

**DOCKETED**

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## **Answers to Questions**

*Additional submitted attachment is included below.*



July 31, 2020

To: California Energy Commission Commissioners:  
Commissioner David Hochschild, Chair  
Commissioner Patricia Monahan  
Commissioner Janea Scott  
Commissioner Karen Douglas  
Commissioner Andrew McAllister

RE: California Energy Commission Docket Number 17-EVI-01

Dear Commissioners Hochschild, Monahan, Scott, Douglas, and McAllister:

I am writing as the co-chair of the Electric Vehicle Infrastructure Training Program ("EVITP") to provide written responses to the questions raised by staff and other stakeholders at the July 21, 2020 California Energy Commission ("CEC") Staff Workshop on Electric Vehicle Charging Infrastructure Training Requirements for the California Electric Vehicle Infrastructure Project ("CALeVIP").

## **I. INTRODUCTION TO EVITP**

EVITP is a non-profit, volunteer, brand neutral, national EV industry collaborative training program that provides specialty training and certification for electricians to safely and properly install Electric Vehicle Supply Equipment (EVSE) systems and related infrastructure. EVITP was developed by an industry-wide collaboration of automobile manufacturers, electrical vehicle supply equipment manufacturers, utility companies, electrical industry professionals, state and local electrical inspectors, first responders, educational institutions and others. EVITP was launched in 2012 at an EV industry meeting at the University of Michigan in Ann Arbor after stakeholders identified the lack of, and need for, a formal, standardized training program to ensure proper and safe installation of EVSE. They identified that lack of advanced training as a barrier to achieving EV industry and public policy goals of transitioning away from gas and diesel powered vehicles. EVITP partner advisors include the Foundation for California

Community Colleges, PG&E, SDG&E, Sempra Energy Utility, General Motors, BMW, Toyota, Southern California Edison, Duke Energy, NFPA, NECA, GE, ClipperCreek, Hubbel Power Systems, the University of California-Davis, Ecotality; Bosch, Leviton, ComEd, Exergenix, Legrand, and others.

EVITP provides comprehensive residential, commercial, and industrial charging infrastructure training. The program is regularly updated with the help of its partner advisors and is currently on its fourth generation of updates. EVITP provides installer training in all of the following:

- Level 1 (120V), Level 2 (220V) Residential Charging
- Commercial / Institutional Level 2 Charging
- DC Fast Charging
- Medium Duty (MD) Commercial / Institutional
- Heavy Duty (MD) Commercial & Industrial
- Site assessment and load calculations (core)
- Commissioning
- Wireless Conductive Energy Transfer
- EVSE Communications and Networks
- Electric Vehicle Battery Types, Specifications and Charging Characteristics;
- Automobile Manufacturer's Charging Performance Integrity Specifications;
- Utility Interconnect Policies and Requirements;
- Utility Grid Stress precautions including demand response integration technologies;
- Role of electrical storage devices as charging intermediaries;
- Integration of electric vehicle infrastructure with distributed generation;
- Electrical Code standards and requirements;
- Fire protection and OSHA regulations;
- Electrical installation standards for ZEV equipment;
- First responder safety and fire hazard measures;
- Next generation charging; and
- EVSE maintenance, troubleshooting, and repair.

EVITP certification requires completion of the training and passing a comprehensive, proctored exam. EVITP also has continuing education requirements, that parallel California's continuing education rules, to ensure certified electricians keep up to date with the latest technological, safety, and code requirement changes.

EVITP training is detailed, yet efficient. EVITP training takes 20-24 hours to complete, including the proctored certification exam. EVITP is also inexpensive and open to all state certified general electricians. EVITP is taught primarily in utility training

centers, industry training centers, and has also been taught in community colleges. EVITP provides its curriculum free to state accredited institutions. EVITP is a non-profit organization that receives just \$75 per student for class materials, exam proctoring, record keeping, certification documents and delivery, as well as website administration, updates, and maintenance.

