution in communities of color is tied to centuries of segregation and structural racism in land-use decisions and government policy, which has resulted in low-income communities of color living near busy roads, freeways, ports, and other freight corridors at higher rates than wealthier communities and whites.

Figure 6: Air Pollution: Exposure Index - California, 2014



As Figure 6: Air Pollution: Exposure Index - California, 2014Figure 6 shows, Latinos and Blacks have a pollution exposure index of 66 and 68, respectively, compared to an index of 54 for

[32] California Air Resources Board, *California Greenhouse Gas Emission Inventory*.
[33] *See* the Charge Ahead California Campaign, *One Million Electric Cars, Trucks and Buses Fact Sheet*. Note: 5,726 annual premature deaths in California due to PM 2.5 and 209 from ozone (Fabio Caiazzo et al., *Air pollution and early deaths in the United States*, Atmospheric Environment, 2013) compared to 3,081 traffic fatalities (*Selected Detail Within Leading Causes Of Death By Sex And Race/Ethnic*, California Department of Public Health.)
[34] *See* the Charge Ahead California Campaign, *One Million Electric Cars, Trucks and Buses Fact Sheet*.
[35] Chandler, S., Espino, J., and O'Dea, J., *Delivering Opportunity: How Electric Buses and Trucks Can Create Jobs and Improve Public Health in California*, Union of Concerned Scientists and The Greenlining Institute, Updated May 2017, p. 6.; *See also*, California Environmental Protection Agency, *Environmental Justice Program Update 2013– 2015*, at www.calepa.ca.gov/EnvJustice/Documents/2016/EJReport.pdf.

whites. This disproportionate exposure leads to higher rates of asthma, cancer, and other pollution-related illnesses, increased health costs and more missed school and work days for people of color.[36]

Moreover, a history of redlining—the proactive disinvestment of the public and private sector in communities of color—exacerbates the unequal impacts of air pollution. People of color have traditionally lacked the financial well-being that would enable them to afford to live in less polluted neighborhoods or enable them to pay for healthcare to manage the negative health impacts of prolonged exposure to pollution.

Figure 7: Working Poor - California

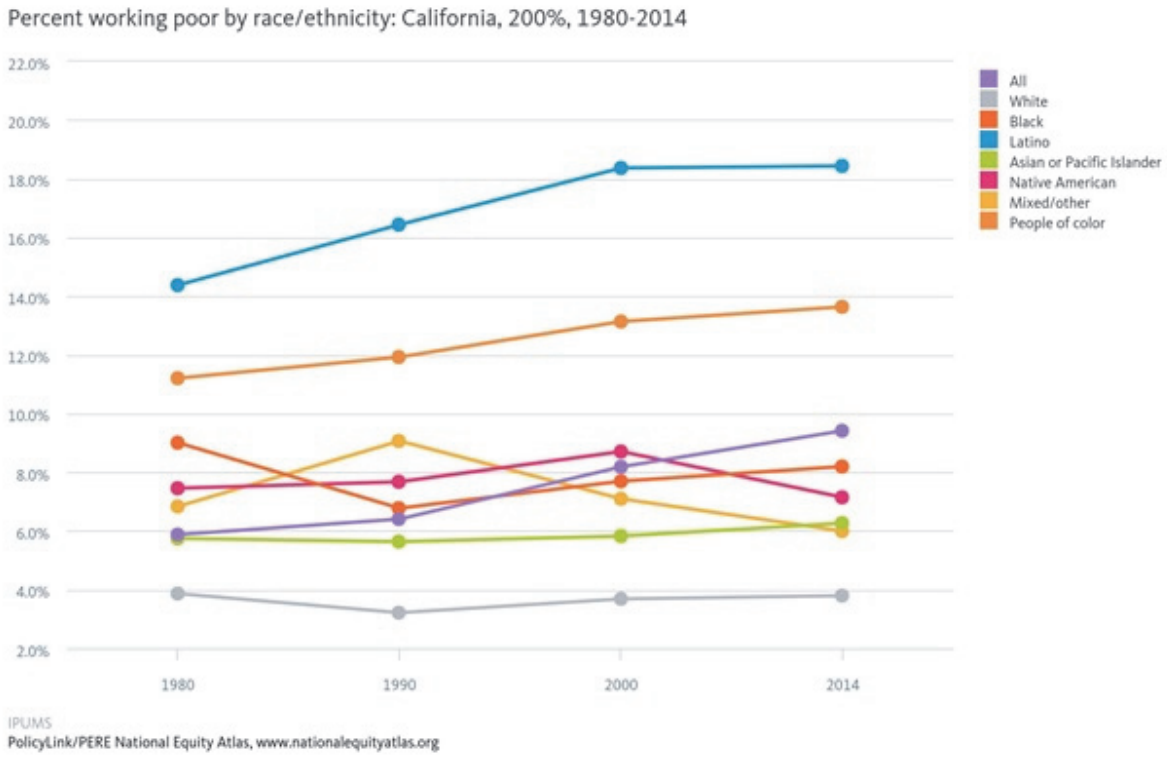


Figure 7 shows that between 1980 and 2014, the share of working poor white Californians remained steady just below 4 percent. During that same period, the share of working poor among people of color grew from 11.2 percent to 13.6 percent. As stated by PolicyLink, "[a]s the low-wage sector has grown, the share of adults who are working full-time jobs but still cannot make

[36] Espino, J., *EVs Need Equity: California is Ditching Big Oil to Charge Ahead with Clean Cars for All*, The Greenlining Institute – Blog, posted October 28, 2015.

ends meet has increased, particularly among Latinos and other workers of color," and thus, the "failure of even full-time work to pay family-supporting wages dampens the potential of millions of workers and our nation as a whole."[37]

In sum, policies, programs (like SCE and PG&E's Standard Review Projects), strategies, and investments aimed at reducing air pollution and greenhouse gas emissions to meet federal requirements and state goals must prioritize low-income communities of color that are disproportionately impacted. In other words, "When you protect the least of us, you protect all of us," as renowned environmental justice and equity advocate, Professor Manuel Pastor has said.[38]

B. Statutory Goals and Requirements Related to Increasing Transportation Electrification in Disadvantaged and Low-Income Communities in Senate Bill 350 (De León, 2015), Senate Bill 1275 (De León, 2014), and Senate Bill 1204 (Lara, 2014).

1. Senate Bill 350 and Senate Bill 1275

Senate Bill 350 amended Pub. Util. Code § 701.1 to change the mission of the utility industry, placing widespread transportation electrification on par with energy efficiency and renewable energy:

> *The Legislature finds and declares that, in addition to other ratepayer protection objectives, a principal goal of electric and natural gas utilities' resource planning and investment shall be … to improve the environment and to encourage the diversity of energy sources through improvements in energy efficiency, development of renewable energy resources, . . . and widespread transportation electrification* (emphasis added).[39]

Senate Bill 350 also added Pub. Util. Code § 740.12, which requires that the Commission direct the utilities under its jurisdiction to file applications:

> *[T]o accelerate widespread transportation electrification to reduce dependence on petroleum, meet air quality standards, achieve the goals set forth in the Charge Ahead California Initiative . . . , and reduce emissions of greenhouse gases to 40 percent below 1990 levels by 2030 and to 80 percent below 1990*

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[37] PolicyLink, *National Equity Atlas: Indicators – Working Poor California*, at http://nationalequityatlas.org/indicators/Working_poor/Trend:40221/California/false/Poverty_Level:200/.
[38] Espino, J., *EVs Need Equity: California is Ditching Big Oil to Charge Ahead with Clean Cars for All*, The Greenlining Institute – Blog, posted October 28, 2015 (quoting Manuel Pastor); *see also*, Manuel Pastor biography, at https://dornsife.usc.edu/pere/pastor/.
[39] Senate Bill 350, (De León, 2015).

levels by 2050 (emphasis added).[40]

The goals of the Charge Ahead California Initiative are as follows:

> [T]o place in service at least 1,000,000 zero-emission and near-zero-emission vehicles by January 1, 2023, to establish a self-sustaining California market for zero-emission and near-zero-emission vehicles in which zero-emission and near-zero-emission vehicles are a viable mainstream option for individual vehicle purchasers, businesses, and public fleets, *to increase access for disadvantaged, low-income, and moderate-income communities and consumers to zero-emission and near-zero-emission vehicles, and to increase the placement of those vehicles in those communities and with those consumers* to enhance the air quality, lower greenhouse gases, and promote overall benefits for those communities and consumers (emphasis added).[41]

In other words, Pub. Util. Code § 740.12 requires that the Commission and utilities accelerate widespread transportation electrification in a way that increases *access to, placement of*, and *use of* PEVs in disadvantaged, low-income, and moderate-income communities as mandated by SB 1275. This means the Commission and utilities must prioritize and direct meaningful charging infrastructure investments in these communities.

