BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Consider Alternative-Fueled Vehicle Programs, Tariffs, and Policies	Rulemaking 13-11-007 (Filed November 22, 2013)

COMMENTS OF THE NATURAL RESOURCES DEFENSE COUNCIL IN RULEMAKING TO CONSIDER ALTERNATIVE-FUELED VEHICLE PROGRAMS, TARIFFS, AND POLICIES

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I. INTRODUCTION

Pursuant to the *Assigned Commissioner's Scoping Memo and Ruling* of July 16th, 2014, the Natural Resources Defense Council (NRDC) respectfully files these comments to the California Public Utilities Commission (Commission). In Section II, NRDC describes the need and rationale for timely action by the Commission and the utilities under its jurisdiction to accelerate efficient transportation electrification. In Section III, NRDC responds to Questions 1-5, as requested in the scoping memo.

II. TIMELY ACTION BY THE COMMISSION IS NEEDED TO ACCELERATE EFFICIENT TRANSPORTATION ELECTRIFICATION TO THE BENEFIT OF ALL UTILITY CUSTOMERS

A. Active Utility Transportation Electrification Programs are Needed to Meet Goals Adopted by the Commission, the Governor, and the Legislature in Response to an Environmental and Public Health Imperative

1. The Public Health and Environmental Imperative to Electrify Transportation and Deploy Necessary Charging Infrastructure

Numerous independent studies conducted by government laboratories, agencies, academic institutes, and non-profits have come to the same conclusion· reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050 will require a dramatic transformation of our vehicle fleet.[1] Wherever possible, a near-total shift to zero-emission vehicles such as battery and hydrogen fuel cell electric vehicles powered by renewable resources is needed. Remaining liquid and gaseous fuels must be very low carbon. The most recent of these analyses concludes:

> *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 the reduction target.*[2]

Public health officials have also concluded that to comply with the federal Clean Air Act in areas historically plagued by dangerous air pollution, a mass adoption of zero and near-zero emission

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[1] 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; internal NRDC analysis; Joshua Cunningham (Air Resources Board), *Achieving an 80% 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.

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

vehicles is likely necessary.[3] Specifically, to attain ozone standards, NOx emissions in the South Coast Air Basin and San Joaquin Valley Air Pollution Control District will require virtually all light, medium, and heavy-duty vehicles be zero or near-zero emission.

There is also growing evidence that the availability of charging infrastructure is a key factor in driving plug-in electric vehicle (PEV) market growth. Tesla officials report their "Super Charger" network has been critical to growing sales of the Model S sedan.[4] Recently published academic research supports this conclusion:

> *We found that financial incentives, the number of charging stations (corrected for population), and the presence of a local EV manufacturing facility were positive and significant in predicting EV adoption rates for the countries in our study. Of those variables, charging infrastructure was the best predictor of a country's EV market share.*[5]

In sum, to meet California's long-term climate goals and to comply with mid-term air quality standards, charging infrastructure must become sufficiently ubiquitous to support comprehensive efficient transportation electrification.

2. *Goals Established by Executive Order, Legislation, and Commission Decision Require a Massive Deployment of Charging Infrastructure within the Next Six Years*

In response to the public health and environmental imperative described above, California has adopted an ambitious *Zero Emission Vehicle (ZEV) Program*, which requires automakers to place approximately 1.5 million ZEVs in service in the state by 2025, and Governor Brown issued *Executive Order B-16-2012*, which includes the following goals:

> *By 2020:*
>
> - **The state's ZEV infrastructure will be able to support up to 1 million vehicles**
> - The costs of ZEVs will be competitive with conventional combustion vehicles
> - ZEVs will be accessible to mainstream consumers
> - There will be widespread use of ZEVs for public transportation and freight transport

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[3] *Vision for Clean Air: A Framework for Air Quality and Climate Planning*, June 27, 2012.
[4] Cal XXX, cite to title of EPRI panel.
[5] Sierzchula, et al., "The influence of financial incentives and other socio-economic factors on electric vehicle adoption", Energy Policy, February 16, 2014.

By 2025:

- Over 1.5 million ZEVs will be on California roadways and their market share will be expanding
- Californians will have easy access to ZEV infrastructure
- The ZEV industry will be a strong and sustainable part of California's economy
- California's clean efficient ZEVs will annually displace at least 1.5 billion gallons of petroleum fuels

By 2050:

- Transportation related greenhouse gas emissions will be reduced to 80 percent below 1990 levels by 2050

Governor Brown's *ZEV Action Plan*, which outlines a roadmap for meeting these goals, directs the California Public Utilities Commission to take numerous actions to accelerate efficient transportation electrification.[6] Without the continued leadership of the Commission and the utilities under its jurisdiction, many of the goals outlined above will be difficult to achieve. Specifically, without action by utilities, it is hard to envision a deployment of infrastructure able to support one million vehicles within the next six years.