EVITP has been successfully implemented as a requirement for numerous programs in California. SDG&E, for example, has installed over 3,000 electrical vehicle charging ports under its Power Your Drive Program with an EVITP requirement and has had no issues with the availability of EVITP-Approved contractors, nor with the availability of EVITP-certified electricians. EVITP is also included in the CPUC safety language, and required by the cities of Carson, Pico Rivera, and Long Beach as well as by the Port of Long Beach in an EPIC grant from the CEC. Moreover, EVITP is required for the EVSE infrastructure installations on the Nevada Electric Highway and in federally funded EVSE installations in Columbus Ohio – winner of the National Smart Cities award. EVITP is the only training program featured in the U.S. DoE Guides on EV infrastructure for public charging hosts, and for contractors. Most recently, EVITP was referenced in The Biden Plan To Build A Modern, Sustainable Infrastructure And An Equitable Clean Energy Future.

## **II. RESPONSES TO QUESTIONS RAISED BY STAFF AT THE JULY 21, 2020 WORKSHOP**

### **1) Can the existing workforce accommodate the anticipated growth in EVSE Installations?**

Yes, EVITP currently has over 1,600 EVITP-certified electricians in California. EVITP's policy for its EVITP-Approved contractors requires at least half of the state-certified electricians on an EVSE jobsite to be EVITP certified. However, this requirement does not apply to apprentices because they are yet electricians. For example, this allows for crews of four consisting of one EVITP-certified electrician, one non-EVITP-certified electrician and two apprentices. That means that the 1,600 EVITP-certified electricians in California can provide a qualified workforce of up to 6,400 electrical installers. For 1,600 crews of 4 to install 250,000 charging systems over a three-year period, each crew of four would install 156 charging systems – 52 each year, or only one per week. That is assuming that no additional electricians were to be certified. An EVITP requirement, however, would drive greater enrollment and substantially increase the number of electricians with EVITP certification, easily accommodating the anticipated growth in California EVSE installations beyond 2025.

## **2) What are the challenges and/or opportunities to ensure a commensurate supply of C-10 licensed contractors to meet these goals?**

First, there are already approximately 75 EVITP-Approved electrical contractors (who employ the 1,600 EVITP electricians and many more workers) in California with service areas covering the entire state, which are able to meet California's EVSE goals through 2025. Some of these are large contractors which employ dozens of EVITP-certified electricians and hundreds of other workers. That is more than enough contractors to ensure that every CEC-incentive job gets multiple, competing bids.

As for additional contractors, there are plenty of other C-10 licensed contracting firms which could become EVITP-Approved Contractors. The current population of EVITP-Approved contractors have the capacity to install the 250,000 units by 2025, and that was before the COVID-19 pandemic. As we know, the pandemic has substantially slowed down construction activities and so there are a significant number of contractors looking for more projects, as well as electricians who are currently unemployed or underemployed, around the state. That is expected to persist for some time so more and more C-10 contractors and electricians will be looking to move into this type of work. But precisely as contractors new to this work enter the field, it becomes even more critical to ensure that they are employing electricians who are properly trained in EVSE installation. EVITP is meeting the current demand, and is ready and able to meet additional demand to rapidly provide training and certification to the contractors and electricians who are expected to shift to this work.

While the number of EVITP-approved contractors continues to increase, the single most important and effective driver for expanding this number (and the number of EVITP-certified electricians) is for EVSE incentives to be linked to EVITP certification requirements. Competitive bidding drives many contractors to operate on a low cost labor strategy that discourages investment in any certification training beyond what is mandated. In order to ensure that all contractors who might bid for work installing EVSE systems use properly trained workers, EVITP must be a requirement – not a mere recommendation. Imposing EVITP requirements now will create motivation and the drive for substantially more contractors to become EVITP-Approved, as EVSE installation ramps up across the state.

## **3) How has the current health pandemic affected training, licensing, and certification? What measures are anticipated should the pandemic continue into 2021?**

As with most training and education, the COVID-19 pandemic has caused temporary delays in EVITP training offerings over this summer. EVITP has been

developing procedures to allow it to provide hands-on classes safely in the fall of this year. Classes have already been scheduled for the fall in both Southern and Northern California. With masks, social distancing, and standardized safety procedures, EVITP is confident that training, licensing and certification will continue safely.