Senate Bill 350 also amended Pub. Util. Code § 740.8 to clarify the standard of review for utility transportation electrification proposals under Pub. Util. Code § 740.3, which is applicable to these applications:

> *740.8. As used in Section 740.3 or 740.12, "interests" of ratepayers, short- or long-term, mean direct benefits that are specific to ratepayers, consistent with both of the following:*
>
> *(a) Safer, more reliable, or less costly gas or electrical service, consistent with Section 451, including electrical service that is safer, more reliable, or less costly due to either improved use of the electric system or improved integration of renewable energy generation;*
>
> *(b) Any one of the following:*
>
> . . .
>
> (5) <u>*Creating high-quality jobs or other economic benefits, including in disadvantaged communities identified pursuant to Section 39711 of the Health and Safety Code*</u> (emphasis added).

[40] *Id.*
[41] Senate Bill 1275, (De León, 2014).

As part of the "ratepayer interest" determination, this section requires the Commission to evaluate and consider the job and economic benefit produced by utility transportation electrification proposals in disadvantaged communities.

2. Senate Bill 1204

Senate Bill 1204 ("SB 1204") created the "California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program," administered by the California Air Resources Board.[42] The goal of the program is to "fund development, demonstration, precommercial pilot, and early commercial deployment of zero- and near-zero emission truck, bus, and off-road vehicle and equipment technologies" and requires prioritization of "projects benefiting disadvantaged communities pursuant to [SB 535]."[43]

Moreover, SB 1204 required CARB to develop guidance that required the implementation of "purchase incentives for eligible technologies to increase use of the cleanest vehicles in disadvantaged communities."

C. Status of Light-Duty Electric Vehicle Programs Benefitting Disadvantaged Communities

1. The Charge Ahead California Initiative, Senate Bill 1275 (De León, 2014).

The Charge Ahead California campaign is a coalition of environmental justice, equity, and environmental groups (Coalition for Clean Air, Communities for a Better Environment, Environment California/Environment California Research & Policy Center, The Greenlining Institute, and the Natural Resources Defense Council) working to place one million light, medium, and heavy-duty plug-in electric vehicles ("PEV") on California's roads by 2023 and ensure that all Californians, especially lower-income households most impacted by air pollution, benefit from zero tailpipe emissions.[44] To achieve this goal, the Charge Ahead California campaign came together to co-sponsor the *Charge Ahead California Initiative* established by Senate Bill 1275 ("SB 1275").

To ensure low-income Californians benefit from PEVs, the Charge Ahead legislation sets

[42] Senate Bill 1204, (Lara, 2014).
[43] *Id*.
[44] Throughout this document, "PEV" and "EV" will be used interchangeably as umbrella terms for pure battery electric vehicles and plug-in hybrid electric vehicles.

a goal of one million PEVs on California roads by 2023, aims to create a self-sustaining PEV market, and works to *increase access* to PEVs in disadvantaged, low-income, and moderate-income communities and *increase placement* of PEVs in those communities.[45] Senate Bill 1275 directs the California Air Resources Board ("CARB") to use Greenhouse Gas Reduction Fund (non-electric sector cap-and-trade) dollars to create equity programs that increase access to clean transportation in low- and moderate-income communities and especially in "disadvantaged" communities identified pursuant to Senate Bill 535 (De León, 2012) that are most impacted by pollution and poverty.[46] Eligibility for these programs depends on the income level of the participant and whether that participant lives in a disadvantaged community pursuant to Senate Bill 535. Table 1 shows the income eligibility breakdown.

Table 1: Eligible Income Levels

Persons in Household	Low *225%**	Moderate *300%*	Above Moderate *400%*
1	$26,730	$35,640	$47,520
2	$36,045	$48,060	$64,080
3	$45,360	$60,480	$80,640
4	$54,675	$72,900	$97,200
5	$63,990	$85,320	$113,760
6	$73,305	$97,740	$130,320
7	$82,643	$110,190	$146,920
8	$92,003	$122,670	$163,560

Individuals at or below the maximum household income levels listed above qualify for various incentives with varying cash value.
*Based on Federal Poverty Level

Currently, there are five equity programs advancing the goals of SB 1275, described below.

1. Vehicle Retirement and Replacement (Enhanced Fleet Modernization Plus-Up)

a. How it works.

The Enhanced Fleet Modernization Program Plus-Up program provides additional

[45] Senate Bill 1275 (De León), Part 5 of Division of the Health and Safety Code, Chapter 8.5, Section 44258.4 (4)(B).
[46] *See*, California Environmental Protection Agency, *CalEnviroScreen 3.0*., at https://oehha.ca.gov/calenviroscreen/sb535

incentives to the existing scrap and replace program (the Enhanced Fleet Modernization Program or "EFMP") that already provides cash incentives to purchase or lease cleaner, more fuel-efficient cars. The EFMP "Plus-Up" program adds another layer of incentives to help low-income individuals and families scrap old, polluting clunkers and replace them with *used or new* advanced clean technology vehicles such as conventional hybrids, plug-in hybrids, or all-battery EVs.

EFMP Plus-Up participants can receive vouchers between $1,500 to $5,000, depending on income level (e.g. low-, moderate-, or above moderate-income) and the type of vehicle to be purchased (e.g. conventional hybrid, plug-in hybrid, or battery EV). For instance, low-income individuals can scrap their old clunker for a $5,000 voucher towards the purchase of a new or used plug-in hybrid EV (PHEV) or pure battery EV (BEV). The regular Enhanced Fleet Modernization Program (EFMP) gives $2,500 to $4,500 to individuals who scrap their clunker to buy a cleaner car. Therefore, the *combined cash incentives (EFMP and EFMP Plus-UP) range from $5,000 to $9,500*, depending on income level and vehicle type, with the lowest-income families buying the very cleanest car receiving the highest cash incentive.

Those vouchers can sometimes exceed the resale value of low-mileage used EVs that are still under warranty, providing participants immediate access to the benefits of driving an electric vehicle. If participants scrap an old clunker, but do not want to replace it, they can get between $2,500 and $4,500 (depending on income level) in vouchers for public transit passes and car-sharing. Plus-Up participants can also get an additional $2,000 for the purchase and installation of a charging station for battery electric cars at their homes.

b. Status of the Pilot.

Currently, the EFMP Plus-Up pilot is available in disadvantaged communities in two regions:

- *South Coast Air Quality Management District* ("SCAQMD")– includes all of Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino counties.[47] This pilot is branded as "Replace Your Ride."

[47] *See* South Coast Air Quality Management District, *Replace Your Ride*, at www.replaceyourride.com.

