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Draft Second AB 2127 Report - Sierra Club CA Comments - 9-20-23

Additional submitted attachment is included below.

September 20, 2023

To: Patty Monahan, CEC Lead Commissioner

Transmitted via docket at: California Energy Commission : e-comment : Submit Comment

Subject: Comments on Assembly Bill (AB) 2127 Assessment Draft Report

Dear Commissioner Monahan,

We would like to commend the Commission and staff on the significant advancements it has made in this excellent report in its comprehensiveness, sophistication, increased accuracy and granularity of its planning models and adjustments to reflect rapidly changing market trends. We appreciate the opportunity to provide these comments and suggestions for your consideration.

Key Assumptions

We generally agree with many of the updated and more realistic key assumptions used in this report including:

- Having a single consistent and more realistic projection of EVs utilizing the CECs IEPR AATE3 forecast of 7.1 million vehicles by 2030 vs the three options offered before from the CEC's IEPR Low forecast (1.9 million), the CEC's IEPR high forecast (5 million) and the MSS forecast (8 million). Although we do believe this number should be increased as discussed below.
- Increasing the forecast number of LD ZEVs in 2025 from 1.5 million to 2.5 million. While a helpful improvement, we believe this number also needs to be increased as discussed below.
- Increasing the proportion of BEVS to PHEVs from a 70%/30% ratio to 90%/10%.
- Increasing the proportion of PEVs to Fuel Cell EVs from 95%/5% to 99%/1%.
- Forecasting a mix of fewer but higher power DCFCs reflecting the market trend of larger batteries, longer ranges and faster charging capabilities of newer generations of EVs.
- Including MCS (Megawatt Charging System) chargers in the charger portfolio with power of up to 1.5 MW for MHD (medium and heavy-duty) vehicles.
- For MHD vehicles, a forecast of a higher proportion of depot to public chargers.
    - MHD vehicles will require 264,500 total chargers in 2035 of which 256,000 are depot chargers (20 kW to 150 kW) and 8,500 are public chargers (350kW- 1.5 MW). Only about 3% of total chargers compared with 10% in the first report.

    - In 2030, about 82 percent of total MHD charging load is estimated to be served by depot charging and 18 percent is served from public charging.
    - All vehicles are assumed to have depot charging access and most vehicles utilize them for the majority of their charging.
    - (Depots" in this model include destinations as well as a home base for vehicles.)
- The 60% decrease in total energy required for MHD vehicles, and a 55% decrease in per-vehicle energy use compared to the original report due to:
    - A 38% reduction in energy use per mile – the original report assumed all trucks were fully loaded. This change reflects the reality that many trucks do not always have a full load.
    - A 28% decrease in average per-vehicle daily energy use compared to the Mobile Source Strategy (MSS) assumptions in the first report due to a larger proportion of small and low-mileage classes among the zero-emission MHD fleet in 2030.
    - 14% fewer zero-emission MHD vehicles in 2030 compared to the MSS (155,000 compared to 180,000) due to CARB's recently approved regulatory policy drivers of the Advanced Clean Trucks (ACT) and Advanced Clean Fleets (ACF) rules.
- This decrease in total energy needed for MHD vehicles significantly reduces the number of chargers needed. The first report estimated a need for 157,000 chargers by 2030 vs the 114,500 chargers now forecast (a 27% decrease).

Fleet Size Growth Projections

Charging Infrastructure planning begins with fleet growth projections.

We understand that this report is driven by the 2022 IEPR demand forecast and that staff are using the most aggressive scenario in that study – the Additional Achievable Transportation Electrification 3 (AATE3) scenario. "The AATE3 scenario is treated as the primary scenario in this report because this scenario allows staff to account for the potential needs of a larger fleet if PEV adoption continues to accelerate…"[1]. However, this scenario was based on data that is now 18-24 months old. The process for forecasting every two years during a period of unexpected very high growth is not sufficiently responsive to what's happening and resulting in an EV forecast that is significantly too low. This will result in too few chargers to meet actual EV demand.

It seems that the CEC is seeking to target striking the forecast just right without also putting out a very possible potential high adoption rate scenario. Because the CEC's forecasts are the State's official assumptions required to be used by the utilities in developing their distribution grid charging infrastructure plans via their integrated resource plans (IRPs) and then funded with CPUC approved General Rate Cases (GRCs) they effectively limit what the utilities can do. If they are too low, they tie the hands of the utilities in adequately responding to EV growth that exceeds the CEC's assumptions and will result in their underbuilding their distribution grids to support the needed number of chargers.

