



May 30, 2019

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505 Van Ness Avenue
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Re: Post-Workshop Comments on the May 9, 2019, Workshop Addressing Metrics and Methodologies to Evaluate Transportation Electrification Programs

Dear Ms. Sisto:

East Yard Communities for Environmental Justice, Center for Community Action and Environmental Justice, Sierra Club, and Union of Concerned Scientists submit these joint comments on the May 9, 2019, workshop addressing metrics and methodologies to evaluate transportation electrification (“TE”) programs. Thank you for bringing together a diverse group of experts to share their insights on program evaluation.

I. There is consensus among the experts that quantifying cost-effectiveness is not a reliable way for judging the success of TE programs, and that the Commission should focus on applying lessons-learned to future programs.

Throughout the day, several experts provided reasons why quantitative cost-effectiveness analyses might produce misleading results. None of the expert panelists disagreed with their colleagues’ critiques of applying cost-effectiveness tests to TE programs.

First, Ziga Ivanic of Energetics explained that different projects can have different goals and provide different benefits. Trying to identify metrics for comparing different projects could be complicated if not impossible. Mr. Ivanic noted, for example, that projects focused on improvements to operations, such as load management, and may not be well-suited for \$/metrics.¹ Further, some projects may install “future proofed” infrastructure upgrades, such as a large transformer upgrade that will support future charging ports.² These programs will look less “cost-effective” if the Commission judges them by the number of ports already deployed. But

¹ Ziga Ivanic, *IOU and Evaluator Perspective*, Energetics, at Slide 17 (May 9, 2019).

² *Id.*

these forward-looking investments are a feature of long-term planning—not a bug. The programs may also not achieve real operational data until later in the 12-month collection phase, reflecting that it takes some time to start a new program but making “[c]ollected data not necessarily representative of true potential.”³

Then, Yachun Chow of the Air Resources Board (“ARB”) drew on her experience developing the Innovative Clean Transit rule to provide insights that are valuable for all the Commission’s TE programs, but perhaps especially crucial for fleet and medium/heavy-duty vehicle programs. Dr. Chow explained that cost-effectiveness evaluation is easier when a project boundary and life is well-defined, but many factors complicate the cost-effectiveness evaluation of a TE infrastructure project.⁴ She explained that infrastructure that is not fully utilized during the program timeframe may be fully utilized later.⁵ Ultimately, Dr. Chow encouraged long-term planning that may require increased near-term investments,⁶ asking the workshop audience if they want to trench a site one or three times in the next 30 years. Dr. Chow found that a minimum of two years of vehicle operation is essential to gain meaningful operating experience, and that the potential for more vehicle downtime during the early deployment stage could complicate cost-effectiveness analysis.⁷ Moreover, a traditional cost-effectiveness analysis will not take into account the ability of current investments to help drive down future costs.⁸

Kicking off the second panel, Philip Kreycik of Cadmus recommended prioritizing lessons learned over cost-effectiveness as the most important aspect of program evaluation for most TE projects at this stage. Mr. Kreycik also explained that many of the challenges to evaluating TE programs are not unique to TE, but may be more acute than in other utility programs.⁹

Next, Dan Bowermaster of the Electric Power Research Institute began his remarks by observing that all of the two to three dozen use cases for electric vehicles are “pretty young” and that although it may be tempting to think about cost-effectiveness we should remember where we are in the process of TE adoption.

During the discussion period, Austin Brown of the University of California, Davis, stated that we do not want a single core metric for the TE programs to optimize around. Dr. Brown also observed that it does not make sense to only look at what chargers are used the most, because those fully utilized chargers may not be where they are most needed. A focus on utilization rates could deter deployment of chargers in disadvantaged communities and other areas that the market is underserving. Noel Crisostomo from the Energy Commission raised the

³ *Id.* at Slide 16.

⁴ Joshua Cunningham and Yachun Chow, *Emissions Modeling, ZEV Programs, & Data Collection*, ARB, at Slide 21 (May 9, 2019) (“ARB TE Presentation”).

⁵ *Id.*

⁶ *Id.* at Slide 24.

⁷ *Id.* at Slides 21-22.

⁸ *Id.* at Slide 21.

⁹ Philip Kreycik, *Evaluation Methodologies From Other Practice Areas*, Cadmus, at Slide 15 (May 9, 2019).

similar point that instead of assessing infrastructure in isolation, the decision makers should consider the network as a system.