**4) What is the number of EVITP certified trainers in California today? What are the projections and assumptions for growth?**

EVITP currently has about 40 trainers on call, which is far above EVITP's current trainer needs and is enough to more than double the number of EVITP-certified electricians in just one year. A class usually consists of 20-30 students per trainer depending on the facility. Training takes 20-24 hours. Even if each trainer taught only two classes of 20 a year (less than two weeks of work), that would result in an additional 1,600 newly-certified EVITP electricians. EVITP certifies more trainers as needed to meet demand, but at this date has enough trainers to handle even the most optimistic projections of growth.

**5) Where and when are EVITP training sessions offered in California for 2020 and 2021? How many electricians will receive the training? What is the cost to the trainee?**

EVITP provides classes around the state based on an on-demand schedule, and offers scheduled classes in Southern and Northern California, which are listed on the EVITP website. More classes and locations would be added if there is a requirement that would drive more electricians to classes. But without such a driver, EVITP is limited primarily to the demand of early adopters. As discussed above, EVITP has plenty of trainers to meet even the most optimistic demand projections should EVITP become a CEC program requirement.

As noted above, EVITP is a non-profit organization that receives just \$75 per student for class materials, exam proctoring, record keeping, certification documents and delivery, as well as website administration, updates, and maintenance. Certain training locations – such as some utility training centers - provide EVITP training at no additional cost; some institutions have fees to cover the cost of instruction. In no case does any fee beyond \$75.00 go to EVITP.

**6) How is eligibility determined to take the training and to become EVITP certified?**

EVITP is open to any California Certified General Electrician. There are no other prerequisites. EVITP builds on, and supplements, the training and certification

requirements of certified general electricians. At 20-24 hours, EVITP certification takes fewer hours than the 32 hour continuing education requirement that California Certified General Electricians are required by law to complete every three years.

**7) Is re-training offered or necessary as technology changes?**

EVITP also has continuing education requirements that parallel California's continuing education rules, to ensure that certified electricians keep up to date with the latest technological, safety, and code requirement changes. EVITP is regularly updated and is on its fourth generation of curriculum.

**8) What factors should the CEC and other funding entities consider in deciding whether to require EVITP certification for CALeVIP and other light-duty charging incentive programs? How should they evaluate the necessity or value of additional training? How could a requirement best be implemented?**

Local, State and Federal agencies have adopted EVITP certification requirements primarily for safety, performance, reliability, and to reduce liability and risk to people and property. No other program provides the scope and depth of training. EVITP has been evaluated by numerous utility programs, and the California PUC. The U.S. Department of Energy sent an evaluator from Washington DC to assess and approve EVITP before the program was featured in two DoE Clean Cities EVSE Guides. EVITP has been successfully required in the installation of tens of thousands of electrical charging ports. In evaluating EVITP, we respectfully suggest that the Commission note the EVITP training and testing requirements (cited in this letter), which are above and beyond those required for a State-Certified Electrician. We also respectfully recommend that the Commission look to the long history of EVITP being successfully applied to various national, state, local, and utility programs, as well as the breadth and quality of the stakeholders that helped develop the program.

It is important to also note that while EVSE is UL listed to meet certain safety and performance standards, UL listing only tests equipment to ensure that its components function according to certain specified performance criteria. UL does not certify that equipment will be safe to install in any manner, in any electrical system, of any condition. While a listing can set forth installation requirements, listing itself does not guarantee proper installation. This is made clear in the UL standard documents which state that the standard assumes that final installation will be performed by qualified service personnel in accordance with the applicable installation instructions, installation practices and national or state installation codes.



The limitations of a UL listing are underscored by the recent lawsuits related to PV panel fires on projects, including numerous installations at Walmart stores and at an Amazon distribution warehouse. As noted in the workshop, PV installer certification was developed early on but then disappeared because it was never made a requirement. We see the result now in example after example of shoddy and dangerous workmanship in PV installations. In the Walmart case, as just one example, Walmart found pervasive installation errors by poorly trained technicians. The lawsuit filed by Walmart states that:

- No fewer than seven Walmart stores had experienced fires due to improperly installed solar systems.
- An eighth store experience a power outage caused by “bad installation of the conduits”.
- A 2019 inspection of 29 of Walmart’s remaining solar installations, identified a total of 157 action items requiring repairs or replacement of system components, 48 of which reflected “conditions that rendered the sites unsafe or potentially unsafe.”
- “Walmart's inspectors observed negligent and dangerous wire connection practices, which were readily apparent at many of the sites visited and are a critical risk factor in contributing to fires.”
- “Personnel had made numerous on-site cable connections using connectors that were not compatible with one another, and they had often failed to "torque" (i.e., tighten) the connectors adequately, due at least in part to their failure to use proper tools for that purpose.”
- “Loose and hanging wires were present at multiple Walmart locations, resulting in abraded and exposed wires, decreased insulation, and a phenomenon known as arcing that substantially increases the risk of fire by causing electricity to travel through an unintended path.”
- Technicians had also “cross-matched” connectors, “meaning that incompatible connectors had been used with one another. When connectors are not matched properly, electric current flowing between the connectors is more likely to encounter resistance-and resistance generates heat, which generates fires.”
- Technicians had also failed to properly “ground” solar photovoltaic systems at multiple sites, “violating basic practices for the installation and operation of

electrical systems in a way that increased the risk of electrical fire.” Improper grounding can cause an electric system to arc, which can result in fires, electrical shock and associated hazards.

- Actual installation was often not consistent with the design, layout and installation locations set forth in the system plans and drawings. “That meant that system components, including safety switches and other critical portions of the systems, could not be readily located at the sites in the event of a fire or other emergency.”
- One fire was caused by an improperly sealed inverter housing.
- Another fire was caused by an inverter fuse box that contained incompatible brass/metal bolts.
- The failures were blamed on Solar City/Tesla’s reliance on untrained, unqualified, and inadequately supervised personnel to install the systems.
- “Tesla’s personnel did not know, for example, how to conduct inspections or how to use simple tools...”
- Walmart’s own consultants had to “educate Tesla’s personnel on how to conduct solar system inspections properly, including the types of conditions that can contribute to the risk of fire, how to use equipment and tools properly to look for and correct such conditions, and how to follow site safety and inspection protocols.”

Similar lawsuits were also filed by Amazon against Solar City/Tesla for shoddy and dangerous installations, fires and other damage. As shown by these recent lawsuits re. PV solar installations, specialized electrical work - such as PV or EV installations - requires specialized training and certification. Allowing the EV industry to operate without appropriate training poses dangerous and costly risks. Requiring the proper training is reasonable, prudent, and safe policy that protects the general public, workers, and emergency personnel.

<sup>1</sup> <https://www.latimes.com/business/story/2019-08-23/amazon-joins-walmart-in-saying-tesla-solar-panels-caught-fire>; <https://www.plainsite.org/dockets/40v40ia2y/supreme-court-of-the-state-of-new-york-new-york-county/walmart-inc-fka-walmart-stores-inc-v-tesla-energy-operations-inc-fka-solarcity-cor/>.

<sup>1</sup> Exhibit \_\_; *Walmart Inc. v. Tesla Energy Operations*, Supreme Court of the State of New York, New York County, Case No. 654765/2019e, Complaint at p. 4, (<https://www.plainsite.org/dockets/40v40ia2y/supreme-court-of-the-state-of-new-york-new-york-county/walmart-inc-fka-walmart-stores-inc-v-tesla-energy-operations-inc-fka-solarcity-cor/>.)

<sup>1</sup> *Ibid* at p. 5.

<sup>1</sup> *Ibid* at p. 8.

<sup>1</sup> *Ibid* at p. 6.

**9) What are the factors that should be considered in requiring EVITP certification for medium-duty and heavy-duty charging incentive programs?**

All the above, plus recognition that medium and heavy-duty charging systems utilize considerably higher voltage and greater amperage. They are therefore more powerful and more dangerous. EVITP is clearly at least as important in these categories as others.

**10) What are the benefits or challenges to disadvantaged communities from EVITP certification requirements? Are there other measures CEC should consider to benefit vulnerable communities?**

EVITP supports workforce development and disadvantaged workers by expressly allowing its EVITP-Approved contractors to use apprentices on these projects as long as they are working alongside and supervised by the appropriate number of EVITP-certified electricians. EVITP requirements thus support continued job access and career training for disadvantaged workers entering electrical apprenticeship programs. Comprised of two apprentices and two electricians, a crew of four would be required to have one certified EVITP electrician. So, contractors that support apprentice programs (union or non-union) only need one EVITP electrician per a crew of four if two of that crew are apprentices. The California Department of Apprenticeship Standards requires every apprenticeship program to include an equal opportunity program with an affirmative action plan to recruit women and minority applicants. By providing an incentive to support apprenticeship programs, EVITP requirements encourage workforce development and help provide construction career pathways for disadvantaged workers.