[1] The Draft Second AB 2127 report– Page 39
https://efiling.energy.ca.gov/GetDocument.aspx?tn=251866&DocumentContentId=86859

We recommend the CEC take a closer look at evaluating the risks of forecasts which are too low vs too high. If the assumptions are too low, the utilities will not be able to provide the needed distribution grid (DG) infrastructure needed to support the required number and power of chargers. This could have dire consequences in discouraging the public who are willing, able and desiring to purchase EVs from doing so.

On the other hand, if the CEC forecasts are too high, then utilities may overbuild for the demand for a short time period but the cost risks of doing this are much smaller than those for underbuilding. Because we know that CARB's ACC II and Advanced Clean Fleet rules will require significant and growing minimum EV Adoption rates, the only downside to over building is that it may take an additional year or so before the new charging assets are more fully utilized.

The risks of underbuilding are especially high in the coming few years. A 20% error in the early years will have a much more negative impact than a 5% error in later years because the baseline of existing chargers in say 2030 will be much larger than in 2025.

We know that the threats of climate change require us to go as fast as we can, and the good news is that the market is responding in California for EV adoption. But if we do not have sufficient chargers, too many new EV owners may experience charger anxiety (different from range anxiety) – anxiety over being able to find an available and working charger without having to wait and this could discourage others from buying EVs for years. This could also especially discourage Californians who are unable to access chargers at their homes (e.g. those living in multi-family housing) and are more dependent on public charging from buying EVs – this is discriminatory especially against people living in disadvantaged and low income communities and runs in the face of all the state and CEC are trying to do to provide equity in this program.

A. <u>Near-Term Charging Infrastructure Needs Are Too Low</u>

Currently, the CEC is forecasting 2.5 million EVs in 2025 taken from its AATE3 projections and estimates that California will need 257,689 public and shared-private chargers, including 15,705 DCFC chargers.

The report notes that "If sales increase more rapidly in 2023 and 2024, California may reach 2.5 million PEVs sooner than expected. Annual charger estimates for 2026 could be used to assess charger needs if California reaches a higher PEV fleet size in 2025." This approach will be too little too late. It's clear today based on recent growth, that the 2.5 million EVs forecast by 2025 is too low and needs to be changed now in this report.

Using conservative assumptions below, we estimate that California will have at least 3.2 million EVs by the end of 2025. This would be 28% more than currently planned and produce a need for about an additional 70,000 chargers by then that needs to be incorporated in this report.

California's EV market share growth had been dramatic in the last few years as follows:

Year	% Mkt Shr	ZEV Sales	Accumulative ZEV Sales
2020	7.8	145,099	803,816
2021	12.4	250,279	1,054,095
2022	18.8	345,818	1,399,913
2023 Q1	23.2		
2023 Q2	25.4		
2023 est.*	25.8	473 ,076	1,872,989
2024 est.*	32%	608,000	2,480,989
2025 est.*	38%	722,000	3,202,989

Note that in 2026, the ACC II will require that at least 35% of sales must be ZEVs.

*Discussion – These are our conservative assumptions:

- We assume that total California annual light duty vehicle sales will be about 1.9 million which is about the average for the last 4 years.
- In 2023, we assume that Q3 and Q4 market share will only be the same as Q2. (In the last four years, Q3 and Q4 sales and % market share have increased substantially over Q2 values.)[2]
- Recent year over year market share growth has been 4.6% from 2020 to 2021; 6.4% from 2021 to 2022 and an estimated 7% from 2022 to 2023 averaging 6% over these three years. So, we increased market share for 2024 by 6% over 2023 to 32% and then added another 6% from 2024 to 25 to get 38%.

We are using conservative assumptions and believe that our estimates may well be exceeded. We are most likely headed for a serious shortage of EV chargers in the short term over the next 3 years if we only plan for the chargers needed for 2.5 million EVS by 2025.