Panelists also seemed to agree that metrics around incremental electric vehicle adoption were not reasonable for assessing these infrastructure investments. Mr. Kreycik explained that there are too many factors influencing electric vehicle adoption to directly connect incremental adoption to infrastructure investment. Mr. Bowermaster supported this conclusion by noting, for example, that public charging may be the least used but is still necessary to support electric vehicle adoption.

At this stage of infrastructure deployment, the experts recommended analysis of lessons learned from TE programs. For instance, during the first panel discussion, Joshua Cunningham of ARB suggested evaluating sites and their users to identify strategies for reducing costs per site in the future. Hypothetically, Mr. Cunningham suggested that a program evaluation might find that an urban DC fast charger might be able to serve its purpose with 100 kW, rather than 350 kW. Dr. Brown views the Commission's pilots as experiments that will help the Commission understand what works so they can scale it up, and shared some of the lessons learned from the TE projects he worked on during his time at the U.S. Department of Energy.¹⁰

Similarly, Mr. Kreycik characterized the Commission's current TE programs as "an opportunity to understand barriers." He urged the group to think in terms of market transformation. His goals include demonstrating to other people who are not participating that there is a model, disseminating lessons, and making the case for other fleet owners to participate in the next round.

The experts' recommendations to favor the collection and dissemination of lessons-learned over cost-effectiveness metrics are consistent with the requirements of Senate Bill ("SB") 350. The statute does not make program approval contingent upon cost-effectiveness testing. Instead, the Legislature required TE programs to "seek to minimize overall costs and maximize overall benefits." Cal. Pub. Util. Code, § 740.12(b). This minimal cost, maximum benefit assessment from SB 350 is a general directive as opposed to an absolute mandate. The Commission should implement this concept by applying lessons-learned from prior TE programs to improve program design and avoid unnecessary spending. For instance, if the utilities discover that they can provide the same level of service at reduced costs by switching from one type of equipment to another, this lesson will allow them to minimize costs without undermining the imperative to "accelerate widespread transportation electrification." *Id.* The Commission should continue to "encourage proposals . . . that can be implemented quickly in the near term, and scaled up if they prove successful"¹¹ and to require measurable indicators for progress

¹⁰ Austin Brown, *Metrics & Methodologies to Evaluate Transportation Electrification Programs*, University of California, Davis, at Slide 14 (May 9, 2019). For instance, one of the "Planning and Management" lessons learned is: "Develop detailed process maps to streamline operating procedures; guide vendors, installers, and service technicians; and provide higher quality customer services and issues resolution."

¹¹ *Assigned Commissioner's Ruling Regarding The Filing of Transportation Electrification Applications Pursuant to Senate Bill 350*, R.13-11-007, at 17, 24 (Sept. 14, 2016),

toward statutory goals “where possible.”¹² But the Commission should not require any absolute demonstration of cost-effectiveness upfront for approval of a given program.

Cost-effectiveness testing is particularly inappropriate for the Commission’s TE programs because traditional cost-effectiveness metrics do not capture the benefits that the Legislature sought to promote through transportation electrification. SB 350 requires the Commission to approve TE programs that are in the interests of ratepayers, which the Legislature defined to include several difficult-to-quantify benefits. Cal. Pub. Util. Code, §§ 740.8, 740.12. For instance, the Legislature made TE programs a tool for reducing health and environmental impacts from air pollution and creating high-quality jobs and other economic benefits in disadvantaged communities. *Id.*, § 740.8. The Commission has no means to quantify these diverse benefits. In cost-effectiveness testing, as the adage goes, “what isn’t counted doesn’t count.” Therefore, requiring TE programs to pass a cost-effectiveness test would subvert the goals of SB 350’s transportation electrification mandates.

II. ARB’s presentations illustrate what failure will look like if the Commission’s TE programs are too halting.

The workshop presentations provided important insight into how the Commission’s TE programs could fail, in addition to discussing how the programs might succeed.

A. The Commission’s electric vehicle programs will fail if the lack of charging infrastructure discourages ARB from adopting stringent emissions rules.