- *San Joaquin Valley Air Pollution Control District* ("SJVAPCD")– includes all of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare Counties and part of Kern County. Potential participants must attend a free smog check "Tune-in, Tune-up" event to qualify.[48] This pilot is administered by Valley Clean Air Now (CAN).

Since launching in the summer of 2015, the EFMP Plus-Up has been successful. Prior to fiscal year 2016-17, both air districts had received a total of $12M in funding.[49] Through December 2016, that has resulted in a total of *1,378 replacements* under EFMP Plus-Up: 794 in SCAQMD and 584 in SJVAPCD. Of those replacements about *40 percent of the vouchers have gone to PEVs*: roughly 15 percent have been for BEVs and about 25 percent for PHEVs. Data reported to CARB shows that 93 percent of these vouchers went to households that qualify as "low-income."[50] Per survey data gathered by Valley CAN through August 2016, all survey respondents say they are not worried about keeping up with monthly loan payments. Other findings:[51]

- Some participants found payments were as low as $50 per month
- One participant paid off his Nissan LEAF and now saves $80 per month used to spend on gas and his electricity bill has only increased by $15 per month
- Repair and maintenance savings ranged from $800 to $1,500 per year
- Fuel cost savings ranged from 30-60percent per month

For fiscal year 2016-17, Governor Brown and the legislature appropriated *$60M* for EFMP Plus-Up, a five-fold increase in funding from the previous two fiscal years. Because of this boost in funding CARB is working with the following air districts to launch their own EFMP Plus-Up program: Bay Area Air Quality Management District, Sacramento Metropolitan Air

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[48] *See* San Joaquin Valley Pollution Control District, *Vehicle Replacement*, at www.valleyair.org; *see also*, Sanchez, A. S., *California's Climate Investments: 10 Case Studies Reducing Poverty and Pollution*, the Greenlining Institute, October 2015, p. 10, at http://greenlining.org/wp-content/uploads/2015/11/CCI-Case-Studies-RPP-to-post-singles.pdf.

[49] *See* California Air Resources Board, *Low Carbon Transportation Investments and Air Quality Improvement Program: Public Workshop on the Fiscal Year 2017-18 Funding Plan*, at https://www.arb.ca.gov/msprog/aqip/fundplan/fp_workshop_presentation_final_021017.pdf.

[50] *See* California Air Resources Board, *Enhanced Fleet Modernization Program Plus-Up Work Group*, at https://www.arb.ca.gov/msprog/aqip/meetings/022417_EFMPworkgroupagenda.pdf.

[51] *See* Valley Clean Air Now, *Enhanced Fleet Modernization Program Plus Up Program Results and Testimonials: Customer Feedback from San Joaquin Valley EFMP Plus Up Participants*.

Quality Management District, and the San Diego County Air Pollution Control District. CARB anticipates launching pilots in some of these regions by the end of 2017. Additionally, Volkswagen, Audi, and Porsche will send CARB *$25M* by July 2017 to support EFMP Plus-Up pursuant settlement terms related to "defeat devices" in its 3-liter diesel passenger cars.[52]

In short, demand for PEV charging infrastructure among low- and moderate-income consumers throughout California is poised to significantly increase. Limited access charging will impact PEV adoption rates in low- and moderate-income communities. EFMP Plus-Up administrators and other administrators of EV equity programs have identified access to charging at home as a barrier limiting program success.

2. Low-Income Financing Assistance Pilot Project.[53]

Supplemental Clean Vehicle Rebate Project (CVRP) rebates can allow low- and moderate-income consumers to lease and finance new EVs for effectively monthly payments that are lower than some cell phone bills. However, many lack the credit history or credit worthiness needed to take advantage of attractive financing options. This financial assistance program provides credit enhancement to allow low-income consumers to combine state incentives with private financing. Additionally, this program covers financing to buy and install EV charging equipment in single-family homes or multiunit dwellings.

Currently, CARB is funding one financing assistance pilot. CARB has selected the Community Housing Development Corporation in Richmond ("CHDC") as an administrator. CHDC launched the program in January 2016 to provide loans of $4,000-8,000 at an 8 percent interest rate to residents of disadvantaged neighborhoods in Alameda, Contra Costa, Santa Clara, Santa Cruz, Solano and San Francisco Counties.[54] Applicants might also be eligible for a buy-down grant of up to $5,000, in addition to the loan. The program also offers grants of up to $2,000 to buy and install EV charging equipment in single-family homes or multiunit dwellings.

Governor Brown and the legislature appropriated $6M for this program in fiscal year

[52] *See* California Air Resources Board, *CARB Announces Partial Consent Decree for Audi, Volkswagen, and Porsche 3-liter diesel vehicles*, at https://www.arb.ca.gov/newsrel/newsrelease.php?id=885.
[53] *See* California Air Resources Board, *Low Carbon Transportation Light-Duty Project Projects that Benefit Disadvantaged Communities* at http://www.arb.ca.gov/msprog/aqip/ldv_pilots.htm.
[54] *See* Community Housing Development Corporation Richmond, *Ways to Work brochure*, at http://www.chdcnr.org/wp-content/uploads/2016/04/WtW_Trifold_Brochure_CHDCvARBfinal2016.pdf.

2016-17. CARB recently closed a solicitation for a statewide financing assistance administrator and will preserve some funding for regional financing assistance pilots like the Bay Area pilot. For fiscal year 2017-18, CARB is proposing a $20M to $25M funding allocation for this pilot.

3. Low-Income Electric Carsharing Pilot Project.

This program will provide electric carsharing services in disadvantaged communities, pursuant to Senate Bill 535. It is designed to increase the visibility and use of electric vehicles, improve mobility, economic opportunity, and air quality in the neighborhoods most impacted by pollution and poverty. Carsharing allows individuals to enjoy cars when they need them while avoiding the costs associated with car ownership.

CARB has selected the following grantees:

- The city of Los Angeles received a grant $1.7 million to double car-sharing in LA, placing 100 clean cars and 110 Level 2 EV charging stations in disadvantaged communities with a goal of serving over 7,000 users. The program launched in June of 2017 and has a goal of establishing 40 or more locations in 2017.[55]

- Sacramento Metropolitan Air Quality Management District received a $1.4 million grant to provide eight EVs and charging stations for a carsharing system in three disadvantaged community subsidized housing projects. The program launched in May of 2017 and will serve up to 2,000 residents.[56]

Governor Brown and the legislature appropriated $8M for more carsharing pilots in fiscal year 2016-17. CARB anticipates funding six projects with this funding. CARB just closed an $8M solicitation to expand existing projects and launch more projects throughout the state. The 15 applicants proposed a total of $21.6 million in projects.[57] CARB is proposing a $20M to $25M funding allocation for this pilot for fiscal year 2017-18.[58]

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[55] *See* California Air Resources Board, *Summary of the Car Sharing and Mobility Options Pilot Project*, at https://www.arb.ca.gov/msprog/aqip/ldv_pilots/car_sharing_faq.pdf; *See also* https://www.bluela.com/.
[56] *Id*.; *See also* http://ourcarshare.org/.
[57] California Air Resources Board, *Fiscal Year 2016-2017 Car Sharing and Mobility Options Pilot Project List of Applications Received and Project Executive Overviews*.
[58] *See* California Air Resources Board, *Low Carbon Transportation Investments and Air Quality Improvement Program: Public Workshop on the Fiscal Year 2017-18 Funding Plan*, at

4. Agricultural Worker Vanpools in the San Joaquin Valley.[59]

Governor Brown and the legislature appropriated $3M for this program in fiscal year 2016-17. This pilot is intended to expand access to clean vanpools to agricultural workers in the Central Valley. The funding covers HVIP vehicles, conversions, and some funding for charging infrastructure. The solicitation is currently under development and CARB anticipates its release in March of 2017.