There are many reasons why we can expect and should increase our planning forecasts for the continued growth of EV sales between now and 2026 when 35% will be required including:

- Rapidly increasing vehicle type availability including in popular categories such as pickup trucks and SUVs and increasing number of models from multiple OEMs.
- Significantly increased volume availability to meet demand from increased production of vehicles from OEMS such as Tesla, VW, Ford, GM and others. In addition to massive investments already being made by OEMs, the Biden administration just announced it is making up to $12 billion available for automakers to retrofit their facilities to make electric vehicles and hybrids.[3]
- Lowering costs for some models due to increased price competition.

[2] Q2-2023_Quarterly-EV-Sales-in-CA.png (1850×1080) (veloz.org)

[3] eedition.sacbee.com/popovers/dynamic_article_popover.aspx?artguid=e7ae568e-1b2f-474d-becc-40a9f05dca3f&appcode=SACBEE&eguid=a1e2289c-d784-47d9-86de-cccde7ed1b10&pnum=96#?deviceId=659C66F5-1514-4A65-8B4F-DA0E49C2E7A8&tempKey=value

- Announcement of new lower price vehicles – e.g., $25,000 for some new models within the next 2-3 years or so which would open up the size of the market that could afford to purchase EVs.
- A growing fleet of lower priced used EVs that will still have good range and will have very low operating costs compared to used internal combustion engine vehicles.
- Currently higher gasoline prices and uncertain gas price volatility making EVs more desirable.
- Growing consumer understanding of the lower total cost of ownership benefits of EVs from educational resources such as Consumer Reports, Veloz and others.
- The new federal vehicle incentives of up to $7,500 / vehicle from the IRA.
- New greatly increased California rebates for low-income buyers.
- The coming adoption of the North America Charging Standard (NACS) over the next two years which will open Tesla's Supercharger network - the largest DCFC network in North America (and the world) - to essentially all vehicles. This will greatly reduce charger anxiety, range anxiety and reliability anxiety from potential purchasers – currently the single biggest obstacle to EV purchase.

Failure to realistically estimate ZEV populations by 2025 and the resulting significant underbuilding of EVSE could have a catastrophic impact on ZEV adoption and could fuel fears of charger insufficiency slowing down EV adoption for many years to come. However, taking these corrective actions now would support California's leading the nation in how to successfully plan for and implement charging infrastructure to support the rapidly growing EV populations.

RECOMMENDATION 1 – Re-visit the actual current trends of rapid EV adoption in California and increase the forecast through 2025 to at least 3.2 million similar to what we suggested above and re-calculate the chargers needed to meet these higher needs **This item is so time critical that we recommend that this revised forecast for needed EVSE by 2025 be brought to the CEC Commission for their expedited approval.**

B. Long Term Growth Forecasts Through 2035 are Too Low

The CEC's AATE3 assumptions from the 2022 IEPR Update report, forecasts 7.1 million plug-in light duty and 155,000 MHD vehicles by 2030.

As discussed above, the forecast for 2025 should be increased by at least .7 million to at least 3.2 million EVs. Then we recommend that the EV forecast going forward from 2026 to 2030 could potentially remain at the same rate of increase as planned but by taking the initial step increase in 2026, end at a minimum of 7.8 million in 2030.

Getting the range of possible scenarios right is critical because the CEC effectively limits what the IOUs can do in their infrastructure upgrade plans and funding requests as approved by the CPUC. The AATE3 scenario (7.1 million) should not be viewed as the aggressive case but instead as a mid-growth case. And as we note, it should be increased to at least 7.8 million. We recommend that the CEC add a "high case" growth planning

scenario of perhaps an additional 10-20% over the AATE3 by 2030. It should also model out the needed charging infrastructure for this scenario. The CPUC could then allow the IOUs to propose what they believe they will need to do within the range of the mid-case and high case to respond to the market demand they are seeing on the ground.

RECOMMENDATION 2 -

- The CEC should increase the forecast for 2025 by .7 million to at least 3.2 million based on the recalculation recommended in the "Near-Term Charging Infrastructure" section above.
- Then for the forecast from 2026 – 2035, each annual forecast value should be increased.by .7 million. In other words. it could keep the upward slope of growth the same as it currently is but just with a stepped up higher starting point and ending .7 million higher in 2030 to 7.8 million and end in 15.9 million in 2035.
- Next year in 2024, the CEC will update its EV growth assumptions which will we foundational for the 3rd version of the AB 2127 report in 2025. We recommend that it give careful consideration about how it can avoid underestimating EV growth which could prevent utilities from supporting enough chargers to meet demand and look to take additional small risk to offer a higher case scenario. One suggestion is that it could state that the AATE3 growth projection is a mid-case scenario and create a new high case that increases the EV forecasts by e.g. 10-20%. It could then state that it would support utilities being able to prepare their IRPs and GRCs using any values between the mid and high case based on the most current actual EV adoption rates and trends subject to CPUC approval.