ARB is responsible for adopting vehicle emissions standards, which are among the primary tools in California’s efforts to achieve health-based air quality standards. California’s most polluted air basins, which are home to millions, will not have healthy air without regulations that compel the transition to zero-emissions vehicles.¹³ At the workshop, ARB representatives explained that infrastructure is one of the factors they consider when they decide how aggressively to set their zero-emission vehicle (“ZEV”) mandates. When ARB sets ZEV passenger vehicle mandates for the period after 2025, it will examine the “[s]ufficiency of fueling infrastructure,” among other factors.¹⁴ Moreover, the availability of charging infrastructure will play a role in how strong future regulations on larger vehicles like buses, trucks, forklifts, and other equipment can be.

<http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M167/K099/167099725.PDF> (confirmed and ratified by the Commission in D.16-11-005).

¹² *Id.* at 17.

¹³ See CARB, *Vision for Clean Air: A Framework for Air Quality and Climate Planning*, at 11-12 (Jun 27, 2012), https://www.arb.ca.gov/planning/vision/docs/vision_for_clean_air_public_review_draft.pdf.

¹⁴ ARB TE Presentation at Slide 11.

B. The Commission’s electric vehicle programs must address the acute localized health threats and regional air pollution threats imposed by the freight industry.

A primary driver of regional pollution in California is the freight and logistics industry. The environmental justice groups most active on pushing to clean up California’s seaports and other associated freight infrastructure have determined that advancing zero-emission technologies, including electrification, is vital to improving air quality in some of California’s most disadvantaged communities, which suffer disproportionately from the toxic diesel emissions emanating from the freight industry. In addition to the regulatory impacts, a key impediment to the wide-scale transportation electrification even exceeding ARB’s regulatory targets and building infrastructure necessary to protect public health is the lack of charging infrastructure in the freight and logistics system. While the Commission has made great strides in approving large programs recently, the scope of challenge—literally electrifying hundreds of thousands of trucks, cargo equipment, locomotives, ships, and other equipment—requires an unprecedented amount of utility involvement to work with customers on projects that these entities have less experience working with. In addition, ARB has explained that a principal challenge to electrification in the medium- and heavy-duty sector is meeting large electric loads at charging sites¹⁵—an issue that utility TE programs are particularly well-suited to address. The Commission must work aggressively to support the electrification of heavy-duty vehicles because they account for 35% of NOx emissions in the dangerously polluted South Coast Air Basin, in addition to the acute toxic threat imposed on communities in California.¹⁶

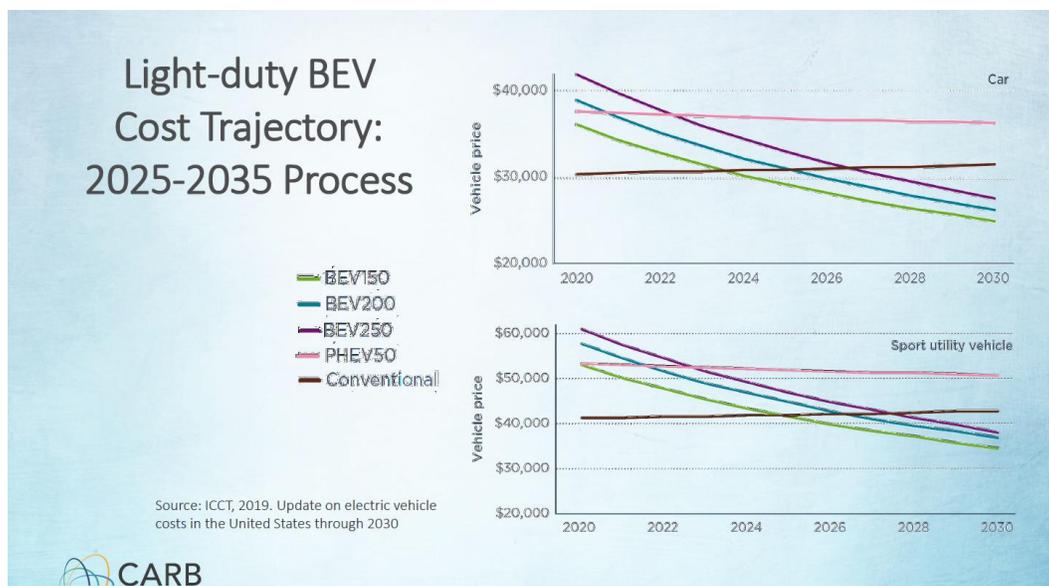
C. The Commission’s electric vehicle programs will fail unless the economically vulnerable Californians who live and work in investor-owned utility territories have access to charging by the time electric vehicles have lower purchase costs than combustion vehicles.