The legislature has also recognized that timely action by the Commission and the utilities under its jurisdiction is needed to accelerate the deployment of necessary infrastructure, issuing the following statutory directive in 2009:

> *The commission, in consultation with the Energy Commission, State Air Resources Board, electrical corporations, and the motor vehicle industry, shall evaluate policies to develop infrastructure sufficient to overcome any barriers to the widespread deployment and use of plug-in hybrid and electric vehicles.*[7]

In the multi-year proceeding initiated in response to this legislation, the Commission adopted the following goals:[8]

1. *Ensure that consumer experiences with Electric Vehicles are overwhelmingly positive;*
2. *Promote Electric Vehicle cost reductions such that they are cost competitive with conventional vehicles;*
3. *Integrate Electric Vehicle charging smoothly into an increasingly clean, efficient,*

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[6] *See* http://opr.ca.gov/docs/Governor's_Office_ZEV_Action_Plan_(02-13).pdf
[7] California Public Utilities Code §740.2.
[8] D. 11-07-029, Issued July 25, 2011, p. 5-6

reliable, and safe electricity grid;

4. *Advance energy security, air quality, climate change, and public health goals;*
5. *Take early strategic action to promote Electric Vehicle-related job creation and economic benefits in California; and*
6. *Facilitate mainstream adoption of Electric Vehicles.*

These are the goals included in the strategic plan of the *California Plug-in Electric Vehicle Collaborative*, were thoroughly vetted by a large and diverse body of stakeholders, and remain relevant today.

Charged with a mandate to provide safe, reliable, affordable, and environmentally responsible energy services, utilities are uniquely positioned to meet the goals adopted by the governor, the legislature, and the Commission in a manner that enhances the reliability of the electrical grid and facilitates progress towards the state's broader renewable energy and energy efficiency goals. Responding to the environmental and public health imperative as well as the relevant legislative and executive directives can be done by leveraging the societal investment in the electrical grid, the world's largest machine, which provides nearly ubiquitous access to a cleaner alternative to oil.

B. Active Utility Transportation Programs are Needed to Avoid Otherwise Unnecessary Investments in Distribution, Transmission, and Generation Assets

Efficient transportation electrification done at a scale necessary to meet air quality and climate goals will have significant implications for the electrical grid. If it is done poorly, the costs will be substantial and could undermine the viability of a strategy that is critical to meeting long-term goals. However, with the right policies and programs in place, the electrification of the transportation sector could be cost-effective, facilitate progress towards the state's renewable energy and energy efficiency goals, and maximize benefits for all utility customers.

Modelling conducted by the Sacramento Municipal Utility District (SMUD) demonstrates the significant difference in the cost implications of vehicle electrification done poorly and vehicle electrification done intelligently. The chart below, taken from an article published in *SAE International Journal of Alternative Powertrains* that describes the results of this modelling, shows the value of programs and policies that ensure costs are below the blue business-as-usual "No TOU" (time-of-use) case.[9]

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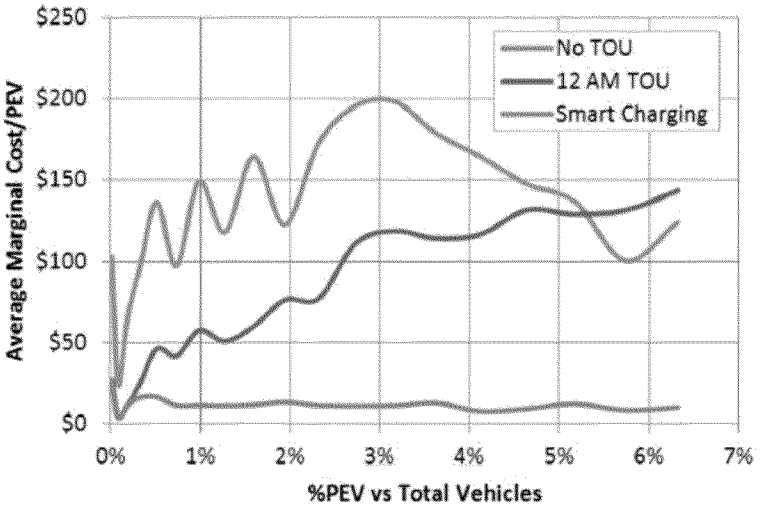
[9] Berkheimer, J., Tang, J., Boyce, B., and Aswani, D., *Electric Grid Integration Costs for Plug-In Electric Vehicles*, SAE Int. J. Alt. Power. 3(1):2014, doi:10.4271/2014-01-0344.