Load Calculations Too High

A key output of the modeling process is the amount of total load needed to serve the chargers. Currently, the output is showing significantly more load than is realistically needed because the assumptions for EV efficiency are too low. **The energy efficiency assumptions in appendix C-3 are significantly too low leading to unnecessarily larger batteries and unnecessarily higher overall load forecasts**. The table below compares the Appendix C-3 values with two examples of commercially available vehicles.

- The 2023 Chevy Bolt is 68% more efficient than the Small SUV in table C-3.
- The Tesla Model S in the Large Car category is 25% more efficient than in the C-3 table.
- In a third example, the 2023 Ford F-150 Lightning in the Pickup category has an efficiency of 480 Wh/ mi. which is 27% greater than the 611 Wh/ mi value from the C-3 appendix. These are significant errors.

	Appendix C-3	2023 Tesla Model S	Difference	% Difference
Vehicle Category	Large Car	Large Car		
Generation	1	1		
Efficiency (Wh/ mi.	**349**	**280**	**69**	**25%**
Electric Range (miles)	390	405		
Battery Size (kWh)	136	113		

	Appendix C-3	2023 Chevy Bolt EUV		
Vehicle Category	Small SUV	Small SUV		
Generation	1	1		
Efficiency (Wh/ mi.	**488**	**290**	**198**	**68%**
Electric Range (miles)	285	247		
Battery Size (kWh)	139.1	72		

We recommend that the CEC update this table using real-life examples of available electric vehicles commercially available today from the Federal DOE's Fuel Economy data website to get more realistic efficiency numbers.[4] Then forecasted load numbers need to be recalculated which will significantly lower them.

RECOMMENDATION 2

a. We recommend that the CEC update the efficiency, battery size and range assumptions in Appendix C-3 utilizing the data maintained by the Federal Government at its DOE Fuel Economy website.[5]
b. Then we recommend that the CEC re-calculate all load values, load curves and Capacity Index Needed Metrics resulting from the use of the EDGE tool.

Modeling Charger Needs

The ultimate objective of charger modeling is to determine how many chargers of specific powers are needed by location and year to meet the needs of the forecasted growing fleet. This information can then be used to guide where and when these chargers need to be installed, costs involved, workforce required, grid enhancements needed etc. It is important that this data be granular enough to be actionable on the ground.

Granularity of modeling results - We understand that the CEC's models report charger need locations at the level of Traffic Analysis Zones (TAZ) used by the California Statewide Travel Demand Model. While this data is critically important at a macro level for many purposes, it is not sufficiently detailed enough to meet the needs of grid planning down to the substation and

[4] The Office of Energy Efficiency and Renewable Energy at the Federal DOE's web site: Fuel Economy of New All-Electric Vehicles
[5] Ibid

distribution circuit level. Are these models producing even more granular results or what needs to be done to get to this level of detail which would be a major benefit to utilities, charger developers and other stakeholders?

While the results in this report are for 2025, 2030 and 2035, it would be very beneficial if the detailed results of number of chargers, locations and charger power could be made available from a publicly accessible CEC data website for each year from 2025 - 2035.

TAZs are being used for LD and MHD modeling. Which in the EDGE tool can now be compared with utility Grid Needs Assessment (GNA) data portal areas.

RECOMMENDATION 3 – We recommend that in the final report, the CEC specify,

a. What level of location granularity is being resulted for this report and if there are future plans to have more granular location results data and if so, what would those be? Is there more location granularity for publicly accessible DCFC under HEVI-LOAD especially as the CEC is collaborating with the California Transportation Committee on its SB 671 Report due December 2023? If so, what is it?
b. Confirm that the DCFC results from the EVI-Pro 3, EVI-RoadTrip, Wired and HEVI-LOAD models can all be combined and totaled by year, number and power of chargers and by TAZs.
c. Maintain modeling results to include year data for each year between 2025 and 2035, location, number and power of chargers and make that data available in a publicly accessible database.

