February 2026

EV Charging Pricing Transparency

Progress and Challenges Since 2024

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Supported By:

CALIFORNIA AIR RESOURCES BOARD

Executive Summary

Public EV charging pricing transparency in California has improved since 2024, but remains inconsistent and difficult for drivers to interpret. Funded by the California Air Resources Board, in partnership with ChargeHub and informed by a series of 2025 stakeholder interviews, our work outlines underlying sources of EV charging pricing complexity and consumer data inconsistency, and shows that while progress has been made in terms of cooperation via data standards, flexible payment options, and policy alignment, more work remains.

This report is intended to serve as an educational tool, explaining the underlying source of today's pricing complexity, the roles of the multiple players, and the status of relevant regulation. It also explores physical card payments versus the expected expansion of Plug & Charge, noting that it is critical to ensure that all drivers have access to multiple payment options.

Several principles are proposed, which are intended to guide industry and government in improving pricing transparency without oversimplifying or stifling the elements lead to complexity but are beneficial to consumers, operators and policy makers. These principles balance the operator's need for flexible pricing with the consumer's right to understand what they will pay:

- **Clarity Before Charging:** Drivers should be able to see all applicable prices and fees before initiating a session. No surprises mid-session or after completion, and no requirement to plug in to find out the pricing.

- **Consistency of Disclosure:** Price components, time of day differences and any additional taxes or fees should be clearly and prominently labeled using standard terminology and presented consistently across platforms.
- **Comparability:** Using OCPI (Open Charge Point Interface), key data fields should be standardized and easily enable consumers to estimate the total cost of a charging session.
- **Show Price alongside Availability:** Charging prices should be presented alongside real-time charger status (working, in-use, number of ports free) to allow drivers to make informed choices on which charger to select and when.
- **Multi-Channel Accessibility:** Complete price information should be accessible through multiple channels, including 3rd party mapping, in car navigation and specialized apps, as well as the charger display screen. Open data sharing and minimum standards of on-side disclosure should all be considered for future regulation.

The report finishes with a call for coordinated action by public agencies, charging operators, and software and app providers to collaborate, developing solutions where necessary and sharing best practice openly. Reducing consumer confusion should be considered a shared priority—and a prerequisite for more convenient, accessible and affordable charging. As one expert we interviewed observed, "great pricing is when people understand what they're getting into." Delivering that clarity will build confidence among current and future EV drivers and cement California's leadership in the North American EV transition.

We must allow complexity where it is beneficial, but make clarity non-negotiable.

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1. Introduction and Background

In late 2024, the California Integrated Travel Project (Cal-ITP) released an EV Payments Transparency report[1] highlighting that payment information and pricing of public EV chargers were confusing. That study found drivers relying on many different apps and platforms for charging information, often struggling to understand pricing and payment options. Inconsistent and siloed communication of prices created friction and undermined driver confidence, especially for low-income drivers, ultimately slowing EV adoption.

The report observed wide variation in how charging networks disclose prices on digital platforms, making it hard for drivers to compare options and estimate costs in advance. It concluded that better data sharing and display practices could improve transparency without requiring new regulation, and anticipated closer collaboration with state agencies in 2025 to accelerate more transparent and accessible EV charging infrastructure.

This report follows up on the 2024 findings with new insights from a series of interviews and meetings conducted by Cal-ITP in 2025. The purpose of this exercise, supported by ChargeHub[2] – an EV charging data aggregator and platform provider – and other industry stakeholders, was to understand the underlying reasons for the

[1] https://resources.calitp.org/calitp/Cal-ITP.EV.Payments.Transparency.Report.December.2024.pdf

[2] https://chargehub.com/en/

current friction, and if and how pricing transparency and data-sharing practices have evolved over the year and a half since the previous research was conducted.

Through interviews, we gathered perspectives from charging network operators and data platform providers. What emerged is a clearer picture of both progress and remaining challenges in making EV charging prices understandable and fair for consumers.

This report highlights the reasons behind increasingly complex pricing schemes, the different roles of charge point operators (CPOs), site hosts, and aggregators, and the state of technical standards enabling interoperability. It discusses how software apps, automaker dashboards, and policy initiatives can collaborate to improve price transparency while preserving the flexibility to tailor pricing to different use cases.

2. Evolution of Pricing Transparency and Data-Sharing Since 2024

The landscape of public EV charging payments has seen some improvement in transparency and accessibility since late 2024.

Most major charging providers now offer pay-as-you-go options with credit/debit cards at stations, reducing the need for drivers to maintain prepaid balances in multiple proprietary apps. A few years ago, EV drivers often had to download a specific network's app, create an account, and sometimes pre-load $10–20 just to start a charge.

Today, open payment methods are far more common, spurred in part by federal NEVI[3] requirements and state rules mandating payment card acceptance. The NEVI program (National Electric Vehicle Infrastructure) requires that publicly funded fast chargers support open-access payments and share real-time price and status data via standardized APIs. This was amplified in California regulation[4] for all public chargers, with parallel requirements to enable card payments and publish pricing information openly for all new chargers, including retrofitting existing chargers over time.

As a result, "roaming" data-sharing agreements between charging networks have expanded, making it easier for third-party apps and in-vehicle navigation systems to display stations from multiple networks along with their pricing.

[3] https://www.transportation.gov/bipartisan-infrastructure-law/regulations/2023-03500

[4] https://ww2.arb.ca.gov/our-work/programs/electric-vehicle-supply-equipment-evse-standards

Roaming platforms and aggregators like ChargeHub report that over 85–90% of California's public chargers are now integrated into data-sharing networks, meaning their locations, availability, and pricing are fed into common interfaces. Even Tesla, historically a closed network, has begun sharing data at a system level to enable third-party visibility of Supercharger sites. All this implies that the raw data needed for price transparency is increasingly in place.

Despite these strides, the consumer experience still lags. Many drivers remain unaware of pricing until they arrive at a station or open a specific app, and even then, the information can be fragmented.

The 2024 Cal-ITP report highlighted that apps often provided incomplete or confusing pricing details (for example, idle fees or membership discounts hidden in separate screens). That problem persists, though to a lesser degree. Some networks now include richer pricing information in their API feeds (e.g., stating any session fees, idle fees, or time-of-use rates upfront) in line with the latest standards. However, third-party consumer apps have only slowly adapted to present this information in user-friendly ways.