5. Rebate Income Cap and Supplemental Incentives for Low- and Moderate-Income Consumers.

The statewide Clean Vehicle Rebate Project (CVRP) currently provides rebates of $2,500 toward the purchase or lease of a new BEV or $1,500 for a new PHEV to income eligible consumers.[60] The Charge Ahead campaign advocated to secure supplemental incentives to poor and working class Californians to further increase access to PEVs. Thus, in March 2016, low- and moderate-income consumers were eligible for higher rebates of $4,000 to buy or lease a new BEV and $3,000 for a new PHEV. At the end of the 2016 legislative cycle, the budget bill—Senate Bill 859 (2016)—increased the rebate amounts for low- and moderate-income consumers and further modified the income cap on CVRP that CARB had established pursuant to SB 1275:

Table 2: Modifications to the Clean Vehicle Rebate Project

Program Component	Before (in thousands)	After (in thousands)
Income Cap		
Single Filer	$250	$150
Head-of-Household Filer	$340	$204
Joint Filer	$500	$300
Increased Rebates for Low-Income Consumers*		
EV (e.g. Nissan Leaf)	$4	$4.5
Plug-in Hybrid EV (e.g. Chevy Volt)	$3	$3.5

*Applicant must have a household income less than or equal to 300 percent of the federal poverty level
Source: Senate Bill 859 (2016)

https://www.arb.ca.gov/msprog/aqip/fundplan/fp_workshop_presentation_final_021017.pdf.

[59] *See* California Air Resources Board, *Low Carbon Transportation Investments and Air Quality Improvement Program: Public Workshop on the Fiscal Year 2017-18 Funding Plan*, at https://www.arb.ca.gov/msprog/aqip/fundplan/fp_workshop_presentation_final_021017.pdf.

[60] *See*, Center for Sustainable Energy, *Clean Vehicle Rebate Project,* at www.cleanvehiclerebate.org.

Now, consumers will not be eligible for the CVRP rebate at all if their gross annual incomes are above the amounts in the "After" column. This will ensure that limited state dollars go to consumer's whose decision is highly influenced by the rebate.

In sum, Greenlining, in coalition with other members of the Charge Ahead Campaign, continue to use the *Charge Ahead California Initiative* and other strategies and tactics to increase access to clean transportation options in low-income communities and communities of color, which are hit first and worst by poverty and pollution. Moreover, because of the funding boosts these EV programs have received and the boosts CARB is proposed for fiscal year 2017-18, Greenlining anticipates a significant increase in demand for EV charging infrastructure in disadvantaged, low-income, and moderate-income communities throughout California. It will be critical to align SB 350 transportation electrification efforts with this increased demand.

D. Status of Heavy-Duty Electric Vehicle Programs Benefitting Disadvantaged Communities

As discussed above, SB 1204 created the "California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program." In response to this, CARB created the following projects:[61]

- *Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)*: To date, 3,022 HVIP voucher have been disbursed for a total of over $85 million. 73% of these vouchers have been requested in disadvantaged communities for over $68 million.
- *Clean Urban Buses*: To date, this project has received $57.8 million.
- *Clean School Buse*s: To date, $17.6 million has been awarded for a Sacramento regional project and a rural pilot project.
- *Clean Delivery Trucks*: To date, $18.1 million has been awarded for four projects.
- *Clean Drayage Trucks*: To date, $23.6 million has been awarded for statewide demonstration of forty-three zero-emission battery electric and plug-in hybrid drayage trucks serving major California ports.
- *Clean Trucks and Rail Yards and Freight Distribution Centers*: To date, $9.1 million

[61] California Air Resources Board, *Heavy-Duty Vehicles and Off-Road Equipment Investments*.

has been awarded for a project in San Bernardino, Commerce, and Fontana that will demonstrate twenty-seven BYD zero-emission battery electric yard trucks and service trucks at freight facilities and rail yards.

- *Multiple Clean Technologies Used in Goods Movement*: To date, $19.5 million has been awarded for two projects.

Moreover, CARB is recommending $140-150 million for heavy-duty vehicle low carbon transportation projects for fiscal year 2017-18.[62] Historically, between 45 percent and 100 percent of these investments have been invested in or benefitted Disadvantaged Communities.[63] The proposals put forward by PG&E and SCE to reduce the cost of charging infrastructure for medium- and heavy-duty vehicles provide California the opportunity to stretch those dollars further, allowing programs CARB is implementing pursuant to SB 1204 to focus on reducing the significant incremental cost of medium- and heavy-duty EVs. Likewise, the those programs, which are largely funded with cap-and-trade revenues from regulated entities outside of the electric sector represent a non-utility-customer source of funding SCE and PG&E's programs can leverage, in line with the guidance include in the Commission's ruling to implement Public Utilities Code § 740.12.

V. SCE'S COMMERICAL RATES - WITNESS MELISSA WHITED, SYNAPSE ENERGY ECONOMICS, ON BEHALF OF NRDC

A. Overview of Southern California Edison's Proposed Commercial EV Rates

Southern California Edison's Transportation Electrification proposals include three new, optional commercial rate schedules for the exclusive purpose of EV charging.[64] These new rates have similar structures that rely heavily on time of use (TOU) energy charges.[65] The three rate schedules apply to customers with different charging demands. The proposed TOU-EV-7 rate applies only to customers with EV charging demand of 20 kW or less, TOU-EV-8 is available to customers with peak demand between 21 and 500 kW, and TOU-EV-9 applies to customers with

[62] California Air Resources Board, *Funding Plan 2017-18 Workshop*.
[63] *See* California Air Resources Board, *Fiscal Year 2016-17 Funding Plan,* at 6.
[64] EV charging stations on these rates will be separately metered from the host customer's load.
[65] Application of Southern California Edison Company (U 338-E) for Approval of its 2017 Transportation Electrification Proposals. A.17-01-021. January 20, 2017. At 7.

demand greater than 500 kW.[66] SCE's proposal does not seek to modify or eliminate any of the currently available commercial TOU-EV rates.[67]

SCE's newly proposed commercial EV rates include TOU energy charges that apply to updated TOU periods including a summer evening "on-peak" period, a winter evening "mid-peak" period, a winter daytime "super off-peak" period, and an "off-peak" period that covers all nights and summer daytimes.[68] For the first five years in which these rates are available, the TOU energy charges will be used to recover all generation, distribution, and transmission costs. From the sixth through the eleventh year, SCE proposes to linearly phase in a non-coincident monthly facilities-related demand (FRD) charge. From the eleventh year onward, this demand charge will be set to recover 60 percent of distribution capacity costs and 100 percent of transmission capacity costs.[69] Each new rate incorporates a monthly customer charge consistent with current, otherwise applicable commercial tariffs for each peak demand block. These customer charges amount to $23.40/month for TOU-EV-7 customers, $220.30/month for TOU-EV-8 customers, and between $303.25 and $2,051.48 per month for TOU-EV-9 customers.[70]

The customer charge and demand charge components of the proposed rates are summarized in the table below:

Table 3: Customer Charge and Demand Charge Components of SCE's Commercial EV Rates

Rate Schedule		Maximum Demand (kW)	Customer Charge ($/month)	Demand Charge ($/kW)						
				Years 1-5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11+
TOU-EV-7		20	$23.40	$0.00	$1.20	$2.41	$3.61	$4.82	$6.02	$7.23
TOU-EV-8		500	$220.30	$0.00	$1.83	$3.66	$5.49	$7.32	$9.14	$10.97
TOU-EV-9	Secondary	Above 500	$303.25	$0.00	$2.15	$4.31	$6.46	$8.61	$10.77	$12.92
	Primary		$634.89	$0.00	$2.18	$4.36	$6.54	$8.72	$10.90	$13.08
	Subtransmission		$2,051.48	$0.00	$1.12	$2.25	$3.37	$4.49	$5.62	$6.74

Source: Response to NRDC-SCE-002 Q.5, Attachment

Many aspects of SCE's proposal will help to support adoption of EVs and charging in a

[66] Testimony of Southern California Edison Company in Support of its Application of Southern California Edison Company (U 338-E) For Approval of its 2017 Transportation Electrification Proposals (TE Testimony). A.17-01-021. January 20, 2017. At 62.
[67] Id. at 60.
[68] Id. at 63-64.
[69] Id. at 66-67.
[70] SCE response to Data Request Set A.17-021 NRDC-SCE-002 Question 02.c.

manner that is compatible with grid conditions. Specifically, the proposal has the following strengths:

- TOU energy rates that encourage charging during off-peak, low-cost times.
- Updated TOU periods that better reflect recent trends in generation and distribution costs during different times of the day, including the need for flexible ramping capacity. Since the updated on-peak periods do not start until 4 p.m., commercial customers will be able to charge EVs at low rates during nearly the entire workday.
- Generally reduced demand charges relative to current rates, which are designed to reflect only the non-peak related costs of the distribution and transmission system.[71]

Despite the strengths listed above, SCE's proposal suffers from a few significant drawbacks, as described below.