EVSE Deployment and Grid Evaluation (EDGE) Tool Utilization

In addition to all the many beneficial uses of charger modeling data, its use in the EDGE tool is essential to provide the roadmap to the utilities on how, where and when they need to upgrade their distribution grids to support the new load from the electrification of EVs in a timely way.

For the electric grid system, EDGE sources information from the IOU Grid Needs Assessment (GNA) data portals. The GNA data provides information regarding the amount of "headroom" that primary circuits and substations have that can accommodate new load before requiring attention through 2025. The GNA data does not provide any information on the secondary distribution system. We agree with the CEC's desire to obtain this additional information from the utilities. The EDGE results indicate the amount of headroom to support new load represented by the Capacity Needed Indicator Metric (CIM) value or the amount of surplus capacity needed in MWs. A positive CIM is bad and means that there is more forecast demand than available capacity.

The preliminary results from the EDGE analysis in 2025 show that 13% of TAZs have no additional capacity. Another 58% have at most 5 MW of headroom. This is forecasting a pending crisis in shortage of capacity unless bold action is taken quickly to create more capacity.

Perhaps the most significant barrier to the timely installation of needed charger infrastructure is the ability of utilities to provide the needed capacity especially for larger projects e.g. for light duty vehicle charging hubs and for MHD vehicle depots and corridor charging hubs.
We agree with the CEC's recommendation to add substation data to the tool. Substations are typically the longest lead time component to construct in the distribution grid infrastructure. Building a new substation or making major upgrades can take many years in today's environment. Therefore, a key objective of the EDGE tool should be to identify underserved substation areas in the grid so that the utilities can do least regrets upgrades to existing substations or build new ones as soon as possible in advance of forecast future need to avoid major charger install delays.

The development, use and results from the EDGE tool are critical to helping ensure adequate distribution circuit capacity in time to support charger needs. It is an information technology (IT) project that involves the utilities (IOUS and POUs), CPUC and CEC working together to achieve a seamless and automated process of importing data from the utilities to the CEC and CEC EDGE tool comparing the demand needs from its modeling to the capacity from the utilities and producing the resulting reports and maps to show where there is insufficient capacity that the utilities must address. If it doesn't already exist, this should be formalized into a cross agency IT project with a documented scope and timeline and resourced appropriately. The reports provided through this process will also be an essential deliverable to help support the CPUC's Zero Emissions Freight Infrastructure Planning (FIP) Project.

RECOMMENDATION 4 – We recommend that,

1. Both IOUs and POUs should provide the needed data to fill gaps that currently exist in the statewide EDGE data set as can be seen on the EDGE Map shown on Page 66 of the report. We applaud the CEC's announcing an upcoming national laboratory contract to help supplement data gaps in EDGE.
2. Add substation data to the tool and create new reports that can clearly identify where and when there is insufficient substation capacity that can inform utilities to begin addressing these deficits immediately.
3. We agree with the CEC that utilities should provide more comprehensive and granular data than provided at the GNA level including secondary distribution circuit level data in addition to substation data to the CEC EDGE tool project and at least on an annual basis. This will enable the utilities to also identify where there is insufficient distribution circuit capacity and work to increase this capacity as needed.
4. The study results need to extend beyond 2025. The utilities need to plan GNA data out for additional years using best estimates of future needs for many reasons including accommodating increased renewable energy, increased DERs including solar and storage and increased building electrification in addition to EV chargers. All of these new use cases could end up creating new demand for substations and other distribution grid assets competing with charger needs. They all must be accommodated.
5. Create a joint project task force between the IOUs / CPUC and the CEC to manage the further development of the EDGE tool, how it can automatically

import data from the utilities and how it can export results data back to the utilities. This may benefit from being an agenda item to be discussed at the Joint Agency Steering Committee (A group of inter-agency staff working together to address obstacles to rapid advancement of EV charging infrastructure and other issues.)[6] Due to the significance and urgency of this project as fundamental to being able to support timely install of chargers, we recommend that the agencies do a review of staffing needs to insure that this project has the staff and/or consulting labor needed to complete and manage this project in as timely a way as possible, especially given its expanded scope of more granularity, producing a publicly accessible database on the CEC website and producing annually updated results.