Now that data consistency is improving, there's new momentum to revisit how pricing is shown to users. Overall, the past year has seen a shift from basic access problems toward finer transparency issues: fewer barriers to initiating a charge (thanks to open payments and roaming), but not yet universal clarity on exactly what one will pay under complex fee structures. In short, data-sharing has improved dramatically, but the presentation of that data to customers is the next challenge.

3. Why EV Charging Pricing is so Complex, and Why That's Not All Bad

One striking finding from our 2025 interviews is that EV charging prices have grown more complex, with multilayered fee structures and dynamic rates, but there appear to be good reasons behind this complexity.

Unlike gasoline (which is typically sold by the gallon with one posted price), EV charging can be billed by time or by energy, can include time-of-day variations, membership discounts, idle penalties, and even separate parking fees. This makes apples-to-apples comparison across charging brands, locations and even sessions difficult, but each pricing component is usually aimed at a specific operational or behavioral goal.

Idle fees and dwell-time charges are a good example. Many charging operators now impose extra fees if a car stays plugged in after it's done charging (often a per-minute charge after a grace period). These fees are intended to encourage turnover at charging stalls, preventing EV owners from treating a charging spot as an all-day parking space. For high-demand public chargers – like a fast charger at a highway rest stop, or a Level 2 charger in a busy downtown location – such policies improve charger access by nudging drivers to move once recharged.

Our interviews confirmed that idle or "post-charge" fees are now considered good practice to improve charger availability and fairness. In an urban example, a downtown event venue might use a tiered pricing approach: charge a modest per-kWh or per-hour rate while the car is actively charging, but then layer on a steep per-minute fee if

the car remains parked after the battery is full. This complex pricing aligns the cost with the user's behavior – essentially charging for both energy and parking time – and discourages "squatting" at the charger. Drivers pay more if they occupy the stall without charging, which helps improve turnover for others. While it complicates the price structure, the rationale is to balance utilization and user behavior.

Mixed-use charging scenarios also drive complexity.

In some settings, charging stations serve a dual role as both an energy source and a parking amenity. For instance, curbside Level 2 chargers in a city may attract drivers who primarily want to park (say, to attend an event or go shopping) and only secondarily charge their battery. In these cases, the "value" of the station is partly in providing premium parking access. Pricing may reflect that by charging per hour (effectively a parking fee) in addition to or instead of per kWh.

Our interviewees described a case in downtown Montreal during hockey games: EV drivers plug into curbside chargers mostly to secure a parking spot, not because they badly need a charge, so the city structures the fee to ensure turnover and recover costs, even if it looks expensive per kWh delivered.

Similarly, a grocery store near a highway might host a 25 kW DC fast charger that serves both local shoppers and through-travelers; the optimal pricing (and any time limits or fees) might change during open shopping hours versus after hours when the store is closed. These situational differences lead to variable pricing models that can be hard to summarize in one simple number, yet they are tailored to the use case at hand.

Power constraints and shared capacity add another layer.

Especially for urban Level 2 installations, multiple charging ports often share a limited electrical capacity. A notable example came from Los Angeles, where the city installed curbside "light pole" chargers on circuits capped around 40 kW for several ports. They billed drivers per hour of charging, a straightforward approach on the surface. However, when only one car is charging, that car might get the full power (say 6-7 kW on an L2), whereas if three cars charge simultaneously, each one's power may drop to 2 kW due to sharing limits – yet the per-hour price stays the same. The result: a driver charging during a busy period effectively pays double or triple per kWh compared to off-peak times, purely because the charging speed is slower while the clock is ticking.

This unintended cost inflation is a direct consequence of per-minute or per-hour pricing on a shared circuit. The operator's perspective could be that per-hour billing encourages drivers not to hog a charger for too long, but the driver's perspective is one of unpredictable cost for the energy received. This illustrates how a single pricing model (time-based billing) can interact with electrical realities (power-sharing) to produce complexity.

It also underscores why some comparability is lost. The "price" of charging there isn't a fixed number; it depends on how many others are charging at the same time, in addition to how many electrons the vehicle's battery can absorb in a given time period. Yet from a grid management and utilization standpoint, such pricing may be deemed acceptable because it passively manages load and encourages off-peak use (drivers get a cheaper charge when fewer people are plugged in).

Underlying utility costs further justify complexity.

Demand charges from electric utilities (fees based on peak power draw) heavily impact the economics of DC fast charging. Operators face huge monthly costs if, for example, multiple 150 kW chargers all run at full power during the same 15-minute window. Those costs persist even if the station sits mostly idle the rest of the time. To cope, some CPOs have introduced innovative pricing that varies with time or load. They might raise the per-kWh price during peak hours or add a session fee to recover demand charges, or conversely offer discounts during off-peak times to spread out utilization.

Idle fees, mentioned earlier, are another indirect response, ensuring drivers don't create artificial peaks by occupying a charger longer than necessary. Some operators also simply pass through high demand costs to drivers, resulting in very high per-kWh prices at low-utilization sites (to at least cover the expensive peak incidents). These approaches, while not "transparent" in a traditional sense, have rational roots in cost recovery.

They also highlight an equity concern: rural or corridor fast chargers, which are critical for network coverage, often suffer low utilization and high demand charges, making each charged kilowatt-hour costly. In a few regions, utilities and governments have stepped in with solutions, such as installing battery storage to shave peaks, or subsidizing operations. For example, government-owned utilities in parts of British

Columbia and Québec have deployed DCFC stations[5] in remote areas with very low usage, absorbing costs that no private operator would bear.

Some of these remote sites use solar panels and large battery banks to provide charging where the grid is weak, operating more as a public service than a profit center. Notably, where the public sector funds charging in such "uneconomic" locations, prices to the driver may be standardized or capped (to encourage use), even if the true cost per session is much higher. Nuanced pricing is less necessary in these cases because utilization is low, a simple flat fee or uniform rate might suffice when the goal is to provide basic access rather than manage demand.

In summary, EV charging pricing has evolved into a complex tapestry of rates and fees because it needs to accommodate diverse scenarios. A "one-size" pricing model would either clog popular stations or bankrupt remote ones.