B. SCE Should Recover Only 40 Percent of Distribution-Related Capacity Costs Through the Demand Charge

SCE states that it will collect "60 percent of all distribution capacity costs" through a non-coincident facilities-related demand charge "that is *not* differentiated by TOU period or by season and is billed based on the customer's maximum demand at any point in any given month."[72] The Company bases this 60 percent factor on the analysis contained in Appendix E.[73] However, Appendix E to SCE's testimony clearly identifies 60percent of distribution costs as "peak-related," and 40percent as "non-peak-related" (also referred to as "grid-related.")[74] The appendix also clarifies that the "peak-related" costs are "time-dependent" and therefore useful for informing TOU rates and periods, whereas grid-related costs are not time-dependent (and therefore best recovered through a non-coincident peak charge).[75]

Recommendation

I recommend that SCE revise its proposed rates and bill impact analysis to allocate only 40 percent of distribution capacity costs to the FRD.

[71] Appendix E, page 38
[72] TE testimony, page 66
[73] TE testimony, page 72 (footnote 128)
[74] TE testimony, Appendix E, page E-29.
[75] TE Testimony, Appendix E, page E-25

C. SCE Should Implement a Public DC Fast-Charging Rate Without a Demand Charge Prior to Year 6

DC Fast Charging stations will be increasingly important to expanding the EV market. However, rate designs with demand charges pose a key barrier to DC fast charging stations that serve drivers who are not the same as the customer of record. Demand charges are set by a customer's monthly maximum demand, rather than based on energy usage, yet users of DC fast charging stations are typically billed based on energy usage or some other factor. Because the volume of energy delivered through a DC fast charging station may vary significantly from month-to-month, it is difficult for the customer of record to accurately set a fee that recovers the demand charge costs from the drivers who use the station.

Under SCE's proposal, the new EV rates would not include a demand charge prior to Year 6. Thereafter, however, the demand charge would increase until Year 11, which would cause difficulties for DC fast charging station owners.

Recommendation

In order to promote the expansion of public charging infrastructure, SCE should implement a public DC fast charging rate without a demand charge prior to Year 6 in order to simplify the payment arrangements and ensure that the costs of operating the station can be recovered through volumetric user fees.

D. SCE's Proposed Commercial EV Customer Charges Should Be Modified to Ensure They Are Not a Barrier to Workplace Charging

Most notably, the stark difference in customer charges between the TOU-EV-7 and TOU-EV-8 rates will likely discourage commercial customers from installing more than two EV charging stations. Under the current proposal, if the metered charging station peak demand increases from 20 kW to 21 kW, a customer would see their monthly customer charge increase by a factor of nearly 10. This increase would by itself result in an annual bill increase of more than $2,300, a 65 percent jump for a typical customer.

Such an increase in the customer charge would strongly incentivize customers to keep the peak demand of their charging stations below 20 kW. A typical Level 2 EV charger has a maximum output rating of 7.2 kW. A commercial entity with three standard Level 2 charging stations could expect to hit a maximum demand of 21.6 kW, pushing it beyond the TOU-EV-7

upper bound into the TOU-EV-8 rate class, with an attendant $2,300 increase in the customer's bill. This would clearly discourage commercial customers from installing more than two charging stations. Such a disincentive would unnecessarily and arbitrarily impede the development of the EV market, and would undermine the Commission's goals of supporting vehicle electrification with appropriate rate designs. A drastic spike in bills with a marginal increase in peak demand is also inconsistent with established rate design principles including pricing efficiency, bill stability, bill understandability, and fairness.

Recommended Modification

SCE should substantially decrease the large jumps in customer charge between its demand-based classes. There are several possible ways of accomplishing this:

- First, SCE could develop customer charges for additional customer sizes.
  - The cost of a line transformer that serves a customer with maximum demand of 450 kW is significantly more than the cost of a transformer to serve a customer with a maximum demand of 50 kW. SCE could develop customer charges that better reflect these cost differentials. For example, SCE could institute categories of 20-50 kW, 50-100 kW, 100–200 kW, etc., or other size intervals that better reflect customer distribution system equipment.
  - Alternatively, for EV rates, SCE could institute a small additional fixed charge per EV charging station installed (with different charges for Level 1, Level 2, and DC Fast Charger stations). However, this may not be reasonable if costs do not increase linearly with demand.
- Another option would be for SCE to move a portion of the line transformer costs currently recovered through a customer charge into some form of a demand charge for customers with demand greater than 20 kW. Encouragingly, SCE states that its 2018 General Rate Case filings include a proposal to recover a portion of Final Line Transformer costs through a demand charge rather than a customer charge for customers with demand greater than 20 kW.[76] A similar change to the proposed EV rate structure could reduce the bill impact for customers who install enough EV charging stations to

[76] SCE response to Data Request Set A.17-021 NRDC-SCE-002 Question 0-2.e.

push their EV peak load above 20 kW.

E. SCE Should Eliminate or Reduce Multiple Demand Charges for Certain Customers

Because EV chargers would be metered separately, SCE's newly proposed rates would result in a customer paying separate non-coincident peak (NCP) demand charges for both EV load and separately metered non-EV (host) load on the same premises. This is a departure from previous EV rates offered by SCE, where the customer would only pay the higher of the EV or host load.[77] Under the new proposal, EV customers could ultimately pay significantly higher total demand charges under the new EV rate than they would if their EV load was metered together with their host load. SCE's illustrative calculations indicate that if EV and non-EV load do not peak at the same time, moving to a new EV rate could increase a customer's total demand charge by up to 30 percent.[78]

The application of dual demand charges raises at least two concerns. First, the demand charge (FRD) is designed to collect grid-related demand costs that are not associated with peak load. These costs include the cost of land for distribution substations and lines, which according to SCE's Rate Design Window testimony[79] are "driven by the physical connectivity of customer to the grid." For geographically-dispersed customers, this is a compelling rationale. However, for a customer whose EV load is located on the same premises as the host customer's load, no additional land must be purchased to serve the EV load.

Second, two separate demand charges could perversely reduce a customer's incentives to minimize their combined peak demand from their host load and their EV load. If the distribution equipment is sized to meet the customer's aggregate demand, then separate demand charges will not provide an efficient price signal.

Recommendation

SCE should modify its demand charge to only charge for the incremental demand that is being added to that portion of the distribution system by billing the customer based on the

[77] TE Testimony at 67-68.
[78] SCE response to Data Request Set A.17-021 NRDC-SCE-001 Question 07.
[79] TE Testimony, Appendix E, pages E-27 – E-29.

maximum aggregate demand of the EV load and the customer's host load.