Figure 1: Comparison of Average Infrastructure Cost per PEV (measured in 2013 dollars)



This analysis is specific to SMUD's generation, transmission, and distribution system; the exact results of such analysis will vary by utility service territory and may not hold in other utility systems. This analysis also does not attempt to account for the financial benefits that could accrue to all utility customers from the intelligent management of PEV load. As the chart shows, both time-of-use (TOU) pricing and smart charging can provide substantial value. In the short term, TOU pricing coupled with strategic customer education and outreach can successfully shift load to off-peak hours and minimizes associated costs. Some customers will likely always prefer to manage their own charging "manually," but in the long-term, the chart also illustrates that smart-charging will become increasingly important. Currently, PEVs account for just under 100,000 or about 0.4 percent of California's registered automobile fleet.[10] Accordingly, there is still some time before PEVs achieve the type of penetration depicted in the chart above. However, the PEV market is expanding rapidly; now is the time to develop policies and programs to ensure the state follows the green "Smart Charging" line in the Figure 1 and avoids unnecessary costs.

C. Widespread Efficient Transportation Electrification Done Right Can Accelerate Progress towards Aggressive Renewable Energy and Energy Efficiency Goals

Californians have already purchased approximately two gigawatt-hours of advanced

[10] *See* California Plug-in Electric Vehicle Collaborative: http://www.pevcollaborative.org/ and California Department of Motor Vehicles: http://dmv.ca.gov/about/profile/official.pdf

battery storage on four wheels.[11] After accounting for different charging power levels and the fact the primary purpose of those vehicles is to be available for transportation purposes, that collective resource is still only a fraction of what is needed to meet the Commission's ambitious energy storage procurement target. However, leveraging that growing investment through managed charging, vehicle-to-grid technology, and battery-second life programs could be a cost-effective pathway to integrating levels of variable renewable generation needed to meet long-term climate goals. Using clean vehicles to support the electrical grid could also provide additional value to PEV drivers needed to overcome incremental technology costs and could tap into the consumer desire to connect clean vehicles to clean energy.

The *California Renewable Energy Resources Act of 2011* obligates electricity providers operating in California to procure at least 33 percent of their retail service from eligible renewable resources by the year 2020 and policy makers have already begun discussing significant increases in that requirement in the mid-term.[1] While no post-2020 target has been set at this point, there is consensus that meeting 2050 climate goals will require the near complete de-carbonization of electricity generation.[2] Research conducted by E3 demonstrates that integrating such high levels of variable renewable generation will require significant energy storage capacity.[3] That need could be met by leveraging the growing customer investment in advanced vehicle batteries. Managing charging, feeding energy back to the grid when it is most needed, and re-purposing batteries to provide scalable and potentially distributed energy storage could be more cost-effective than alternative forms of energy storage and could also provide a value stream to PEV drivers that would accelerate efficient transportation electrification.

While driving a PEV in California emits only about a quarter as much greenhouse gas pollution as the average new US passenger vehicle, many customers within the PEV market segment are motivated by a desire to drive completely "emissions free."[4] Maximizing the "green" advantage of PEVs could be important to support early commercialization and market expansion. Almost half of respondents in an international study conducted by Accenture reported that knowing electric vehicles were charged with renewable electricity would encourage them to buy one.[5] Researchers from Simon Fraser University and the University of California at Davis

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[11] Assumes an average battery size of 20 kilowatt-hours, which approximates the sales-weighted average battery size on the road today.

found that combining "green energy" with PEVs caused conventional car buyers participating in a design exercise to purchase PEVs 23 percent more frequently.[6]

The increased energy awareness that accompanies vehicle electrification provides an opportunity to help meet California's ambitious energy efficiency goals while cutting consumer costs.[7] Sixty-seven percent of participants in a yearlong study conducted by the University of California at Davis and BMW reported that driving an electric version of the MINI Cooper, the "MINI E," changed the way they think about energy.[8] In fact, several participants installed solar panels and undertook building energy efficiency upgrades. Once people plug-in their vehicle, they often start thinking differently about the source of their electricity. Energy efficiency is generally the lowest cost resource to offset increased electricity usage from PEV charging and does not create any local or greenhouse gas pollutants. Driving a PEV can increase typical household electricity consumption by about a third, an amount that can generally be completely offset using readily available residential efficiency upgrades, including lighting, heating, cooling, and building envelope improvements.[9] Businesses can also cost-effectively combine energy efficiency upgrades with PEV charging equipment installations. Nationally, commercial buildings have the potential to reduce load 30 percent using currently available technologies.[10] In sum, the increased energy awareness that results from the use of electricity as a transportation fuel can drive cost-effective energy efficiency, further improving the economics of vehicle electrification and facilitating progress towards the state's ambitious energy efficiency and renewable energy goals.