Our research reinforced that complexity per se isn't the enemy; opacity is. If each fee and rule is clearly disclosed and predictable, complexity can improve fairness (by charging more to those who linger excessively or use congested stations at peak times, for example). Great pricing, as one interviewee put it, is when "people understand what they're getting into", the price structure matches the charging context, and is communicated clearly to the user.

[5] https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/clean-transportation-policies-programs/clean-energy-vehicle-program/dcfc-program/hydrogen-fuelling-52518

4. Who Sets the Price? The Roles of CPOs, Site Hosts and Aggregators

Part of the transparency challenge is tracing who actually determines the price a driver pays. Ownership and business models vary widely, which is one driver of pricing inconsistency.

The EV charging ecosystem has multiple actors:

- Charge Point Operators (CPOs) who run the network and back-end system
- Site hosts (property owners or businesses where chargers are located)
- Aggregators or e-mobility service providers (EMSPs) that intermediate between the driver and the charger

In a vertically-integrated model, Tesla or Electrify America for instance, a single company typically operates the stations and sets one uniform pricing scheme across its network. Many CPOs, however, follow different models.

A common approach in North America is the “franchise” or site-host model, exemplified by networks like ChargePoint. in this model the CPO sells or installs charging equipment and provides the cloud software (CPMS), but the site host (e.g., a shopping center, an employer, or an individual retailer) owns the station and has the right to set the pricing. The site host logs into the management software and sets the fee schedule for their station, which could be anything from free charging to complex fee structures.

Our interviews confirmed that pricing initiates in the CPO's system, but the decision-maker varies by model: in some cases, the CPO centrally sets the price, whereas in others the property owner inputs their preferred price into the CPO's platform.

For example, a fast food franchisee that installed a "Network X" charger might decide to charge $0.25/kWh and enter that into the Network X's system themselves. Meanwhile, the Network X-operated public chargers in a different location might charge a different rate, or the city government hosting Network X chargers on streetlights might dictate a fee by municipal ordinance.

We even heard of intra-brand price variability on the same street: in an actual example, multiple "Network A" units just blocks apart priced charging sessions differently because one is owned by a private business and another by the city, each exercising their own pricing authority. This type of occurrence is not exclusive to this particular CPO and applies to other networks as well.

Examples within a half-mile radius (actual example*):

Network A, address 1	Parking is paid. Minimum $2 for 15 minutes. Electricity is $1.50/hr for the first 3 hours, then $5/hr.
Network A, address 2	Charging is free, but there is a parking fee if you are not an employee
Network A, address 3	Payment Required $0.34/kWh

**Actual example, with CPO name and specific addresses removed*

This fragmentation means that seeing a network's logo (or using their app) doesn't guarantee a consistent price – a notable contrast to gas stations, where a particular brand's station generally has the same price on its marquee for all pumps in a region.

Aggregators and roaming platforms generally do not override prices, but they play a role in how prices reach consumers.

An aggregator like ChargeHub operates a "hub" that connects many CPO networks to many driver-facing platforms (like automaker dashboards or other apps). In these arrangements, the CPO publishes the price for each station into the hub's feed, and the hub relays it to the third parties.

The hub typically does not control or modify the price, aside from formatting it appropriately. ChargeHub noted that pricing data is transmitted "as-is" from the CPO's systems – if a station is listed as $0.00 (free) or $0.30/minute in the CPO's feed, that's what ChargeHub will show in its API to others.

Because of this, the accuracy of pricing info in wider circulation still hinges on each CPO (or site host) updating their backend correctly. In interviews, we learned of occasional mismatches and errors – for instance, a CPO's system bug that mistakenly showed a station as "Free" in apps even while it billed users, or a physical charger display that was stuck showing an old price while the digital feed had a new price. These glitches, while relatively rare, can undermine trust. They illustrate why real-time data sharing alone isn't a panacea; the data must also be correct and kept up to date at the source.

The relationship between CPOs, site hosts, and MSPs also affects pricing models like memberships or passes. Some networks offer membership programs with lower per-kWh rates or monthly subscriptions. Often, these are only available via the network's own app/account (since that app is what identifies the user as a member to apply discounts). From a transparency standpoint, this creates multiple price tiers for the same station: one price for a walk-up user paying with a credit card or roaming app, and another (lower) price for a member logged in to the CPO's app.

For example, EVgo[6] and Electrify America[7] have membership plans that give a slight discount if you pay a monthly fee, and ChargePoint allows site hosts to offer free or discounted charging to certain driver groups (e.g. employees or residents) via RFID or app authentication. These practices add complexity – the "price" of charging is no longer a single number at individual stations.

Interviewees noted a consumer dilemma: some drivers maintain multiple memberships or app accounts to always get the best price locally (at the cost of managing many accounts and prepaid funds), whereas others simplify by using only one app or membership, accepting that they might pay a bit more at certain stations for the convenience. Either way, it results in additional complexity that needs to be conveyed to users (e.g., an app might need to show both the guest price and the member price).

[6] https://www.evgo.com/pricing/

[7] https://www.electrifyamerica.com/pricing/

Agent vs. reseller models in payment structures also play a role.

North America's EV charging market predominantly uses an "agent" model for e-mobility service providers (EMSPs) – meaning apps like PlugShare, ChargeHub, or automaker services act as an agent initiating a session on the driver's behalf, but the transaction is ultimately between the driver and the CPO (who is the merchant of record). This is why you often get a receipt or bill from the charging network even if you started the session in a different app. The agent model has prevailed because it avoids treating MSPs as energy resellers, which in many jurisdictions would trigger utility-level regulation for selling electricity.

In Europe, by contrast, some markets pushed toward direct pricing and "reseller" models (partly due to financial regulations like Payment Service Directive 2[8]), but that required rethinking how prices are displayed and taxed.

In the California context, the consensus has been to keep the agent model, meaning each price shown is the CPO's price and any MSP or app is simply facilitating payment. This has implications for transparency: an MSP app can show the same price you'd see on the CPO's own app, rather than marking it up or averaging it.

In terms of policy efforts, these can focus on making CPO-disclosed prices clear and available, knowing that intermediaries aren't supposed to alter the numbers (aside

[8] https://eur-lex.europa.eu/eli/dir/2015/2366/oj/eng

from currency conversion or fees they explicitly add, which would also need to be disclosed).