F. SCE Should Consider Developing EV Rates that Reflect Local Distribution System Conditions

SCE's rate design proposal reflects the time-varying nature of electricity generation and delivery costs through TOU rates. However, in developing the TOU periods underlying its proposed commercial EV rates, SCE used all distribution circuits for which it had hourly data to calculate hour-specific marginal distribution costs.[80] SCE states that it did not focus on commercial circuits when determining commercial TOU periods, and states that it is unable to provide peak data for commercial circuits, since SCE has not evaluated this data itself.[81]

The approach that SCE took when developing rates provides a general indication of when the system is most stressed, and therefore provides helpful information to guide EV charging times. However, SCE's method does not reflect the constraints facing a particular circuit, which could peak at a very different time than the rest of the system. Circuits that serve primarily commercial load may tend to peak earlier than circuits that primarily serve residential load. Prices that better reflect local conditions may help to mitigate the need for distribution system upgrades as EV adoption grows.

Recommendation

I recommend that SCE consider implementing pricing that provides information regarding local grid conditions in the future. For example, SCE could implement local distribution circuit critical peak pricing for the top 50 circuit hours, which is similar to what SDG&E has proposed.

VI. SDG&E'S COMMERICAL RATE - WITNESS MELISSA WHITED, SYNAPSE ENERGY ECONOMICS

We recognize that SDG&E's commercial rate was proposed in the context of priority review projects, but SDG&E has indicated the rate would be made available to all commercial customers, which we support because rates designed with transportation electrification in mind

[80] SCE response to Data Request Set A.17-021 NRDC-SCE-002 Question 0-3.a.
[81] SCE response to Data Request Set A.17-021 NRDC-SCE-002 Question 0-3.b-c.

should not be limited to the locations targeted by SDG&E's pilots.[82] Accordingly, consistent with the Scoping Memo requesting testimony on "commercial rates" to be served on this date, we submit the following:

A. Overview of SDG&E's Proposed Commercial Grid-Integrated Rate

SDG&E's proposed Commercial GIR would apply to participants on SDG&E's proposed "Fleet Delivery Services project," but would also be available to any commercial customer, which is appropriate given all customers should have access to rates that are designed with transportation electrification loads in mind.[83] The Commercial GIR is based on the medium/large Commercial & Industrial (C&I) class rates and would consist of the following components:

- Grid Integration Charge (GIC): a demand charge with a ratchet. The GIC would be "applied to a customer's maximum annual demand" outside of the super-off peak period. The GIC is designed to recover all customer-related costs and 80 percent of distribution demand-related costs, while the remaining 20 percent would be collected through the dynamic adder for the top 200 circuit hours.
- Hourly Base Rate = $0.0969 + CAISO Day-Ahead Hourly Price
- Dynamic Adders
    - System Top 150 Hours = $0.50535
    - Circuit Top 200 Hours = $0.18656

SDG&E states that its Commercial GIR is designed based on cost-causation principles, "to ensure that charging occurs in a manner consistent with electric grid conditions and provides customers with price signals to incent behavior which minimizes incremental system and local capacity needs."[84] However, the Company's proposed Commercial GIR suffers from several key flaws that do not provide accurate price signals and may hinder widespread transportation electrification. Specifically:

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[82] *Reply of San Diego Gas & Electric Company (U 902 E) to Protests and Responses Regarding Application for Approval of Sb 350 Transportation Electrification Proposals*, A.17-01-020, March 13, 2017, p. 17: "Regarding EVgo's assertion that rates should be open to competitive market providers, SDG&E has in fact proposed such availability to all customers. (Direct Testimony of C. Fang (Chapter 5) at CF-4.)"

[83] SDG&E, A.17-01-020, CF-4.

[84] Testimony of Cynthia Fang, p. CF-2.

1. The Demand Ratchet Would Result in 15 Minutes of Peak Demand Setting a High Fixed Charge for at Least the Following 12 Months

SDG&E's proposed Grid Integration Charge is a demand ratchet, which means that the customer's monthly GIC is based on the customer's highest annual peak demand during any 15-minute period in a given hour. Demand ratchets are problematic for several reasons. First, under a demand ratchet, the GIC would essentially operate as a fixed charge, as a customer must maintain a lower demand level for a full year before the customer would experience a lower demand charge. Because of this, the GIC would offer few incentives for customers to reduce demand below their annual peak, even if it would be beneficial to the system to do so.

Second, the demand ratchet may reduce incentives for customers to install storage technologies. Ratchets penalize customers whose demand varies substantially from month-to-month. Customers with solar PV and storage may be especially penalized, as they are likely to have low demands during the summer months, but higher demands during the winter months. This is due to the solar generation being used to reduce demand during daylight hours, and the storage system being able to charge during the day and reduce demand during the other hours. By basing a demand charge on a customer's maximum annual demand rather than monthly demand, a demand ratchet would charge a customer with solar and storage technology based on their winter demand, and would not recognize that the customer has low demands during the summer when the system tends to be most stressed. In this way, the GIC is likely to reduce customer investments in storage and reduce the use of existing storage systems.

Demand ratchets also excessively penalize storage customers who experience brief equipment failures, or who must temporarily conduct maintenance. Under such a scenario, a customer with storage could face an entire year of high demand charges due to a brief 15-minute spike in demand, despite the fact that a single customer's temporary demand spike would likely have little impact on the distribution system.

2. The Step Function Design of the GIC Would Result in Inequitable Bill Impacts for Customers Who Exceed Specified Thresholds for 15 Minutes

Another concern regarding the GIC is the fact that it does not increase in a smooth, continuous fashion. Instead, the GIC segments customers into bins based on maximum annual demand, which results in a step change in the GIC as customers cross thresholds between bins.

Because of this, similar customers will experience large differences in their bills, depending upon whether their annual peak usage falls just above or below a bin boundary. For example, a customer with a maximum demand of 20.1 kW would pay $4,300 more annually than a customer with a demand of 19.9 kW. Likewise, customers on either side of the 50 kW threshold would see a difference of nearly $7,000 annually. Such dramatic differences in bills between two otherwise similar customers raises serious concerns regarding equity and fairness.

Table 4: Commercial GIR[85]

Grid Integration Charge	
(kW)	($/Mo.)
0-20	522.37
20-50	882.55
50-100	1,458.85
100-200	2,539.41
200-300	3,980.15
300-400	5,420.90
400-500	6,861.64
500+	up to 160K

3. The GIC Overly Emphasizes Customer Non-Coincident Demand

SDG&E's proposed GIR seeks to recover 80 percent of demand-related costs through the GIC. However, the GIC is based on customer individual non-coincident demands, regardless of whether they occur during hours in which the distribution system is stressed. As a result, the GIC provides a less efficient price signal relative to a rate that concentrates the price signal during local peak hours such as the adder for the top 200 circuit hours, or a time-of-use rate.

As described by the Company in docket A.15-04-012, SDG&E designs its distribution facilities "to meet the peak demand for that portion of the distribution system which serves customers located in the specific area."[86] Capacity upgrades are primarily driven by the local peak demand of each circuit and substation, and may include transformer additions, reconductoring circuits to larger wires, adding additional circuits, or even adding new

[85] SDG&E, A.17-01-020, p. CF-24.
[86] Prepared Direct Testimony of John Baranowski in Support of Second Amended Application, February 9, 2016, pages JB-1 – JB-2.

substations.