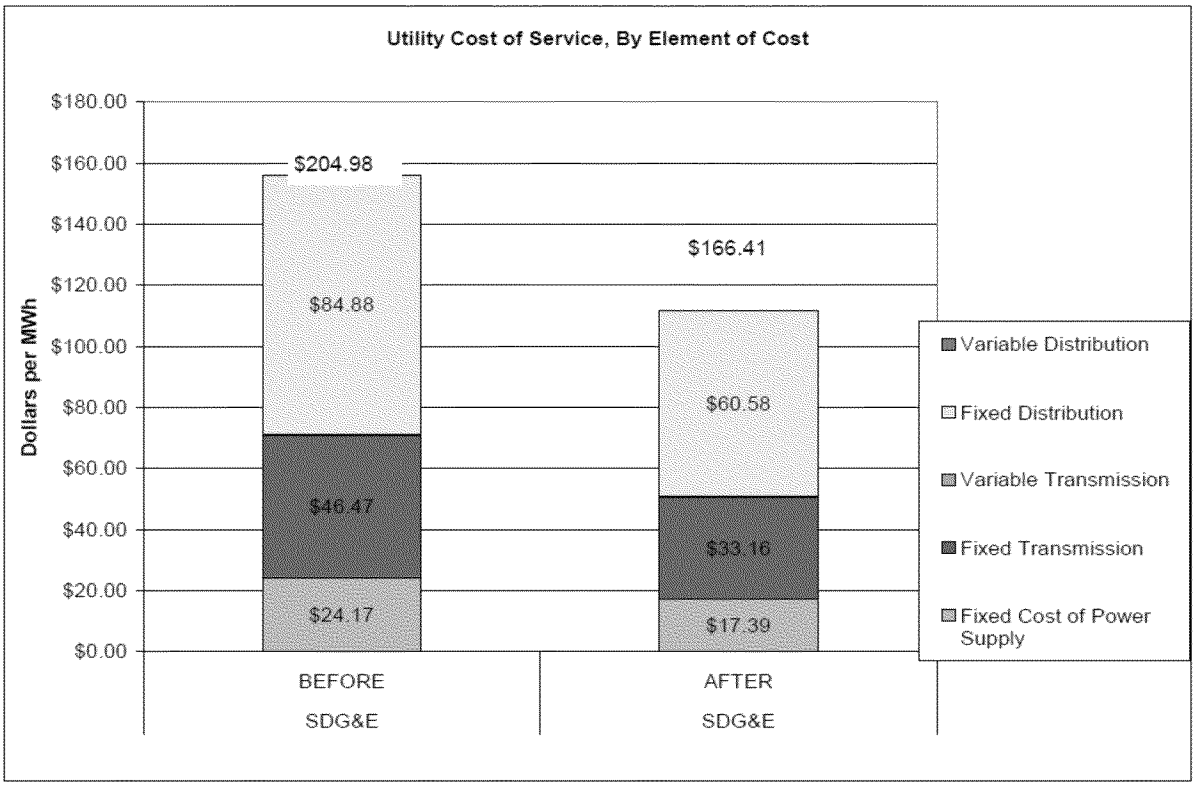
D. Efficient Transportation Electrification is Fundamental to a Viable Utility Business Model of the Future that Does Not Leave Lower-Income Households Stranded

In an era of modest or declining load growth due to energy efficiency investments, 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.[11] The same researchers also modelled impacts on the marginal cost of utility service associated with transformative transportation electrification on two utilities, Cincinnati Gas & Electric and San Diego Gas & Electric (SDG&E). The results of a 60 percent plug-in hybrid penetration scenario in SDG&E territory are illustrated below.

Figure 2: Theoretical San Diego Gas & Electric Cost of Service Before and After the Efficient Integration of Plug-in Hybrids (60 Percent Penetration Scenario)



These results do not reflect all the complexities of SD&GE's systems, and should not be construed as a forecast, but the significance of the directional shift (~20 percent reduction in the cost of service) is noteworthy in a proceeding that is meant to ensure widespread and efficient "Vehicle Grid Integration." Every utility customer would benefit from such shift. 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.

III. RESPONSES TO QUESTIONS POSED IN SCOPING MEMO

1. *Should the Commission adopt the proposed AFV Guiding Principles? What modifications, if any, are appropriate?*

The Commission should adopt the proposed "AFV Guiding Principles" bulleted below, which are well conceived and could serve as a valuable reference in this and future proceedings. NRDC only suggests the term "ratepayer" be replaced with the phrase "utility customer:[12]"

- *Promote the deployment of safe and reliable AFV grid infrastructure designed to meet transportation and energy service needs while maximizing ~~ratepayer~~ benefits and minimizing costs to all utility customers.*
- *Target near-term solutions that complement the use of preferred energy resources and utilize the grid efficiently.*
- *Incorporate and enhance policies from other, related Commission proceedings to promote efficient program implementation and use of ~~ratepayer~~ utility customer funding.*
- *Enable and incorporate the full range of values from VGI in a new program as part of the Commission's overall AFV efforts while remaining technology neutral and allowing for business model innovation.*

NRDC also recommends the Commission adopt the following fifth guiding principle:

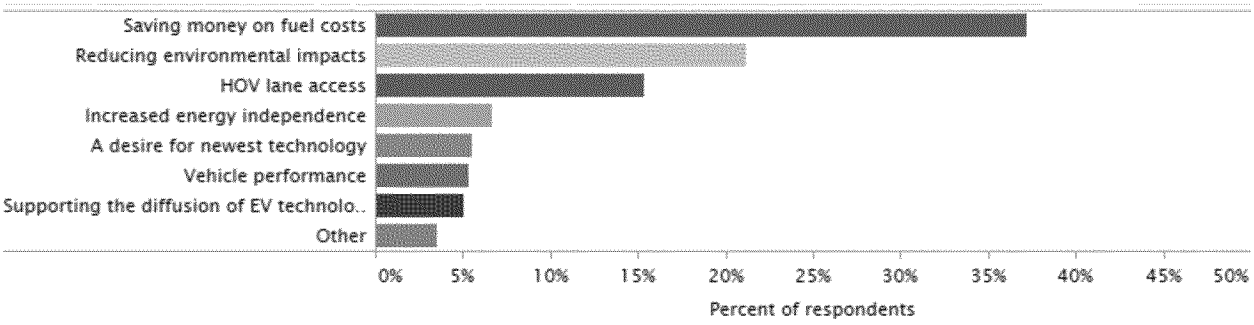
- *Evaluate programs and policies from the customer perspective and preference simple solutions that improve the economics of a decision to drive on electricity and to charge in a manner that supports the electrical grid*

This principle is meant to ensure the customer perspective is thoroughly incorporated into policy and programmatic decisions. Potential PEV drivers are less concerned about balancing the needs of the electric grid and other aspects of "Vehicle Grid Integration." They want to know where they can plug-in, how clean their electricity is, and how much it will cost relative to gasoline. They will continue to look to utilities to answer such questions and will be reluctant to participate in complicated programs that require expensive equipment or multiple hand-offs. The

[12] "Ratepayer" is impersonal and does not reflect the fact customers pay bills, not rates.

principle suggested above would also ensure programs are developed that account for the "Primary Motivation for Purchase" factors documented in the *PEV Owner Survey*:

Figure 3: Primary Motivation for PEV Purchases in California[13]



The principle suggested above recognized the Commission's policies will have direct impact on the largest single "Primary Motivation for Purchase" ─ saving money on fuel costs. While the Commission will not modify specific utility PEV tariffs in this proceeding, such rates are being modified in parallel proceedings and increasing the adoption of such rates is squarely within the scope of this rule-making. The principle recommended above should help guide those efforts, as well as related efforts to enroll PEV customers in VGI programs.

The novel principles described above should serve the Commission well in this proceeding, but NRDC also recommends the Commission reaffirm the goals adopted in D. 11-07-029 enumerated in Section II(A)(2). It is worth noting that the first of those goals ("Ensure that consumer experiences with Electric Vehicles are overwhelmingly positive") aligns very well with the additional principle suggested above.

2. *Should the Commission consider an increased role for the utilities in PEV infrastructure deployment and, if so, what should that role be? If the Commission should consider utility ownership of PEV charging infrastructure, how should the Commission evaluate "underserved markets" or a "market failure" pursuant to D.11-07-029? What else should the Commission consider when evaluating an increased role for utilities in EV infrastructure deployment?*

The Commission should consider an increased role for utilities in PEV infrastructure deployment for the reasons detailed in Section II. The role of the utilities should be to accelerate efficient transportation electrification that minimizes adverse impacts to the electrical grid and

[13] Center for Sustainable Energy (2014). California Air Resources Board Clean Vehicle Rebate Project, *EV Consumer Survey Dashboard. Retrieved* [date retrieved] from http://energycenter.org/clean-vehicle-rebate-project/survey-dashboard.

maximizes benefits to the body of utility customers, as well as facilitating progress toward other clean energy goals adopted by both the Commission and the state of California.

NRDC recommends the Commission avoid attempting to define abstract concepts such as "market failures" or to consider the question of utility ownership in a theoretical sense. Whether or not they include utility ownership of charging infrastructure or attempt to serve what could be described as "underserved markets," specific proposals should be evaluated based on the value they provide to the electrical grid and the body of utility customers, and their potential to accelerate the efficient electrification of the transportation sector in line with meeting the goals adopted by the Commission in D. 11-07-029, by the legislature in Public Utilities Code § 740.2, and by the governor in *Executive Order B-16-2012*.