5. The State of Standards: OCPP, OCPI, and Interoperability

Data standards underpin much of the progress (and remaining gaps) in EV charging information sharing.

Two acronyms often come up:

- OCPP (Open Charge Point Protocol): this is the language spoken between the charger and its backend system (the CPO's central management system) [9]
- OCPI (Open Charge Point Interface): this is a language for communication between different systems, for example, between a CPO's system and a third-party service or another network.

Both OCPP and OCPI are crucial for interoperability and transparent data, but they were not originally designed with all of today's needs in mind, which has resulted in challenges.

OCPP, now widely adopted (especially OCPP 1.6 and 2.0), allows chargers from various manufacturers to communicate status, meter readings, etc., to any compatible backend. This has helped standardize how charger availability and energy usage data are transmitted.

Pricing, however, is typically not an OCPP function (pricing logic lives in the backend, not the charger). Thus, OCPP ensures that basic station information (online/offline

[9] https://openchargealliance.org/protocols/open-charge-point-protocol/

status, start/stop transactions) flows reliably, but price transparency relies more on the next layer.

OCPI is the key standard for sharing pricing, location, and availability information between companies.

For instance, if Network A wants to make its stations visible and usable to Network B's app (roaming), they might exchange data via OCPI. Version 2.1.1 of OCPI is common in North America, with 2.2.1 also in use and a 2.3 version under discussion.

OCPI defines data fields for things like price (including different components), accepted payment methods, real-time status, etc. In theory, if every network exposed a fully compliant OCPI feed, a third-party app could get all the information needed to display stations in a standardized way. In practice, interpretations vary.

A recurring theme from our technical discussions was that even networks using "the same" OCPI version often have subtle differences in how they populate fields or interpret the spec, leading to integration hiccups. For example, one network might list a price as "$0.30/kWh, idle fee $0.40/min after 10 minutes" all under a single pricing record, while another might break that into multiple records or omit the idle fee field entirely.

These inconsistencies mean that an aggregator like ChargeHub must build custom translation layers to make data from different sources comparable. ChargeHub's team has created modules that map between OCPI versions (2.1.1 to 2.2.1, etc.) and even between OCPI and proprietary APIs used by some networks. Interviewees joked about

doing "data gymnastics" to preserve the meaning of fields that don't directly align across systems.

The takeaway is that technical interoperability is still a work in progress. Significant effort goes into normalizing data so that, say, a "session fee" or a "time-of-use schedule" is conveyed properly no matter which network it comes from. Hypothetically, solving this issue could allow non-EV specific mapping tools such as Google and Apple Maps to show this information without sacrificing data accuracy, which is a major bottleneck right now.

Regional differences have called for evolving the standards.

OCPI was born in Europe, where EV charging prices are typically quoted with all taxes included (VAT) and where pricing units are more standardized. North America's landscape – with differing state and local taxes, various fee structures, and currency differences (i.e. US/Canada), required extensions.

One tangible example: tax itemization. OCPI originally had a single field for taxes (assuming a single VAT), but in the U.S. a charging session might incur state sales tax, local energy tax, and maybe a road fee, all of which need separate accounting.

ChargeHub found that out-of-the-box OCPI couldn't fully represent North American tax breakdowns or even address fields for U.S. states and Canadian provinces (it had country codes but not finer granularity). In response, industry participants, including ChargeHub, have been contributing to the OCPI 2.3 development to incorporate these needs.

This is a positive example of industry-led adaptation: rather than relying on regulations, companies realized it was in everyone's interest to update the standard so that, for instance, California drivers can be shown the correct taxes on a charging session, or a Québec station can label its prices in CAD with GST/PST taxes clearly. No government intervention was required here; it has been a voluntary evolution driven by practical necessity.

Going forward, maintaining common, updated standards (like OCPP for charger communications and OCPI for data sharing) will be vital. Interviewees stressed the importance of "best practice" implementation – getting all parties to use standards consistently – as perhaps more important than introducing any new standard. Simply put, we have the needed protocols; the focus now is ironing out the inconsistencies and ensuring everyone actually uses all the fields (for example, always populate the price fields for all relevant scenarios, so that apps don't have to guess or hard code anything).

Standards are beginning to address is multi-component pricing.

OCPI 2.2 introduced the concept of "Tariffs" with different elements (e.g. a fee per kWh, a fee per minute, a flat session fee, and so on). If fully utilized, this can convey the entire pricing scheme that a driver would be subject to. A challenge, however, is presenting that to the consumer in a meaningful way.

If a station's OCPI data says:

- energy_price: $0.20/kWh

- time_price: $0.10/min
- parking_fee: $2.00/hour after 1 hour
- session_fee: $1

How does an app show this? There's ongoing discussion in the industry on display conventions, akin to how airlines present ticket prices with taxes and fees.

Should it show "$0.20/kWh + potential idle fees" with a link to details? Should it attempt to calculate an example cost? There isn't yet a standard user interface approach, but the data standards at least support providing all the component pieces.

The 2024 Cal-ITP report noted that lack of standard data and terminology was hindering apps, many simply didn't receive the info about fees or had nowhere to put it in their UI. As of 2025, thanks to wider OCPI adoption and requirements from programs like NEVI, more of this data is becoming available in real-time feeds. It is anticipated that, over time, consumer software will catch up and start using it to present clearer pricing to consumers.

6. The Role of Apps and Dashboards in Improving Transparency

With data standards maturing and most charging networks sharing data, attention turns to the consumer-facing software, the smartphone apps, car navigation systems, and web maps that drivers use to find and select between chargers. To use a transportation metaphor, these platforms are the "last mile" for pricing transparency, and they have both an opportunity and a responsibility to present charging costs in user-friendly ways.

Currently, the app ecosystem for EV charging is fragmented. There are mapping platforms (e.g. Google Maps, Apple Maps), automaker in vehicle dashboards and apps (e.g. Ford, Kia), dedicated EV apps (e.g. ChargeHub's own app, PlugShare, etc.), network-specific apps (e.g. Tesla, ChargePoint, Electrify America, etc.), and even traditional transit or travel apps that have started to include EV information (e.g. Moovit). Let's consider how some of these are doing with respect to pricing information.