The average SDG&E circuit serves approximately 1,000 customers and has a peak demand of more than 5 MW. It is the combined demands of these customers that drive circuit peaks and substation peaks, rather than individual customers' non-coincident peak demands during other hours.[87]

Thus, to provide an efficient price signal, rates should encourage customers to shift their demand away from circuit peak hours. Although circuit peak hours are more widely distributed than system peak hours, circuit peaks tend to occur during summer afternoons and evenings. Circuits that primarily serve commercial customers tend to peak during summer business hours (8 am to 5 pm), as shown in the heat map below.[88]

Figure 8: Heat Map of Frequency of Top 10 Hours for Each Circuit (2014-2016)

Hour	1	2	3	4	5	6	7	8	9	10	11	12
1	-	-	1	-	-	1	-	1	-	-	-	4
2	-	-	1	-	-	-	-	-	-	-	1	4
3	-	-	1	-	-	1	-	1	-	-	-	5
4	-	-	1	-	-	-	-	-	-	-	1	5
5	1	1	1	-	-	1	-	-	-	-	1	-
6	2	-	-	-	-	-	-	3	-	-	3	4
7	3	6	1	1	1	2	-	7	1	2	2	4
8	2	2	3	4	2	3	5	7	2	3	-	4
9	11	5	1	2	2	2	14	9	4	2	1	9
10	9	1	3	3	-	12	26	19	19	3	4	8
11	5	6	2	2	1	34	64	50	47	3	4	3
12	2	2	2	7	13	34	89	78	75	5	5	3
13	4	4	4	11	8	33	114	86	82	8	6	-
14	3	6	4	2	1	21	112	59	91	5	5	-
15	1	2	3	2	2	13	48	23	36	5	5	-
16	3	1	2	2	-	2	22	9	19	4	7	2
17	2	1	2	-	-	-	7	2	7	1	2	-
18	2	5	2	2	-	-	7	6	6	1	4	4
19	1	5	1	2	-	-	2	4	2	2	3	11
20	2	3	1	2	3	1	8	5	-	1	2	4
21	3	-	-	-	-	-	4	-	-	-	4	4
22	2	-	1	1	-	1	1	1	-	-	3	-
23	3	-	1	-	-	2	-	2	1	1	-	-
24	2	1	1	-	-	-	-	1	-	1	-	2

Note: Limited to circuits with 50 percent or more commercial customers.

As proposed, the GIC largely fails to take into account the timing of a customer's demand and its coincidence with circuit peaks (other than exempting demand during the hours of midnight to 6 am). Since the demand ratchet is based on a customer's maximum demand on any

[87] Analysis of data provided in response to NRDC-01-04 and NRDC-02-02.
[88] *Id.*

day of the year during almost any hour, the GIC provides little incentive for customers to reduce demand when it matters most—during summer afternoon/evening hours.

B. To Comply with Public Utilities Code §740.12, the Commission Should Revise SDG&E's Proposed Commercial Rate

To address the issues described above, we recommend the following modifications to SDG&E's proposed Commercial GIR:

1. The GIC Should be Reduced to More Accurately Reflect Costs

The Office of Ratepayer Advocates (ORA) observes that distribution system peak demands at the circuit and substation level are time-dependent, and notes that Decision 14-12-080 found that a significant portion of distribution costs are driven by coincident peak demand and not by individual customers' maximum non-coincident demands.[89] Because peak demands at the circuit and substation level are inherently time-related, ORA proposes that a significant portion of distribution demand costs be collected through a time-varying volumetric rate. NRDC generally supports ORA's recommendation to recover more demand-related costs through a time-varying volumetric rate. However, we do not necessarily believe SDG&E's proposed dynamic Commercial GIR should be replaced with a TOU rate. Unlike itinerant EV drivers charging on the Public rate, the fleet managers who would charge vehicles under their control on the proposed Commercial GIR should be better situated to respond to dynamic pricing that can potentially provide additional grid benefits and fuel cost savings. As with SDG&E's "Power Your Drive" pilot, the fleet managers would be repeat users who could be armed with the appropriate tools to allow them to "set-and-forget," stipulating certain conditions via apps or websites and letting an algorithm optimize charging in response to those conditions.

For small commercial customers (with demands <20 kW), ORA recommends that SDG&E design a separate GIR based on a TOU rate with dynamic circuit and system adders and a spring mid-day super off-peak period. Under ORA's recommendation, this rate would not have a GIC; rather, customers would be subject to the same fixed charges applicable to the default small commercial tariff (TOU-A). Further, this rate would not include CAISO hourly pricing.[90] We acknowledge that there may be some merit to designing a separate, simpler rate for small

[89] *Opening Brief of ORA*, p. 43.
[90] *Id.* at 47

commercial customers. For medium and large commercial customers, we suggest that it would be appropriate to recover more demand-related costs through SDG&E's proposed dynamic circuit adder, and retain hourly pricing based on CAISO day-ahead prices.

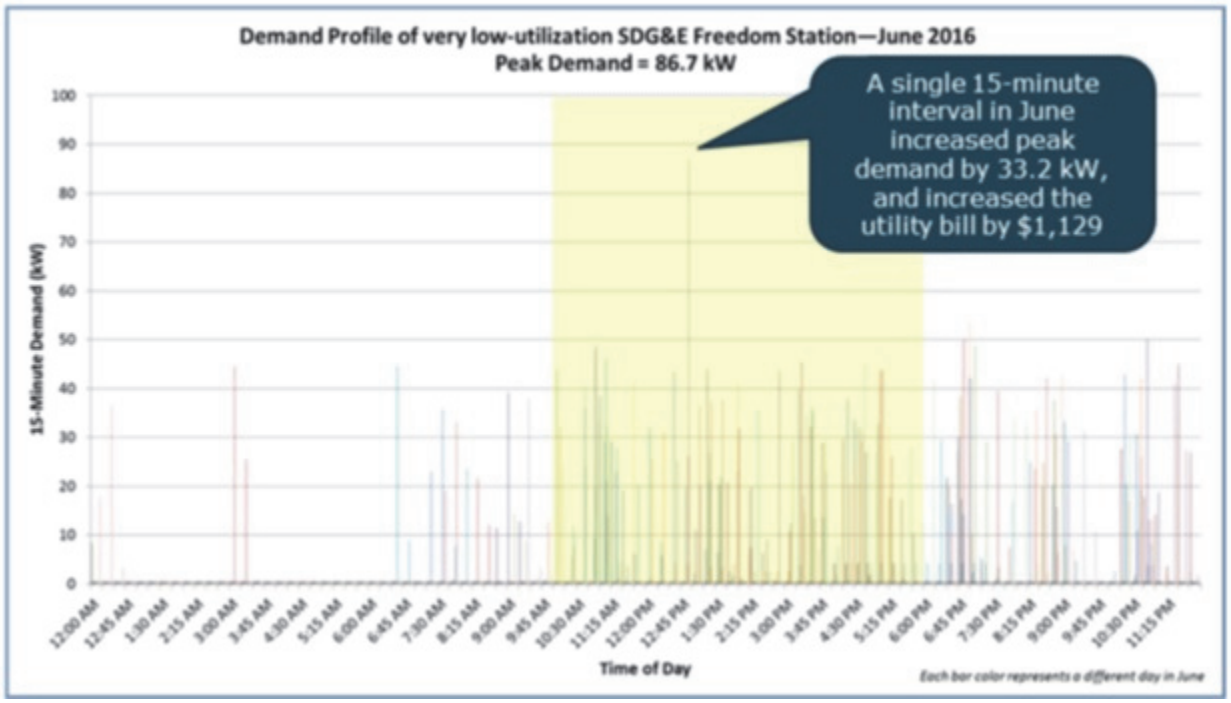
In addition to reducing the magnitude of the GIC, as recommended by ORA, we suggest that the GIC be designed as a seasonal rate, or be restricted to a smaller number of hours to better reflect coincident demand at the circuit or substation level. As noted in Figure 8, most commercial circuits peak during the hours of 8 am to 5 pm, particularly during the summer months.[91]