Recent Overnight Revolution in Charger Standards

Until about three months ago, the charging standard for LD vehicles has been the J 1772 and CCS-1 standards and in fact these standards are required under CARB's ACC II regulation adopted last year.

In November 2022, Tesla announced the opening of its proprietary charging standard to use by others and the North American Charging Standard (NACS) name. Then in May 2023, Ford announced that "…starting early next year, Ford EV customers will have access to more than 12,000 Tesla Superchargers across the U.S. and Canada., in addition to the over 10,000 DC fast chargers that are already part of the BlueOval Charge Network. This will give Ford EV customers unprecedented access to fast charging. In 2025, Ford will offer next-generation electric vehicles with the North American Charging Standard (NACS) connector built-in, eliminating the need for an adapter to access Tesla Superchargers."[7]

Then two weeks later, GM made a similar announcement.[8] Since then nearly every major OEM has made a commitment to support the Tesla NACS Standard.[9]

NACS has never gone through a formal standard setting process with other stakeholders including other OEMs, EVSE manufacturers, standard setting organizations and others. However, SAE announced that they would target managing an accelerated standard setting process that could make the NACS an officially designated standard by the end of 2023.[10]

[6] Draft Second AB 2127 report – Page 7.

[7] Ford EV Customers To Gain Access to 12,000 Tesla Superchargers; Company to Add North American Charging Standard Port in Future EVs | Ford Media Center

[8] GM announces it will also adopt Tesla's NACS connector | Electrek

[9] CCS1 To Tesla NACS Charging Connector Transition: Everything We Know (insideevs.com) (note: since this article in July 2023, many more OEMS have made commitments to this "standard".)

[10] SAE wants to certify NACS by end of year, and fix plug & charge too | Electrek

CharIN – the international standards setting body responsible for managing the ongoing development of the CCS standard, has announced its support to help the development of the NACS standard.[11]

This development could have significant impacts on charger availability, reliability, interoperability, standards for MHD vehicles, further increase in EV adoption rates and impacts on grid planning.

> **RECOMMENDATION 5 -** We recommend that the CEC reference this recent significant development, state its intent to track this and when appropriate but fairly soon begin a workshop process to explore its implications and possible actions the CEC should take.

Charger standards for MHD trucks. The report states, "The lack of a unified charging connector standard for MDHD and equipment adds to the complexity of tracking."[12] This is confusing to us because the de facto standard utilized by nearly all MHD truck OEMs has been the CCS-1 standard. This can be easily substantiated by looking at spec sheets from MHD OEM electric vehicles such as from Daimler, Volvo, Paccar, Nikola, Ford, etc. and looking up the charger standard they are using. It is further assumed that the MCS standard will soon be adopted for higher power needs.

> **RECOMMENDATION 6 –** We recommend that the above statement in the report be revised to clarify that CCS-Type 1 is the standard in predominant use by MHD EVs.

Question re: DCFC Utilization – The report states, "This assessment assumes that public chargers for MDHD vehicles will average around 5 percent utilization per day in 2030, with utilization somewhat lower for 1.5 MW chargers."[13] This would mean that on average each MDHD charging port would only be utilized for one hour and 12 minutes per day. This does not appear to be economically feasible. We would request having additional information on this.

> **RECOMMENDATION 7** – Please clarify if the above statement is true and if so, some background information on how such low utilization was computed and how it can be economically viable.

Measuring and Tracking Progress

The CEC is to be commended for its "Zero Emission Vehicle and Infrastructure Statistics" webpage which tracks progress in actual vehicle and charger counts on a quarterly basis

[11] CharIN Stands Behind CCS and MCS, but also supports the standardization of Tesla NACS – CharIN

[12] Draft Second AB 2127 report - Page 28

[13] Draft Second AB2127 report – Page 60

including the more recent addition of counts for MHD vehicles. However, this data would be even more useful if it tracked performance comparing actual results vs planned goals.

Having a set of new reports that compares planned vs actual performance and variances for a few key indicators would go a long way to enhance stakeholder's confidence that the state does have a plan, is tracking actual performance against that plan and (hopefully) that it is on plan.