Major mapping platforms (Google/Apple Maps)

Both Google and Apple have integrated EV charger locations into their interfaces, and they even show real-time availability for certain networks. However, their pricing information is minimal to non-existent across all charging networks we could find.

Typically, a user tapping a charger on Google Maps might see something like "Charging station – 2 ports – CCS/SAE – Network: Blink" and maybe an indication if the station is free or paid, but not a detailed price.

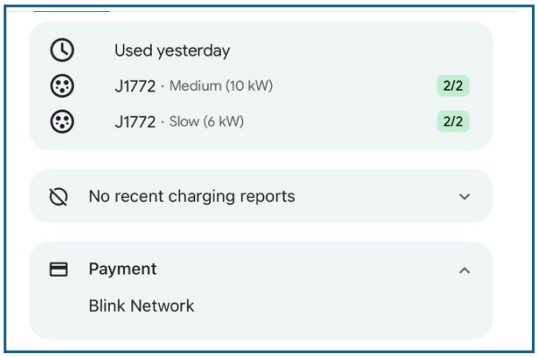

Figure 2: Google Maps: Blink Charger San Francisco

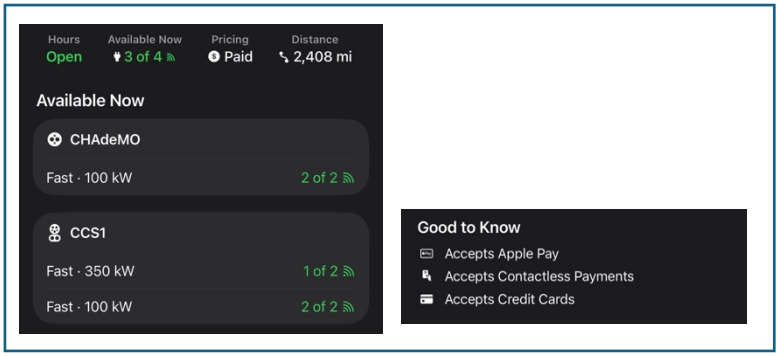

Figure 3: Apple Maps: Blink Charger San Francisco

Apple Maps similarly has basic details and often relies on user reviews for info. These companies have not made EV charger pricing a priority, likely in part due to the complexity and the fact that relatively few users needed it until recently. There's also a data challenge: they prefer standardized feeds (like the open transit data GTFS), and EV charging hasn't had a universal open feed that includes pricing. As a result, while convenient, these general maps are not yet reliable tools for EV charging pricing. A driver using them might know a station exists, but not necessarily what it will cost them to use it.

Automaker dashboards and OEM apps:

Many newer EVs come with built-in navigation that includes charging stations. Often, the data for these systems is supplied by aggregators, companies like TomTom, HERE, or ChargeHub. In our interviews, ChargeHub noted that it provides enriched POI (point of interest) data to several automakers' infotainment systems. This enriched data can

include pricing. For example, some Hyundai and Kia models use a ChargeHub feed via their navigation supplier, and they may display the station's price when you select it. Tesla's system of course shows Supercharger prices and idle fees on its in-car map for Tesla drivers.

The question is, do these OEM systems show the full picture? It varies. If the car's interface is basic, it might only show something like the base price (e.g. "$0.35/kWh") and not elaborate on idle fees or special conditions. There are limitations of screen space and driver distraction to consider, an in-car display might not be suited to show a long list of pricing terms. That said, the automakers have a vested interest in giving a good experience to drivers, so we see them pushing for better data.

In fact, much of ChargeHub's business is tailoring EV charging APIs for automakers, who want to integrate this data seamlessly. They might decide, for instance, to show an estimated cost for charging to 80% at a given station, rather than raw unit prices. Done right, that could greatly aid driver understanding (e.g. the vehicle displaying "Charge here for approx. $8 to go from 20% to 80%"), which would create transparency from a user perspective. While this level of integration has not yet been achieved, conceptually the data exists to do it.

Dedicated EV charging apps (third-party):

Apps like ChargeHub's, PlugShare, and other aggregators are perhaps best positioned to present comprehensive info, because they aren't tied to a single dedicated network and they cater specifically to EV drivers.

PlugShare[10] historically focused on user-contributed info and reviews, showing stations and basic pricing. ChargeHub's app similarly shows station details and pricing, and because ChargeHub integrates roaming capabilities, users can even start sessions for certain networks through the app.

However, based on discussions, even these apps have room to improve in presenting comparative pricing. As of now, if you open such an app, you typically see a map with pins and can filter by free vs paid, by connector type, etc. You might see a station detail page that lists "Cost: $0.40/kWh; Idle fee: $0.50/min after 10 min; Network membership available." But there is usually no feature to compare the total cost of charging at Station A vs Station B for your specific vehicle or needed energy.

One idea raised in our project was to introduce an "apples-to-apples" comparison tool. For example, an app could let the user enter, "I need 20 kWh of charge" or "I will charge for 30 minutes," and then calculate estimated session costs across nearby stations. This would account for each station's pricing scheme (energy vs time, any fees) and give a meaningful comparison (much like GasBuddy might show you the cost for 10 gallons across gas stations). Currently, no major app does that automatically, but it's a logical next step as data becomes more uniform.

Third-party apps are also incorporating user feedback to augment transparency. ChargeHub's app, for instance, uses a hybrid model: it takes the "seed" data from networks (locations, prices, status) and layers on user-contributed information

[10] https://www.plugshare.com

(photos, comments) and its own validation. This can surface issues like a station being hard to find within a parking lot, or a note that "parking fee not included in charging fee" from someone who learned the hard way. Such context is invaluable for improving customer experience and aiding with transparency beyond just the price numbers.

Cal-ITP's thoughts: do current apps and systems display pricing in ways users understand?

The answer is: not consistently. Some network-specific apps do a decent job of listing their fees (especially after California's 2023 requirement that any per-minute billing disclose the equivalent price per kWh at 50 kW, etc., which forced clearer info). Some third-party apps show all the data they have, but might bury details in sub-menus. OEM dashboards often display minimal pricing info, focusing more on navigation.

In general, a user still has to do homework: they might click on a station's info to see pricing, then manually compare that to another station's info. There's no one-step comparison view or guarantee that every fee is clearly labeled.