Equity demands that all Californians have access to passenger vehicle chargers by the time electric vehicles are cheaper to purchase than combustion vehicles. According to projections in ARB’s presentations, all-electric cars with a range of 150 miles on a single charge will have a lower up-front price than their internal combustion counterparts by 2024:¹⁷

¹⁵ *Id.* at Slide 14.

¹⁶ *Id.* at Slide 4.

¹⁷ *Id.* at Slide 10.



Californians who purchase these low-cost electric vehicles will experience benefits far beyond the competitive purchase price: electric vehicles have room for superior safety features and are less prone to rollover accidents,¹⁸ save consumers money on fueling and maintenance over the life of the vehicle,¹⁹ and avoid emissions of health-harming and climate-forcing pollution. To ensure equitable access to these financial and health benefits, it is imperative that all Californians have access to vehicle charging by no later than 2024, if not sooner.

The Commission must oversee a vast and rapid effort to deploy the necessary charging infrastructure by the time economically vulnerable consumers will demand electric vehicles as a money-saving opportunity. 2024 is four and a half years away. Historically, it has taken more than a year from the time a utility files an application for a large TE investment for the Commission to issue a decision on the proposal. Even after program approval, the utilities undergo a lengthy process before they put steel in the ground. The Commission and utilities must work together to hasten charging deployments at multi-unit dwellings, workplaces, and other public sites in particular to provide access to the millions of Californians who do not yet have adequate access to vehicle charging. Most Californians do not live in single-family, owner-occupied homes and will rely on state policy to overcome the barriers to deploying charging infrastructure to serve them.²⁰

¹⁸ Nicolas Zart, *Do Electric Vehicles Have Better Overall Safety? Part 2*, Clean Technica (Apr. 1, 2018), <https://cleantechnica.com/2018/04/01/do-electric-vehicles-have-better-overall-safety-part-2/>.

¹⁹ Union of Concerned Scientists, *Going from Pump to Plug* (Nov. 2017), <https://www.ucsusa.org/sites/default/files/attach/2017/11/cv-report-ev-savings.pdf>.

²⁰ According to the most recent census data, 45.5% of California housing units are renter-occupied, and 58.1% of the state's housing units are detached single-family homes. See United States Census Bureau, American Community Survey, Community Facts—Selected Housing Characteristics for California 2016, https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP04&prodType=table. 37% of rental homes in California are single-family homes. Turner Center for Housing

III. Metrics like “\$/GHG reduction” or “\$/incremental EV adoption” are not reliable because they conflate the cost of an investment with the impact on rates.

The notice of the May 9 workshop raised the question of whether metrics like “\$/GHG reduction, \$/incremental EV adoption, \$/kWh load shift” might best identify the most successful utility TE programs. The answer to this question is: No.

The proposal for a metric such as “\$/GHG reduction” appears to rest on the assumption that the Commission can determine a program’s financial cost to ratepayers and plug that figure into the numerator of the \$/GHG reduction equation. This premise is flawed because the cost of the investment in a TE program does not represent the program’s impact on rates. In the long term, ratepayer investments in transportation electrification can put downward pressure on rates. TE programs bring on new load, and thus allow utilities to spread their fixed costs across more kilowatt-hour sales. Moreover, electric vehicle loads are often flexible. The ability of vehicles to charge when renewable power is cheap and abundant creates significant opportunities for electric vehicles to provide grid benefits.²¹ According to recent research from Synapse Energy Economics, electric vehicles are already driving down rates for California’s investor-owned utilities.²²

IV. Data Collection Templates

We identified a few specific areas to be modified on the data collection templates. Those suggestions are found in Appendix A.

V. A Framework Built Around Lessons Learned

Like the expert panelists at the May 9 workshop, we encourage the Commission to focus its program evaluation on learning rather than metrics. At this still very early stage of transportation electrification, evaluators should assess what has worked well in the projects to date, and what has not, and then explore why. We encourage the Commission to collect and share lessons from the past to provide guidance going forward. Are there steps that can avoid the pitfalls of the past? Did the program identify barriers to widespread electrification of a particular vehicle sector, or demonstrate models for addressing those barriers? Avoiding the mistakes of the past will help minimize costs, and scaling up proven models for targeting the barriers to widespread transportation electrification will maximize benefits. Thus, learning will aid the Commission in meeting SB 350’s directive, which is to approve programs that seek to maximize benefits and minimize costs and meet other statutory criteria. § 740.12(b).