3. *What education and outreach activities must the utilities provide to support further customer PEV adoption? What existing resources are available for these activities and what additional resources are needed?*

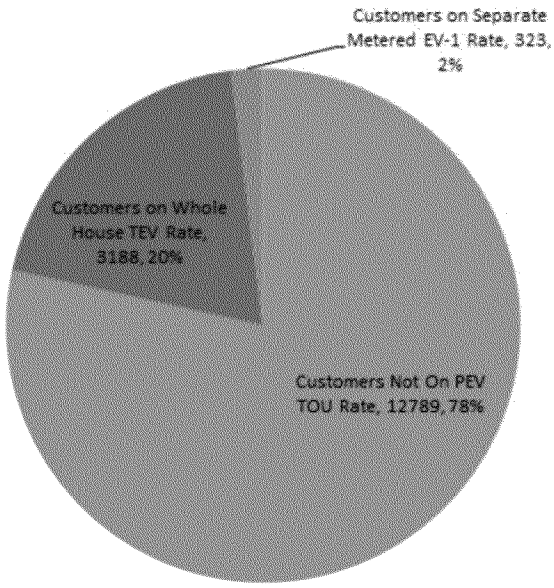
California's utilities are national leaders in PEV customer education and outreach, but the market is still nascent and much work remains to be done to achieve the state's PEV deployment goals in the most cost-effective manner. NRDC recommends the Commission focus on increasing the adoption of time-of-use rates by PEV customers, on implementing a strategy outlined in the *ZEV Action Plan* (by displaying the cost of electricity in "eGallons"), and on proactively informing customers as to the bill savings they could realize by switching to a more appropriate rate.

a) *Increasing the Adoption of Time-of-Use Rates*

As both NRDC and the utilities note in comments, the majority of PEV are not taking service on time-of-use rates that encourage off-peak charging, and many are charging on upper-tier prices that can largely erase savings relative to gasoline.[14] For example, in Southern California Edison (SCE) territory, only 22 percent of PEV customers are taking service on time-of-use PEV rates:

[14] NRDC, *Opening Comments*, p. 9; SCE, *Opening Comments*, p. 18; PG&E, *Opening Comments*, p. 6; SDG&E, *Opening Comments*, p. 9.

Figure 4: PEV Customer Rate Selection in Southern California Edison Territory[15]



As San Diego Gas & Electric (SDG&E) explains, these "customers will tend to charge as soon as they get home, which is during the residential circuit peak time as they do not receive a price signal to influence them to charge during off-peak periods."[16] Likewise, the *Joint IOU Electric Vehicle Load Research Final Report* reveals "customers who have an electric vehicle but remain on a regular domestic rate, are not charging as much during super off peak hours compared to those on PEV rates."[17] The figures below, reproduced from the load research report, illustrate this point.[18]

[15] SCE, *Prepared Testimony in Support of SCE's 2013 Rate Design Window Application,* December 24, 2013, p. 17.
[16] SDG&E, *Response of San Diego Gas & Electric Company (U 902 M) to the Order Instituting Rulemaking to Consider Alternative-Fueled Vehicle Programs, Tariffs, and Policies*, December 13, 2013, p.9.
[17] *Joint IOU Electric Vehicle Load Research Final Report*, Filed on December 28, 2102, p. 30.
[18] *Id* at p. 31 and 49.

Figure 5: SCE-4: TOU-D-TEV and All Single Family Residence Average Load Profile

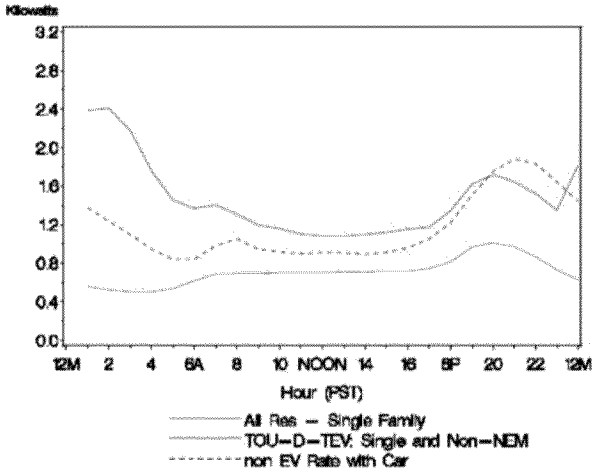
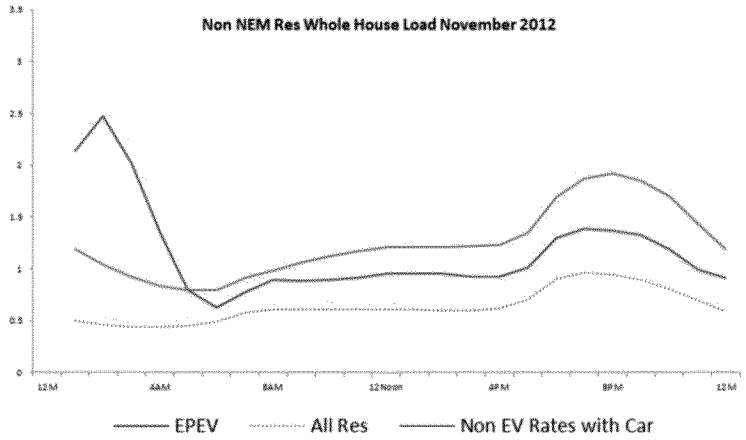