One encouraging note is that regulations in some places are catching up. The European Union's new Alternative Fuels Infrastructure Regulation[11] (AFIR) explicitly requires that providers make price information (with all components) available to users before a session starts. It doesn't mandate exactly how (app, charger screen, etc.), but it emphasizes the principle of price transparency as crucial to a seamless

[11] https://transport.ec.europa.eu/transport-themes/clean-transport/alternative-fuels-sustainable-mobility-europe/alternative-fuels-infrastructure_en

experience. California's Department of Measurement Standards (Weights & Measures) has also been examining how to extend traditional pricing disclosure rules (like clearly visible pricing) to EV chargers. That said, while today a California EV charger must display the price on its screen or a sign, rules about the digital dissemination of that price (to apps) are still evolving.

Given the prevalence of smartphones, leveraging apps to convey accurate, comprehensible pricing is a logical approach. Our interviews highlighted that most of the necessary data is already flowing through back-end channels; we just need to liberate it on the consumer-facing front-end.

7. Physical Payment vs. Plug & Charge: Different Paths to Access

Pricing transparency is closely tied to payment methods. How a driver pays, via a credit card tap, a mobile app, or an automated vehicle authentication, can influence what pricing information they see and when. There is ongoing debate about the best way to ensure all drivers can access public chargers, and California has been considering requirements for physical payment terminals on chargers versus newer solutions like Plug & Charge or app-based roaming. Each approach has trade-offs that affect both cost and user experience.

Physical payment terminals (card readers)

These are the familiar payment card slots or "contactless" tap pads that you might see on a charging station, allowing you to pay with a bank-issued credit, debit or prepaid card directly at the point of use. California mandated that public chargers accept payment cards by 2024 (for fast chargers) and 2026 (for Level 2), aligning with the idea that EV drivers should be able to pay as easily as at a gas pump.

The advantage of a card reader is obvious: any driver, even one who never downloaded a charging app, can walk up, swipe or tap a card, and initiate a charge. It's an inclusive solution, especially for spontaneous use or for drivers who are not tech-savvy. It also often forces a degree of transparency right at the charger, just as gas pumps display prices, a card reader-equipped charger usually has a screen that shows the price per kWh or per minute before you confirm payment.

While card readers ensure pricing is shown on-site (often mandated by weights & measures rules), they don't solve the broader issue of comparing prices before you arrive.

Plug & Charge (ISO 15118)

Plug & Charge is a technology standard where the act of plugging an EV into the charger automatically identifies the vehicle and handles authentication and billing in the background. The driver doesn't need to swipe a card or open an app; rather, the car and charger perform a "handshake" and the payment is charged to a pre-configured account (like how a Tesla automatically bills a Tesla account at a Supercharger).

Once set up, this is arguably the most seamless consumer experience, and it can be very transparent if implemented well, because the vehicle's screen could tell you the price and progress of your charging session. However, it currently requires the driver to have set up an account with the network or a trusted partner ahead of time, making it great for regular users (who can link, say, their EVgo account to their car once), but not immediately helpful to someone who is not enrolled. It also doesn't inherently display price before charging unless the vehicle's interface does so.

As part of our discussions, Plug & Charge is seen as a promising alternative to physical cards: it provides universal access (any compatible car can use any compatible charger, in theory), and it shifts costs from station hardware to software and the cloud. The major automakers and networks are rolling it out (at the time of writing new Ford, GM, VW, etc. support it), but adoption is still in early stages outside the Tesla ecosystem.

To support pricing transparency, one could imagine a Plug & Charge session where your car or app pops up:

"Charging at Station X – rate $0.35/kWh, idle fee $0.10/min after – press OK to charge,"

This would be ideal. We're not quite there universally, but it's technically feasible.

Roaming-based access (apps without physical cards):

This option includes solutions like using your phone to scan a QR code on the charger or selecting a charger in an app (like ChargeHub or Shell Recharge) and starting it, without needing the network's own app.

Many networks have enabled this through OCPI roaming; for instance, a driver can use the Shell Recharge app to start a charge on an EVgo charger, because Shell Recharge acts as a roaming partner. This approach can be very cost-effective: no extra hardware, just software integration. It gives drivers flexibility to use one app for multiple networks.

The downside of this option is that it requires a smartphone and cell service at the location, and having set up an account in at least one app. For those who have a smartphone and are comfortable with that, it's fine; for those who aren't or if the station has poor signal, this could be a barrier.

8. Recommended Principles for Improving Pricing Transparency

Our research and discussions culminated in identifying several principles that could guide industry and government efforts to improve pricing transparency without oversimplifying or stifling the useful elements that lead to complexity.

These principles are meant to balance the operator's need for flexible pricing with the consumer's right to understand what they will pay. Here are the key principles Cal-ITP proposes:

- **Clarity Before Charging:** Drivers should be able to see all applicable prices and fees before initiating a session. This means any time-of-day rates, per-minute or per-kWh charges, session fees, and idle fees are clearly disclosed up front, whether on the charger's screen, in the app, or both. No surprises mid-session or after the bill. Further, the driver should not have to plug in to find out the pricing. This echoes the EU's requirement that the price must be shown before charging starts.
- **Consistency of Disclosure:** Price components should be labeled and presented consistently across platforms. For example, if one app calls it an "Idle Fee" and another calls it a "Parking Surcharge," that can confuse users. Standard terminology (idle fee, session fee, energy rate, etc.) and units (per kWh, per minute) should be used. Moreover, if a station has time-of-use pricing (different rates at different times), the interface should make that clear, e.g. "$0.30/kWh (peak 5-9pm), $0.20/kWh off-peak", rather than burying it in fine print. The same goes for taxes: ideally the price shown should include taxes or at least indicate "+ tax" if not known.