2. The GIC Should be a Continuous Function based on Monthly Demand

As noted by EVgo and the California Energy Storage Alliance (CESA), demand charges can destroy the value proposition of EVs for customers.[92] We are concerned that the magnitude and design of the GIC for commercial customers may undermine the fundamental economics of transportation electrification. EVgo points out in its opening brief that its 2016 average all-in electricity costs for DC fast-charging varied by a factor of three across the IOUs' territories. The cost of charging in SDG&E's territory was nearly three times higher than in PG&E's territory, largely due to differing demand charge structures.[93] Indeed, as illustrated by the chart below from the *2016 Electric Vehicle Charging Station Project Annual Report*, under SDG&E's current AL-TOU rate, a single 15-minute spike in demand can result in a bill increase of more than $1,000.[94]

[91] *Opening Brief of the Natural Resources Defense Council, the Coalition of California Utility Employees, and Plug In America on the Priority Review Transportation Electrification Proposals from San Diego Gas & Electric, Southern California Edison, and Pacific Gas and Electric*, A.17-01-020, et al., p. 5-6.
[92] *Opening Brief of EVgo on the Priority Review Transportation Electrification Proposals from San Diego Gas & Electric, Southern California Edison, and Pacific Gas and Electric,* A.17-01-020, et al., p. 2; *Opening Brief of the California Energy Storage Alliance,* p. 2.
[93] *Opening Brief of EVgo*, p. 1.
[94] EVgo Services, LLC, *2016 Electric Vehicle Charging Station Project Annual Report: Settlement Year 4 Progress Report to California Public Utilities Commission*, March 5, 2017, p. 17.

Figure 9: Bill Impacts Resulting from One Demand Peak at a Low Utilization DC Fast Charging Station



EVgo's experience with demand charges for DC fast chargers in SDG&E's territory is also relevant to commercial customers. DC fast charging or the simultaneous use of multiple Level 2 chargers could have a significant impact on customers' bills due to the proposed GIC. Instead of mitigating this impact, SDG&E's proposed GIC would intensify it by applying the customer's highest demand for an entire year. As ORA observes, "in essence, SDG&E's GIC behaves like a non-coincident demand ("NCD") charge. However, because it is evaluated based a customer's maximum annual demand instead of monthly maximum demand, it is less flexible and more punitive as a price signal than monthly NCD charges."[95]

Further, due to the use of bins for administering the GIC, a commercial customer could experience an increase in their annual bill of more than $17,000 due to one 15-minute spike in demand that moved the customer across a bin threshold. This is illustrated in the Table 5below.

[95] *Opening Brief of ORA*, p. 44-45.

Table 5. Bill Increases due to GIC Design

kW Demand	GIC ($/Mo)	Increase over Previous Bin ($/Mo)	Annual Bill Change from Moving to Larger Bin
0 - 20	$522		
20 - 50	$883	$360	$4,322
50 - 100	$1,459	$576	$6,916
100 - 200	$2,539	$1,081	$12,967
200 - 300	$3,980	$1,441	$17,289
300 - 400	$5,421	$1,441	$17,289
400 - 500	$6,862	$1,441	$17,289

We are not aware of any compelling rationale for using such bins that result in arbitrary and significant bill increases for otherwise similar customers to administer the GIC, as SDG&E's current AL-TOU rate appears to be implemented as a continuous function ($/kW).

C. Summary of Recommended Modifications to the Commercial GIR

For the reasons noted by NRDC, the Coalition of California Utility Employees, Plug In America, ORA, EVgo, and CESA, SDG&E's Commercial GIR should be modified in the following ways:

- The magnitude of the GIC should be significantly reduced, as distribution demand-related costs are largely driven by coincident demands at the circuit or substation level. More demand-related costs should be recovered through the dynamic adders.
- To better reflect the inherent time-related nature of distribution peak demands and to provide customers a more actionable incentive to reduce demand when it matters most, the GIC be restricted to a smaller number of hours (e.g., 8 am to 5 pm), or be set higher during summer peak hours than during the rest of the year (e.g., $10/kW during summer peak hours, but $5/kW the rest of the year).
- The punitive ratchet feature should be removed and the period over which maximum demand is assessed should be changed. The GIC should be based on a customer's highest monthly hour of demand, rather than a customer's annual 15-minute peak demand.

- Any demand charge should be implemented as a continuous function, rather than in steps, to avoid dramatic and arbitrary differences in bills between otherwise similar customers, resulting from a single, minimal difference in peak usage.

VII. CONCLUSION

With the modifications recommended above, PG&E's "Fleet Ready," SCE's "Medium and Heavy-Duty Vehicle Charging Infrastructure Program," SCE's commercial EV rates, and SDG&E's Commercial GIR would meet the relevant statutory and regulatory criteria and should be approved.

Dated: August 1, 2017

Respectfully,

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Attachment A: Statement of Qualifications for Max Baumhefner

Max Baumhefner is an attorney and expert in clean vehicles and fuels, within the *Energy and Transportation Program* of the Natural Resources Defense Council (NRDC) based in San Francisco. Since joining NRDC in 2010, his focus has been on policies to accelerate the electrification of the transportation sector and to ensure the efficient integration of electric vehicles into our nation's utility system. Mr. Baumhefner has testified and presented on energy issues before the California State Legislature, the California Energy Commission, the California Public Utilities Commission, and the California Air Resources Board. He holds a bachelor's degree from Pomona College and a Juris Doctor from Boalt Hall at the University of California, Berkeley. .

Attachment B: Statement of Qualifications for Joel Espino

Joel Espino is Legal Counsel for the Greenlining Institute's Environmental Equity Program, based in Oakland, California. Since joining Greenlining in August of 2014, his focus has been on policies, programs, and strategies aimed at reducing poverty and pollution in communities of color by advocating for accessible and affordable clean transportation choices and a diverse clean energy economy. Mr. Espino leads Greenlining's transportation equity work developing ways to increase equity in transportation planning and investments; implementing the Charge Ahead California Initiative (De León, 2014) (SB 1275), a law that works to make electric vehicles accessible to low- and moderate-income Californians; and advocating for equitable EV charging infrastructure investments at the California Public Utilities Commission. He also works to connect low-income communities of color to emerging, high-quality jobs in transportation electrification. Mr. Espino has presented on clean transportation equity issues at national and local conferences, legislative briefings, and California Energy Commission workshops. Mr. Espino has participated, in a bilingual capacity (English and Spanish), in a number of EV ride and drive events in Oakland, Stockton, Los Angeles, and Riverside, aimed at educating low- and moderate-income individuals about PEV benefits and PEV incentives. He is author of "Electric Vehicles for All: An Equity Toolkit;" lead author of "Electric Carsharing in Underserved Communities: Considerations for Program Success;" and co-author of "Delivering Opportunity: How Electric Buses and Trucks Can Create Jobs and Improve Public Health in California." He holds a bachelor's degree from Arizona State University and a Juris Doctor from the University of California, Hastings, College of the Law.

Attachment C: Statement of Qualifications for Melissa Whited

Melissa Whited is a Principal Associate at Synapse Energy Economics, where she has worked extensively on issues related to utility regulatory models, rate design, and policies to address distributed energy resources (DER). In the rate design arena, Ms. Whited's work focuses on the development of rate designs that effectively balance the fundamental principles of revenue sufficiency, fair apportionment of costs, and efficiency of use. She has authored numerous reports and testimony regarding the impacts of fixed charges and demand charges on low-income customers, customers with distributed generation, and the ability of states to achieve their energy policy goals. Ms. Whited has testified on rate design matters before the Massachusetts Department of Public Utilities, the Texas Public Service Commission, and the Public Service Commission of Utah. In addition, she has filed testimony on performance-based regulation and market power before the Hawaii Public Utilities Commission and the Federal Energy Regulatory Commission, respectively. Ms. Whited holds a Master of Arts in Agricultural and Applied Economics and a Master of Science in Environment and Resources, both from the University of Wisconsin-Madison.