An EVITP requirement also provides needed safety to more economically depressed communities that generally have older building stock and older electrical systems that may not be able to reliably and safely handle EVSE loads. Installation by properly trained EVITP-certified electricians helps to mitigate the greater risk of structure fires and electrical hazards when EVSE is installed in these communities.

Finally, EVITP is a distinct and valuable asset to goals to provide work opportunities for underserved businesses enterprises and communities. In its Charge Ready program, Southern California Edison evaluated the impact of its EVITP certification requirement for installation of electric vehicle charging stations and found that, even with this requirement, the participating contractors exceeded its goals for employing Diversified Business Enterprises.

## **11) Should the CEC and/or local partners require EVITP certification for CALeVIP?**

EVITP strongly believes that using its EVITP-certified electricians makes EVSE installations safer, provides for quicker, more efficient, less costly installation, reduces errors and mistakes, reduces the risk of lawsuits and liability, and protects the integrity and reputation of the EV industry. All of that also and importantly advances state GHG reduction and public health policy by increasing public confidence in, and acceptance of clean transportation. EVITP has a long history of successful adoption as a requirement by state, local and national agencies.

On the local level, EVITP would hope that the CEC would follow its own policy of allowing local agencies to set their own incentive program standards as long as they do not conflict with CEC requirements. Moreover, local agencies are in the best position to assess risk and know the capabilities and needs of the local workforce.

At the CEC level, EVITP notes that the CEC's CALeVIP program is funded through the Clean Transportation Program, also known as the Alternative and Renewable Fuels and Vehicle Technology Program (ARFVTP) (AB 118 2007 and AB 8 2013). Among the statutory goals of the program is to "support workforce training." In its Investment Plan Update, the CEC acknowledges that "workforce training and development are critical" and outlines its efforts to invest in and help develop installation and maintenance training programs. An EVITP requirement would be consistent with these goals.

EVITP was developed by a wide array of industry stakeholders to ensure that there would be a sufficient qualified workforce available to meet the escalating demand for EVSE. While the CEC has generously supported EVITP training initiatives, without a concurrent requirement to actually have this training there is little incentive for contractors that operate on a low-wage, low-cost bidding business model to have their employees take this training. Without a workforce training requirement, CEC incentive programs actually create an economic disincentive for contractors to invest in worker training and employ qualified workers by directly rewarding contractors that employ poorly trained and less than qualified workers. This conflicts with the Clean Transportation Program's goal to increase the number of trained and qualified workforce available to perform this work. Disincentives for training also conflict with state policy goals and regulations such as CARB's Zero Emission Bus and Clean Truck rules.

<sup>1</sup> CALeVIP, <https://calevip.org/about-calevip>; Clean Transportation Program Overview, <https://ww2.energy.ca.gov/transportation/arfvtp/index.html>.

<sup>1</sup> Patrick Brecht. 2020-2023 Investment Plan Update for the Clean Transportation Program. CALIFORNIA ENERGY COMMISSION. Publication Number: CEC-600-2020-001-SD. March 2020, at 59.

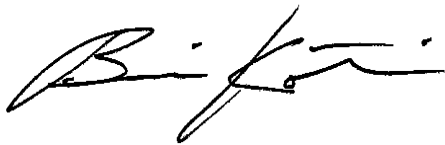
First responders, workers, and the public are put at risk when improperly installed EVSE poses fire, electric shock, and other safety hazards. For these reasons, EVITP believes that the sooner a workforce training requirement for EVSE incentives is implemented, the sooner important objectives will be realized: the CEC's goals, benefits to the EVSE industry, and essential public health and safety protections.

### **III. CONCLUSION**

EVITP appreciates the CEC's consideration of its training program and remains committed to helping California meet its EVSE goals in a safe and timely manner.

Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Bernie Kotlier". The signature is fluid and cursive, with a prominent initial "B" and a long, sweeping underline.

Bernie Kotlier  
Co-chair  
San Jose, California

National EVITP Office  
Royal Oak, Michigan