- **Comparability:** While we accept that pricing will vary, we should enable apples-to-apples comparison by standardizing key data fields. At a minimum, any app or system should provide a common baseline, such as the price per kWh for the first 30 minutes of charging, or an estimated cost for a standard charge (e.g. adding up to 50 miles of range). This could be akin to how some European countries compare electricity tariffs or how fuel economy is listed for cars, a standard metric for easy comparison. The underlying data (through OCPI) should include all the components so that a smart app can perform these calculations. We recognize not every driver is interested in detailed comparisons, but the information should be there for those who want it. Transparency means the diligent consumer can compare effectively if they choose.
- **Show Price Alongside Availability:** One principle raised was that pricing transparency is most useful when paired with availability information. Knowing a charger's price is great, but if it's occupied or broken, that doesn't help your immediate needs. Conversely, a station might be free and available, but if it's significantly more expensive than a nearby one, a driver might choose differently. Thus, any consumer tool should present price alongside real-time status (working, in-use, number of ports free). Many apps already do this (showing green or red icons for availability), but it should become a standard expectation that you see "Station A – 2 available – $0.35/kWh" and "Station B – 0 available – $0.25/kWh" at the same time. This helps drivers make holistic decisions: maybe pay a bit more for a guaranteed open charger, or wait for the cheaper one if it's due to free up. The data for this exists via OCPP/OCPI integration; it's about presentation now.

- **Multi-Channel Accessibility:** Price information should be accessible through multiple channels, not just a proprietary app or a physical sign. Essentially, meet drivers where they are, which means multiple places. If a driver uses Google Maps, they should be able to see charging prices there (via an open feed, similar to parking or public transit). If they rely on their car's navigation, it should show the prices (with the help of aggregators). If they prefer a specialized app, it should have complete information. And crucially, if they walk up to a charger with no digital aids, the charger needs to display the standard pricing clearly on screen. No one should be forced to download an app just to know what they'll be charged. In practice, this means encouraging open data sharing – making pricing information available via public or semi-public APIs so that any developer can incorporate it accurately. It also means possibly having to regulate a minimum standard of on-site disclosure (like "must display base rate and any idle fee on the device").

By following these principles, the industry could allow complexity in the pricing models (to serve different needs) while ensuring clarity and fairness for consumers. One phrase we gravitated towards through this investigation is that we must allow complexity where it is beneficial, but make clarity non-negotiable. A driver might have to digest a two-part fee or dynamic rate, but we owe them an explanation of it in plain terms.

We must allow complexity where it is beneficial, but make clarity non-negotiable.

9. Implementing Improvements through Policy and Regulation

The EV charging transparency issue touches multiple domains: technology, consumer protection, transportation policy, and equity, which means several government entities have a stake in ensuring the balance of interests are taken into account.

From a policy alignment perspective, we recommend a cross-agency coordinated set of guidelines and regulations that address:

- **Data Sharing:** Requiring that networks share more specific data (pricing, status) openly, either to a state-operated database or via compliance with OCPI. This would ensure that any station benefiting from state funds or any new station has to provide an API with its pricing (similar to what some European regulations are doing).
- **Display and Disclosure:** Updating the California Code of Regulations to mandate clear price display, both on the physical charger and in any app/website used for charging. This might include, for example, requiring that if there are multiple fees, it has to cycle through them on the charger screen, and/or that the station ID and price can be obtained via a phone query.
- **Payment Methods:** Continuing the work on defining what constitutes sufficient access (physical vs. digital), and should consider how Plug & Charge is incorporated into the next EV regulations, including establishing that Plug & Charge be added to the minimum payment methods available at a charger. Further, Cal-ITP continues to recommend that agencies and partners work to ensure that there are solutions for the un- and underbanked drivers and those without smartphones, ideally leveraging programs that already support and interact with these individuals (e.g. general aid subsidy programs).

- **Pricing Methodology:** Drafting guidelines that prevent misleading pricing practices. We recommend working with industry players to refine the guidelines and codevelop accompanying implementation approaches. The guidelines could include making sure that if pricing is subject to change (time-of-day), it is labeled as such, to prevent what could be seen as a bait-and-switch; or perhaps, limits on how membership pricing is advertised (so people aren't lured to a station by a low member price that they can't actually get without signing up on the spot). These could be best practice guidelines or evolve into rules or regulations if consumer problems persist.

We recommend that all approaches utilize industry collaboration and cooperation as a first and preferable tactic to lengthy regulatory processes, which should only be considered if industry engagement is ineffective. This echoes the sentiment from our 2024 report, believing that through public-sector-guided collaboration, many challenges could be addressed without new mandates.

Our 2025 findings continue to support this approach: we see the industry making positive moves, including embracing OCPI, improving roaming, and even acknowledging the need for better disclosure. The role of government should be to align incentives and step in where market forces alone aren't improving consumer outcomes. A classic analogy raised through our conversations was gas price signs, where there is actually no federal law forcing the big pole signs we see at gas stations, but competitive pressure and perhaps some local rules made these the norm.

For EV charging, market pressure alone hasn't yet yielded transparent pricing displays, possibly because competition is still limited and drivers may prioritize availability over price. A gentle regulatory nudge could establish baseline expectations, such as "you

shall make pricing openly available and visible", and then allow competition to develop on a fair, transparent level playing field.

10.Moving Forward: Collaboration for Clarity and Preserving Diversity

As we look ahead, the path to truly transparent EV charging will require collaboration across government, industry, and software providers. Each has a part to play, and the synergy among them will determine how quickly and smoothly we can improve clarity without undermining the beneficial diversity in pricing models.

Recommendations for Government and Regulators

Agencies should focus on setting enabling policies and standards rather than micromanaging prices. This means establishing requirements for data sharing (so no network can hoard pricing info as a competitive advantage) and disclosure (so consumers are protected from hidden fees).

For example, regulators could mandate that any public charger must output its pricing via a standard API and must display key pricing info at the point of use. If not already underway, they can also coordinate to provide a neutral platform or repository for this data – akin to the U.S. Department of Energy's Alternative Fuels Data Center (AFDC) which collects station info, but expanded to real-time pricing.

On the flip side, regulators should be cautious about limiting specific pricing structures themselves. It might be tempting to outlaw per-hour fees or require uniform pricing, but that could backfire by removing tools operators use to manage consumer behavior or costs. Instead, a principle-based regulation, e.g. "price differences by time of day are allowed, but changes must be clearly communicated and not applied retroactively to a concluded or ongoing session", would preserve flexibility.

Consumer protection authorities will play a key role in adapting measurement and labeling rules for this new context, and they should engage with industry to ensure any rules are practical. Meanwhile, EV infrastructure funders can incorporate transparency goals into funding and programs, for instance, giving preference in grants to projects that demonstrate open data and user-centric design. And importantly, all relevant government agencies can keep convening stakeholders to share best practices and nudge laggards.