Figure 6: SDG&E - 7: Non NEM Residential Whole House Load November 2012



Customers with PEVs taking service on standard rates can exacerbate evening system-wide peak demand. If the majority of PEV customers continue to take service on standard rates, the promise of widespread PEV charging that increases the utilization of existing assets, minimizes adverse impacts to the distribution, transmission, and generation systems, and maximizes customer savings relative to gasoline may not be realized

Increasing the adoption of PEV rates also helps utilities identify which of their customers are PEV customers, knowledge that is foundational and must be secured before advancing to the more sophisticated VGI activities described in the Energy Division Whitepaper. As GM explains, "VGI activities will be greatly enhanced by establishing a relationship between PEV drivers and their utility. The foundation of this relationship will be establishing consumer

knowledge and comfort with PEV-specific rates."[19] As NRDC stated in opening comments, you cannot target PEV customers if you do not know who they are.[20]

b) *Presenting Electricity Prices on Utility Bills in a Manner than Can Be Equated to Gasoline Prices*

The governor's *ZEV Action Plan* tasked the Commission with addressing the following strategy in 2013:

> *Explore presenting electric usage of PEVs more explicitly on consumers' utility bills to demonstrate savings compared to conventional gasoline and diesel fueling for same amount of travel.*[21]

If fully implemented, this strategy could significantly increase the adoption of time-of-use rates and drive PEV adoption. In line with this directive, the Commission should make the price of electricity as a transportation fuel transparent and comprehensible by translating the prices of TOU rates into dollars-per-gallon equivalent terms, or "eGallons," using the methodology employed by the Department of Energy.[22]

Increasing the transparency of fuel savings could accelerate the PEV market. A survey conducted by Maritz Research found that fuel savings are the single most important reason for a purchase of a PEV by a wide margin, a conclusion that parallels the "Primary Motivation for Purchase" show in Figure 3.[23] Another survey conducted by JD Power and Associates found that the top benefit motivating consumers intending to purchase electric vehicles is fuel savings.[24] However, the same JD Power survey also found that concern about increased electricity bills was one of the top concerns amongst customers considering PEVs.[25] In other words, consumers are motivated by fuel savings, but many are unsure if increased in electricity bills will outweigh

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[19] GM, *Opening Comments*, p. 9.
[20] NRDC, *Opening Comments*, p. 3.
[21] 2013 ZEV Action Plan: A Roadmap toward 1.5 Million Zero-emission Vehicles on California Roadways, p. 17
[22] http://energy.gov/sites/prod/files/2013/06/f1/eGallon-methodology-final.pdf
[23] Maritz Research, *Consumers' Thoughts, Attitudes, and Potential Acceptance of Electric Vehicles*, National Research Council meeting, Washington D.C., August 13, 2013.
[24] David E. Steele, J.D. Power and Associates, *Predicting Progress: What we are learning about why people buy and do not buy EVs*, Electric Drive Transportation Association 2013 Annual Meeting, Washington D.C, June 11, 2013.
[25] David E. Steele, J.D. Power and Associates, *Predicting Progress: What we are learning about why people buy and do not buy EVs*, Electric Drive Transportation Association 2013 Annual Meeting, Washington D.C, June 11, 2013.

savings on gasoline.

Drivers are acutely aware of the price of a gallon of gasoline, which is prominently displayed on many street corners and confronts the driver at the moment of refueling. In contrast, most PEV drivers would be hard pressed to say with any accuracy how much they pay in comparable terms, or how much they save relative to gasoline on a monthly basis. Those who remain on standard rates (the vast majority) and whose charging pushes them into the upper tiers may be unpleasantly surprised by how little they are saving on fuel expenses. Driving on upper-tier electricity is like driving on $3.31/gallon gasoline.[26]

Unlike inherent technology cost barriers, this is a barrier the Commission is uniquely situated to remove by making TOU rates more attractive and transparent, increasing awareness through more effective education and outreach, and conveying fuel prices in terms that allow for intuitive comparison to gasoline. In partial fulfillment of the *ZEV Action Plan* strategy, the Commission should ensure online and print materials explaining TOU rates display prices in dollars-per-gallon equivalent, or "eGallons," using the methodology employed by the Department of Energy.[27]

c) *Proactively Informing Customers of Savings They Could Realize by Switching to a Time-of-Use Rate*

Each of the three IOUs have online rate calculators and can conduct bill analysis upon request by consumers interested in switching to time-of-use rates. Such tools are critical, but likely insufficient, as evidenced by the fact the majority of PEV customers remain on standard rates. In implementing revisions to its time-of-use rate as required by D.11-07-029, SCE intends to conduct bill analysis on affected customers and migrate such customers to tariff options that should minimize their bill. NRDC recommends the Commission require the IOUs to conduct similar analysis for those customers identified as PEV customers who remain on standard rates and proactively reach out to the portion of those customers who would realize bill savings were they to switch to a time-of-use rate, much in the way a cellular phone provider reaches out proactively to its customers before they exceed a monthly data allowance and suggest they might

[26] Using PG&E's upper tier price and the Department of Energy's "eGallon" methodology: http://energy.gov/sites/prod/files/2013/06/f1/eGallon-methodology-final.pdf
[27] http://energy.gov/sites/prod/files/2013/06/f1/eGallon-methodology-final.pdf

realize lower bill were they to switch plans. This would require some work up-front to analyze the bill impacts for existing customers, but, given utilities only know the identity of a fraction of their PEV customers, this should not be overly burdensome and now is the time to act before the number becomes overwhelming. Over time, as more PEV customers are identified and as more customers become PEV customers, the effort could be continued incrementally.

