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CALIFORNIA ENERGY COMMISSION STATEMENT ON PLUG & CHARGE IMPLEMENTATION IN CALIFORNIA

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In October 2025, the California Energy Commission unanimously adopted the first-in-the-nation rules for electric vehicle (EV) charger uptime, including recordkeeping and reporting. Drivers' concerns about EV charging infrastructure remain a barrier to broad EV adoption. By setting a standard for EV charger reliability the CEC helped build trust in the public charging infrastructure.

EV chargers being operational is the least that EV drivers should expect. Charging an EV should be a better experience than fueling a gas vehicle, not just a cleaner one. Charging an EV should be safer, simpler, and more secure: **as easy as plugging an appliance into an electrical socket**. This is the outcome that Plug & Charge is looking to achieve, fully aligned with CEC's goal of improving the driver experience.

The CEC has many levers to advance the driver experience, including regulatory authority, funding for its Clean Transportation Program, and policy statements. This document is intended to provide information on the availability and status of Plug & Charge in California and describe related efforts by CEC. As such, it may be construed as a basis to inform policy work in progress and potential future actions by the commission to advance Plug & Charge adoption in the state.

THE CASE FOR PLUG & CHARGE IN CALIFORNIA

California has set ambitious targets for zero-emission vehicle (ZEV) adoption, including an Executive Order to reach 100% ZEV sales for new light duty vehicles by 2035¹. Despite a changing policy environment at the federal level, California remains committed to the adoption of zero-emission vehicles which it continues to see as critical to reduce and mitigate the effects of climate change and improve public health. Further, the transition to ZEVs is an economic opportunity.

A positive driver experience is crucial to achieving high rates of ZEV adoption, including by providing access to an open, reliable, interoperable, easy, and cost-effective EV charging infrastructure.

Plug & Charge is a key feature of ISO 15118 that enables modern charging systems to simplify a driver's ability to initiate and pay for a charging session. Broad adoption of Plug & Charge by EV manufacturers, charging network providers (CNPs), and end-users would significantly reduce charging issues related to charging session initiation and facilitate a seamless EV roaming experience. Plug & Charge improves the driver experience in three ways.

¹ [Executive Order N-79-20](#)

PLUG & CHARGE SIMPLIFIES AUTHENTICATION AND PAYMENT

Plug & Charge considerably simplifies the driver's experience at public charging stations. When enabled by the vehicle, charger, and driver, Plug & Charge removes the need to interact with an app, credit card, phone number, or the charger (other than plugging-in the connector). Charging is automatically initiated and paid. Many EV drivers who have access to Plug & Charge primarily use this method to start their charging sessions and may base their decision of where to charge on whether the network supports the functionality.

PLUG & CHARGE IMPROVES CHARGING RELIABILITY

Many failed charging attempts are caused either by the driver's failure to complete authentication and session initiation within the time allowed by the charger or a failure in the payment process (which may be due to multiple causes, including but not limited to issues with payment hardware). By automating session initiation, Plug & Charge eliminates these potential failures, making charging more reliable at stations that implement the capability. Multiple automakers and charging network providers who track charging activity have reported double-digit improvement in the charging success rate when using Plug & Charge.

PLUG & CHARGE FACILITATES NETWORK ROAMING

Plug & Charge supports and facilitates roaming through standardized authentication. It uses Public Key Infrastructure (PKI) technology to establish secure communication links, allowing vehicles to authenticate and authorize themselves at any ISO 15118-compatible station across different networks. From a driver's perspective, there is no need to juggle between multiple apps and/or retain a long list of credentials to access various networks.

STATUS OF PLUG & CHARGE IMPLEMENTATION

California's public EV charging infrastructure is rapidly growing, with the total number of public and shared private chargers exceeding [201,000](#) as of September 24, 2025. While it is unknown how many of these chargers are configured for Plug & Charge, it is estimated that a large portion of DC fast chargers are Plug & Charge capable. California has important requirements to ensure continued expansion of Plug & Charge deployments within the state:

- California Assembly Bill 1423 requires all public DCFC deployed after July 2024 to include ISO 15118 Plug & Charge payment capability
- Many funding programs encourage chargers to be hardware-ready for ISO 15118 (this includes many programs for public charging, workplace, tribes, multi-family housing, and schools, representing thousands of chargers)

However, having Plug & Charge capable infrastructure is not enough to ensure the scaled implementation of Plug & Charge. EVs must support Plug & Charge as well, and more importantly, EV manufacturers and charging network providers need to ensure their implementations are interoperable. Further, business agreements need to be in place between charging network providers and e-mobility service providers (eMSPs).

A large majority of electric vehicles currently operating in California are not capable of ISO 15118 Plug & Charge and, in many instances, cannot be updated to support it without a visit to the dealership. The

functionality was first introduced in late 2021 by a handful of vehicle manufacturers, joined since by most major brands. Note that while Tesla has long offered a Plug & Charge-like experience to Tesla drivers, it relies on a proprietary implementation only compatible with Tesla charging stations. Adoption of ISO 15118 Plug & Charge on the vehicle side continues to progress rapidly, with more makes and models supporting the capability. Almost all EV manufacturers surveyed in 2025 confirmed that ISO 15118 Plug & Charge is available on their new vehicle models today or will be within the next 12 months.