RECOMMENDATION 7 - We recommend the CEC's Zero Emission Vehicle and Infrastructure Statistics Dashboard be modified to display key indicator reports and that for each key indicator, shows planned, actual, variance and % variance activity. The format would be very similar to a financial budget variance report. At a minimum, the key indicators could include:

1. Electric Vehicles - Numbers of CEC planned electric vehicles according to the ACCTE3 forecasts vs actual vehicles by LD and MHD vehicles. This is critical because it drives the number of chargers needed.
2. Chargers - Status of actual chargers installed vs CEC planned chargers from the Second AB 2126 report for a given year. The first level of stats could be on L1 & L2 chargers, DCFC chargers and total chargers for the whole state each for LD, MHD vehicles and totals. Additional more detailed reports could be prepared as resources are available and as needed. For example,
   - By local geography - by county/city or zip code.
   - By use type – i.e., from NREL on Table 6 in the report. - Public (non-work activities), Public (while at work), Shared Private (while at work), single family housing and multi-family housing.[14]

   All of these variance reports could use "traffic signal colors" for status – i.e., green for OK on plan, yellow for beginning problem area variance and red for serious negative variance warranting immediate attention to fix.
3. Grid Capacity Readiness – Planned vs actual electrical capacity by grid region Traffic Analysis Zones (TAZs) by year and where there are Capacity Need Index Metrics Value (CIMS) gaps. This would come from the CEC's EVSE Development Grid Evaluation (EDGE) modeling tool and could be displayed graphically similar to Figure 30: "Statewide EDGE Map of Capacity Need Indicator Metric Values in TAZs" [15] and also numerically such as presented on slide 37 entitled, "Draft Results – CIM Values"[16] This information should be shared at a detailed level with the utilities to assist them in knowing where they need to begin upgrading their distribution circuits in time to support new charger loads and do least regrets upgrades.

[14] Ibid Table 6 – page 43

[15] Ibid – Page 66

[16] Presentation slides from the workshop on the Staff Draft Report of the second AB 2127 assessment https://efiling.energy.ca.gov/GetDocument.aspx?tn=252159

Supply Chain Shortage Caused Delays

At the May 9, 2023 IEPR Workshop - **Commissioner Workshop on Clean Energy Interconnection – Electric Distribution Grid**, significant delays of charging infrastructure projects caused by supply chain shortages was raised as a significant obstacle. Several speakers referred to supply chain delays in equipment such as electrical switch gear and transformers as being especially troublesome. For example, Franchesca Wahl from Tesla noted that transformer shortages could delay projects by 18-24 months.

We recommend that this obstacle issue be added to the AB 2127 report along with a recommendation on next steps to address it. One approach we would recommend is that the **CEC convene a public workshop** / task force including relevant state agencies such as Go-Biz, the CPUC, the Department of General Services as well as other stakeholders such as EVSPs and utilities. The objectives could be to develop a better understanding of this issue (which pieces of equipment are affected, how long are delays, what is the volume of the problem, what are the causes, etc.), what are some of the solutions that the state and its agencies could take and which agency should take lead to address this issue. One option for financial aid would be to see if federal financial aid from the Inflation Reduction Act could help provide support for e.g. transformer manufacturers to expand capacity. This same approach may apply to other critically short materials.

> **RECOMMENDATION 8 –** We recommend that the CEC convene an exploratory workshop including key agencies and stakeholders to define all aspects of the nature of critical equipment supply chain shortages and delays, the causes of the shortages and actions that could be taken to solve this problem and reduce significant delays currently occurring in the timely install of EVSE,

Workforce Needs

We agree with the CEC that, "Labor and workforce training and development support for electric vehicle charging infrastructure (EVCI) deployment is critical for ZEVs to be 100 percent of sales in California."[17]

We would like to highlight a critical vocational category where we understand there is a shortage of trained and experienced applicants. Utilities have reported that one of the significant causes for delays in installing chargers timely is a combination of rapid growth in number, size and complexity of new project requests along with delays in their engineering, planning and design sections caused by staff shortages.

> **RECOMMENDATION 9 -** We recommend that in collaboration with the utilities and educational organizations, a special focus be made on training and internships to increase the volume of trained applicants in electrical design, analysis and engineering within utilities to meet the human resource needs for this critical function.

[17] Ibid Page 88

Thank you for the opportunity to submit these comments and we very much appreciate your consideration of them.

Sincerely,

Ray Pingle
Lead Volunteer, Transportation Electrification Campaign
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Associate Director
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