Recommendations for Industry (CPOs and Operators)

It is Cal-ITP's position that charging providers should recognize that transparency is in their long-term interest. While some might fear that comparability will drive prices (and profits) down, it actually can drive volume up. As drivers gain confidence, they'll use public charging more, which could benefit all operators.

Industry could collaborate on standardizing data definitions and sharing protocols even as they compete on service. They could continue working on standards like OCPI, filling gaps (tax handling, etc.) and aligning interpretations so that one network's data plug seamlessly into another's app. They could also consider voluntarily adopting a "no surprises" customer commitment: for instance, ensuring that any fee beyond the energy rate (like an idle fee or station access fee) is explicitly communicated in any app or screen when a driver starts a session. Some of this could be done through industry groups or an open transparency pledge.

In addition, operators could explore offering estimation tools in their own apps. If a network knows a driver's vehicle, it could estimate "this session will likely cost $X" when they plug in. That would be great for user experience and set a bar for others.

Collaboration could also take the form of sharing lessons on pricing experiments. For example, if one operator finds that a certain idle fee threshold is effective without angering customers, sharing that insight can help make such fees "recommended" across the industry so drivers aren't dealing with a dozen different idle fee policies.

Lastly, industry could engage openly with regulators, because if they don't, they could risk having rules imposed without their input. By showing leadership – e.g. a few major networks agreeing to publish all their prices openly and work with third-party apps – they can stave off potential regulation and shape the solution.

Recommendations for Software and App Providers

This includes third-party apps, automakers (for in-car software), and routing/navigation services. These tools are the bridge between raw data and the consumer's eyes. We encourage these players to innovate in user interface and features that enhance transparency. Some ideas include:

- Implementing cost comparison features that let a user input a desired charge amount or session time and see estimated cost across stations.
- Providing notifications or highlights for price changes, e.g. an app could alert "Station X's price just dropped off-peak" or "Station Y will impose idle fees after 1 hour".

- Simplifying the display by adopting common icons or labels, like a little clock symbol next to a price to denote time-based fees, with a standardized legend.
- Integrating user reviews or tips specifically about pricing that the app surfaces clearly, e.g. showing a user could comment "Heads up: you also have to pay for parking here".
- Working with existing transit or map platforms to include EV charging information feeds, as this will bring transparency to the masses who choose not download a special app, as well as encourage multimodal travel, e.g. driving an EV to a transit hub's parking lot to continue a journey by bus or rail.

Preserving Useful Differences

A recurring caution has been not to "stifle" the diversity in pricing models that provide real business and public policy benefit. Cal-ITP wants to clarify that our recommendations are not intended to imply or force all charging to cost the same or use one model.

Instead, we recommend that pricing tools can be nuanced but must be intentional and intelligible. Idle fees, time-of-use rates, and membership programs can all continue if they provide value. In fact, we expect more creative pricing to emerge, such as "free charging for first 30 minutes, then paid" promotions, or loyalty points, or pairing charging fees with retail coupons or public transit vouchers. The key is any such scheme should be rolled out transparently and not trap or trick the consumer.

As an example of good practice: some networks email or display a session summary right after charging, showing exactly the breakdown (e.g. "You were charged $5.20 for 20 kWh and $2.00 idle fee = $7.20 total"). Going further, if that session summary could be previewed before charging ("if you charge for 60 minutes, it will cost roughly $7"), the driver is fully informed. We want to see this level of clarity become standard.

In areas where complexity continues to cause clear problems, industry and regulators should collaborate on guidelines for simplification. For instance, if per-hour pricing on shared circuits is causing too much variability in cost, perhaps guidelines could suggest pairing it with informative labels like "Estimated 15–30¢/kWh depending on load" so drivers understand. Or perhaps encourage a hybrid approach, such as charging by kWh but with a time cap to ensure turnover, as a best practice instead of pure per-hour on L2 chargers. These are things the industry can hash out internally or with light-touch policy encouragement.

Finally, equity-focused collaboration is also important. Community organizations and local governments can partner with charging providers to pilot transparent, affordable charging solutions in underserved areas. But to make such programs work, the eligibility and pricing details must be clearly communicated (imagine signage that says "50% discount for residents in [program]; scan ID to apply" or an app that automatically applies the discount if your account is linked to a qualifying utility account)[12]. This is

[12] Further, at a larger scale Cal-ITP recommends thinking about discounts and subsidies statewide rather than municipality-by-municipality.

another example of where complexity serves a purpose, and with good design, can be made transparent and easy to use.

11. Conclusion and Acknowledgements

EV charging is moving from an early adopters' semi-experimental phase into a mainstream utility. With that maturation comes the need for more transparent, user-friendly practices.

We have seen progress in the last few years – networks cooperating via data standards, more flexible payment options, and recognition from policymakers of the issues at hand, more work remains. The interviews with ChargeHub and others underlined that much of the technical heavy lifting is already done: the majority of stations are online and transmitting data. In parallel to continuing to improve reliability, now the focus should turn to presentation, alignment, and refinement.

By implementing the principles and recommendations outlined in this paper – clarity before charging, consistent disclosure, comparability metrics, multi-channel access, and smart regulatory alignment – we can allow the EV charging ecosystem to maintain the nuanced pricing that operations require and drivers can benefit from, while making it much clearer and fairer for consumers.

Everyone stands to gain from better transparency:

- Drivers gain confidence and save time and money, which encourages greater EV uptake.
- Operators build trust and usage, which can increase their revenue and justify expansion.

- The grid benefits from informed and incentivized charging behavior that help drivers avoid peak pricing times and flatten demand.
- And society benefits from a faster, more equitable electrification of transportation, as fewer people are deterred by the "mystery" of public charging costs.

Working together, government, industry, and software providers can turn EV charging from a source of confusion into a model of transparent, innovative mobility service. As one expert put it in our sessions, "great pricing is when people understand what they're getting into". Achieving this will take effort, but it is absolutely within reach in the near term.

Acknowledgements

Cal-ITP would like to thank ChargeHub contributing to this project, as well as the other industry stakeholders interviewed. We also thank CARB for its ongoing partnership, and, with its sister state agencies, its leadership in North America's EV transition. We look forward to continuing this important work together.