Most major charging network providers operating in California (defined as operating at least 100 charging sites) are entering agreements with vehicle manufacturers to enable Plug & Charge on their network. Note that the Tesla network supports ISO 15118 Plug & Charge to enable access for non-Tesla vehicles, with several major vehicle manufacturers already onboard. However, there are still many access and interoperability gaps between major charging network providers and vehicle manufacturers, as well as between major charging network providers and e-mobility service providers, to enable the broad availability of Plug & Charge and EV roaming for California drivers.

California Assembly Bill 2697 allows the Commission to set interoperability billing standards for EV charging. Any such standards would “require major electric vehicle charging network providers to accept payment for charging made by users from multiple other major electric vehicle charging network providers and automakers to simplify drivers’ ability to find an electric vehicle charging station and pay for charging”. The CEC could leverage authority from Assembly Bill 2697 to set targets and further accelerate the adoption of Plug & Charge.

In sum, despite clear benefits and a supportive legislative and public context in California, the implementation and availability of Plug & Charge on public charging infrastructure are still in their infancy, currently limited to a few (albeit large) networks (e.g., Tesla Network, Electrify America) integrated with select EV manufacturers.

BARRIERS TO FASTER ADOPTION OF PLUG & CHARGE

Operationalizing Plug & Charge requires a complex system approach that goes beyond the simple integration of an electric vehicle with a charger or charger network. It requires technical and business alignment between multiple entities, including the vehicle and its driver, the charging network provider who manages the charging equipment, and the e-mobility service provider who manages the charging contract. This complexity generates multiple challenges and barriers that impact the pace and robustness of Plug & Charge implementation.

LIMITED INTEROPERABILITY

Multiple communication links and related standards are involved in a Plug & Charge transaction: ISO 15118, OCPP, OCPI. Each of these standards continues to evolve, with multiple versions currently active. For example, most EV manufacturers implement ISO 15118-2 on their vehicles today for Plug & Charge, with a few starting to explore ISO 15118-20. Most charging networks still use OCPP 1.6, with growing policy incentives to migrate to 2.0.1 or the latest 2.1 version. And some network providers rely on OCPI 2.1.1 or 2.2.1 today, with versions 2.3 and 3.0 about to become available. The numerous combinations make interoperability harder and costlier to achieve for Plug & Charge stakeholders. Inconsistent testing and certification practices across standards, and the general lack of interoperability testing standards and facilities, compound these issues.

LIMITED PUBLIC KEY INFRASTRUCTURE OPTIONS

As of today, there are limited options for stakeholders looking to implement Plug & Charge capability on their vehicle or network, without implementing a PKI from the ground up, which is both technically difficult and costly. For several years, Hubeject had been the sole PKI provider for Plug & Charge. Other PKI service providers have come online since, and more importantly, in late 2024, the Society of Automotive Engineers (SAE) EV PKI project published several documents that laid out the foundation for an interoperable PKI ecosystem. The consortium launched its EVPKI production environment in May 2025.

LIMITED ABILITY TO PROVISION CONTRACT CERTIFICATES ON ELECTRIC VEHICLES

As discussed in the previous section, EV manufacturers now have access to PKI options to provide contract certificates for their vehicles. The provisioning of the contract certificate remains an operational challenge for most vehicle manufacturers, particularly if their vehicles lack over-the-air update capability. Often, a contract certificate cannot be pre-installed, as it pertains to a mobility service agreement with the vehicle buyer, separate from the vehicle purchase. Without an over-the-air update, the vehicle owner must return to the dealership to have the contract certificate installed. A charging network provider may successfully achieve technical interoperability with a particular vehicle make and model, but that does not guarantee the vehicle can successfully initiate a Plug & Charge session. Contract certificate issues are a key factor slowing the “opening” of Tesla’s charging network to other vehicle manufacturers.

COMPLEXITY OF ROAMING AGREEMENTS AND PRICING TRANSPARENCY

A Plug & Charge transaction is a roaming situation. The driver has a contract with an e-mobility service provider (e.g., the vehicle manufacturer) to pay for charging at a charging station belonging to a charging network. In most cases, the network provider and e-mobility service provider are unaffiliated. Broad availability of Plug & Charge, therefore, requires many business agreements between network providers and e-mobility service providers, either bilateral agreements or agreements entered through a roaming hub such as Hubeject or ChargeHub. Establishing agreements takes time and is driven by business considerations specific to the parties, which may create an uneven playing field. For example, certain EV manufacturers acting as e-mobility service providers may stop pursuing agreements with charging network providers once they have secured partnerships with a few of them, or certain charging network providers may offer Plug & Charge benefits only to drivers of select EV models. Furthermore, information sharing between network providers and e-mobility service providers, including real-time information, may affect a driver’s ability to determine the cost of a particular charging session in advance or while at the station. Such potential disparities in treatment between users for reasons that are unclear to them create a negative experience.