4. *How should the Commission mitigate the impact of demand charges, if at all, on entities pursuing transportation electrification?*

Demand charges reflect important cost-causation principles and could be important to ensuring the cost-effective integration of widespread PEV charging. However, the Commission should evaluate how demand charges are currently implemented and look to rationalize discrepancies between utility service territories that may not reflect differences in the cost-of-service. Given that it is a pattern of peak demand, as opposed to isolated peak demand events, that can prematurely age distribution system assets, the Commission should also consider averaging peak events in assessing demand charges to prevent customers from realizing unjustifiably high bills based on isolated peak events. The Commission should also consider targeting PEV customers for energy efficiency programs, given that reducing non-PEV demand could help minimize total peak demand on which demand charges are assessed. As noted in Section II(C), there is a significant overlap in the customer populations most interested in PEVs, distributed generation, and energy efficiency upgrades. Targeting PEV customers for participation in energy efficiency programs could improve overall programmatic results and improve the economics of a decision to drive on electricity.

5. *How should the Commission identify and consider in this proceeding best practices achieved and lessons learned from current AFV pilot project results?*

The Commission should allow for individual programs and pilots to move forward in parallel to this policy proceeding so that real world experiences can be incorporated into policy decisions that result in this rule-making. On a pragmatic note, we cannot afford to wait for the culmination of this proceeding before initiating programs needed to accelerate efficient transportation electrification to meet the state's goals in a manner that also supports progress towards the Commission's other clean energy goals.

IV. CONCLUSION

NRDC thanks the Commission for the opportunity to submit these comments and looks

forward to working with the Commission and the parties to this proceeding to meet the goals articulated in D.11-07-029, in Public Utilities Code §740.2, and in *Executive Order B-16-2012*.

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Respectfully submitted,

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[1] California Senate Bill X1-2, 2011.
[2] California Council on Science and Technology, *California's Energy Future: Portraits of Energy Systems for Meeting Greenhouse Gas Reduction Targets*, September, 2012..
[3] https://ethree.com/public_projects/renewables_portfolio_standard.php
[4] US EPA, Beyond Tailpipe Emissions. Note that the calculator compares electric vehicles to the average new US passenger vehicle including both cars and light trucks/sport utility vehicles.
[5] Accenture, Plug-in Electric Vehicles Changing Perceptions, Hedging Bets, 2011, p. 16.
[6] K.S. Kurani, J. Axsen, N. Caperello, K. Bedir, and J. Tyree Hagerman, *Consumers, Plug-in Electric Vehicles, and Green Electricity*, presented at "Plug-in Electric Vehicles and Clean Energy in California," Sacramento, California, October 24, 2012.
[7] *See* California Air Resources Board, Climate Change Scoping Plan, December, 2008; California Public Utilities Commission, California Long Term Energy Efficiency Strategic Plan, September, 2008.
[8] Tom Turrentine, Dahlia Garas, Andy Lentz, and Justin Woodjack, The UC Davis MINI E Consumer Study, May, 2011, p. 71.
[9] The average U.S. household uses 11,500 kilowatt-hours per year (Energy Information Agency, Table 5.A: Residential Average Monthly Bill by Census Division, and State 2010.) A PEV with an efficiency of 0.33 kilowatt-hours per mile driven 10,000 miles per year would increase the average home consumption by less than a third, an amount that can be offset using readily available technologies (Rich Brown, Sam Borgeson, Jon Koomey, and Peter Biermayer, U.S. Building-Sector Energy Efficiency Potential, September, 2008, Table 2.) For reference, current Nissan Leaf drivers are averaging approximately 7,900 miles per year. (*See* Ecotality, EV Project Quarterly Report, Second Quarter, 2012. Note: estimation assumes linear vehicle adoption throughout quarter in question.) Of course, PEV utility is expected to increase as technology improves and more charging infrastructure is deployed. Electric mileage for plug-in hybrid drivers will also depend on individual driving patterns. For reference, according to Chevy's "On-Star" data, Volts are being driven 62 percent on electricity.
[10] *Ibid.*
[11] Michael Kintner-Meyer Kevin Schneider Robert Pratt, *Impacts Assessment of Plug-in Hybrid Vehicles on Electric Utilities and Regional U.S. Power Grids*, November, 2007.