Innovation, *Finding Common Ground on Rent Control*, at 15 (May 2018), http://ternercenter.berkeley.edu/uploads/Rent_Control_Paper_053018.pdf.

²¹ Jonathan Coignard *et al.*, *Clean vehicles as an enabler for a clean electricity grid*, Environmental Research Letters, Vol. 13, No. 5 (May 16, 2018), <https://iopscience.iop.org/article/10.1088/1748-9326/aabe97> (“By displacing the need for construction of new stationary grid storage, EVs can provide a dual benefit of decarbonizing transportation while lowering the capital costs for widespread renewables integration.”).

²² Jason Frost *et al.*, *Electric Vehicles are Driving Electric Rates Down*, Synapse Energy Economics (Feb. 2019), <https://www.synapse-energy.com/sites/default/files/EVs-Driving-Rates-Down-8-122.pdf>.

Lessons learned from program evaluations can inform the Commission's Transportation Electrification Framework. For instance, the framework can highlight best-practices that will help maximize benefits and minimize costs. It could also be useful for the framework to recommend a checklist of questions to ask in designing programs and identify resources for planning. Even if these best practices are not available by October 2019, the framework can establish a general system for building off past experience that can be refined over time.

Sincerely,

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Appendix A: Recommendations for Data Collection Templates

Standard Review Projects Template

1. It would be helpful to adhere to consistent terminology in the reporting templates to avoid confusion and ensure that TE programs are evaluated on the same basis.
 - a. Programs vs. projects: utility efforts have typically been referred to as TE *programs*, rather than *projects*, in utility proposals and Commission decisions.
 - b. Participants vs. partners: the term program *participants* is less ambiguous than project *partners*, as used in 3(e) and 9(a) of the “Final Report Template” Word document.
2. The template does not appear to refer to a timeframe for data collection, which, per stipulations by PG&E and SCE with multiple parties, requires data collection for an additional five years beyond the installation of charging stations. While this timeframe may appear in other documents, it would be useful to include it explicitly in the template.
3. The template does not mention how investor-owned utilities will record whether potential or actual program participants have included on-site load management technologies, or how the utilities take those load management technologies into account when scoring potential DC fast charging (PG&E) or medium- and heavy-duty projects (PG&E and SCE), as required by stipulation with multiple parties. This information should be recorded in the “Final Report Template” document in the “Project participants” section.
4. The template does not require a discussion of how the electric vehicle loads at a program site coincide with overall grid load. It would be helpful to call for this discussion as part of item 6(e) in the “Final Report Template.”
5. Both templates ask for reporting on incremental vehicle adoption attributable to the TE program. As discussed in the comments above, pinning down incremental vehicle adoption is problematic because of the many barriers that must be overcome in order for a consumer or fleet operator to adopt an electric vehicle. It is not meaningful to identify which barrier-breaking factor tipped the scale for that consumer or fleet operator. Instead, we urge the Commission to focus on the following:
 - a. Discussion of how the program broke down barriers to electric vehicle adoption with a focus on lessons learned about effectively continuing to break down these barriers in future programs.
 - b. Reporting of total vehicles supported during the program period and the total number of vehicles that could be supported by make-ready infrastructure installed as part of the program (as part of future proofing investments).
6. The “Charging Session Data” tab of the “Final Data Collection Template” Excel document does not include a field for volumetric rate for electricity during each charging

event (\$/kWh). We believe volumetric rate is an important factor to collect alongside other cost metrics for charging events.

7. The “Charging Session Data” tab of the “Final Data Collection Template” does include a field for demand charge for each charging event. However, there is not a demand charge associated with each charging event at sites that are on rates with a demand charge because demand charges are typically based on the highest power demand in the billing period. It is important to capture demand charges at program sites. We recommend demand charge data be captured at the site level along with data on-site utilization in order to give site evaluators an idea of how onerous demand charge are at different sites.
8. The guidance on calculating greenhouse gas and criteria pollutant reductions is open ended. While we see value in allowing for some flexibility in the development methodologies to assess greenhouse gas and criteria pollutant reductions, we urge the Commission to establish basic assumptions for these calculations so they can be compared across utilities. For example, the Commission could specify that the gas vehicles to serve as the basis for comparison with the electric vehicles in the program should be the gas or diesel equivalent of the participants’ electric vehicles, rather than the participants’ previous vehicles.