CEC’S ACTIONS TO ACCELERATE PLUG & CHARGE ADOPTION IN THE STATE

California is committed to a successful transition to zero-emission vehicles. The CEC collaborates with other state agencies, including the California Air Resources Board (CARB) and the Public Utilities Commission (CPUC), to implement policies that will help the state meet its targets.

The CEC is the primary agency in charge of energy planning and policy and, as such, the lead California agency for building EV charging infrastructure, including leading the state’s actions to develop Plug &

Charge. As discussed in this paper, EV companies play a significant role, either as vehicle manufacturers, CNPs, or e-mobility service providers. CARB regulates EVs and coordinates with CEC staff on Plug & Charge adoption.

The CEC has been an early proponent of Plug & Charge and has taken key actions to enable its progress.

PRIORITIZING POLICY THAT IMPROVES DRIVER EXPERIENCE

The CEC recognizes that improving the driver experience is key to accelerating EV adoption and deploys several levers, including regulatory authority, funding, and technical expertise, to provide guidance and assistance to the industry. To keep this goal at the forefront of electrification efforts, the CEC organized multiple workstreams related to the Driver Experience under a single “Improving the Driver Experience” umbrella and tracks them collectively to ensure consistency and impact. Examples include work on issues such as reliability, vandalism, interoperability, payment, roaming, and more. More information and access to additional materials are available at <https://www.energy.ca.gov/programs-and-topics/topics/transportation/improving-electric-vehicle-driver-experience>.

COMMUNICATING A BROAD INTEROPERABILITY VISION

In November 2023, the CEC issued a [statement](#) on interoperability that outlined a vision for a future in which any driver with any EV could easily charge at any charger on any network. This statement describes many of the communication links involved in Plug & Charge and argues for the necessity of implementing open, interoperable standards and conformance testing. Recognizing that interoperability starts at the physical layer, the CEC also issued (and updated) a [statement on the SAE J3400 NACS connector standard](#), reiterating its commitment to driving toward a single-connector future for light-duty vehicles. These statements provide a path for the industry to follow and provide transparency about the CEC’s approach and priorities.

ENGAGING AND COLLABORATING WITH INDUSTRY

CEC staff engage regularly with all stakeholders involved in the Plug & Charge ecosystem, such as end-user associations, EV manufacturers, charging network providers, e-mobility service providers, and standards organizations. Engagement includes organizing public workshops (e.g., [2024 Workshop on Network Roaming](#)), participating in conferences, meetings, surveys, etc. This broad outreach and collaboration are critical to identify, inform, and prioritize actions that address the most pressing barriers to ZEV adoption and driver experience.

PROVIDING FUNDING TO HELP CLOSE INDUSTRY GAPS

In addition to block grants that aim to deploy charging infrastructure across all segments and geographies within California, the CEC also provides funding for specific projects that help address market gaps. Several funding programs require chargers to be networked and support ISO 15118 and OCPP 1.6 or later protocols (with some recent funding opportunities seeking OCPP 2.0.1 compliance).

While infrastructure funding helps create a base of chargers with the technical capability, it does not go far enough to ensure Plug & Charge capability. The industry critically needs conformance and interoperability testing standards, but few, if any, facilities currently support them. In 2023, the

CEC funded [VOLTS](#), the then-largest interoperability testing event in North America. In 2021, it funded the DEKRA Vehicle-Grid Innovation Lab ([ViGIL](#)), which is testing for OCPP interoperability. Finally, in 2025, the CEC issued a solicitation for a California-based Charging Interoperability and Collaboration Yard ([Charge Yard](#)), and selected a proposed awardee in June 2025. This project aims to close the remaining interoperability gaps in standards, collaborate on conformance testing, including for ISO 15118 and OCPI, and provide a facility to conduct end-to-end interoperability testing for current and future use cases.

DEVELOPING A BALANCED REGULATORY ROADMAP

Based on legislative authority on driver experience topics such as reliability (AB 2061), payments (AB 1423), and EV roaming (AB 2697), as well as constant monitoring of technology evolutions and market adoption, CEC staff continue to look for ways to accelerate the broad implementation and adoption of Plug & Charge.

When implemented, Plug & Charge delivers the expected benefits and achieves high levels of satisfaction among drivers, vehicle manufacturers, and charging network providers. Several technological and economic barriers still block the transition to mass adoption, and a blunt, unilateral policy approach won't resolve them.

The CEC is coordinating with CARB to create a sensible policy to broadly enable Plug & Charge capability, starting with the light-duty electric vehicle fleet.

The CEC is building on the requirement for Plug & Charge capability in public DCFC, aiming to support the ability for any infrastructure deployed in California, whether AC or DC, to offer this functionality. A key priority is to address the technical interoperability barriers to Plug & Charge to increase the readiness of the charging infrastructure. The CEC is expecting Charge Yard to have a significant impact.

The CEC continues to monitor the announcements and implementations of Plug & Charge agreements among the different stakeholders and to analyze their impact on the driver experience. This work will inform future policy approaches that need to balance the needs and interests of EV drivers, EV manufacturers, charging network providers, and e-mobility service providers.

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