Plug-In Electric Vehicle Charging Station Open Access

The future of transportation is widely seen to be electric. Plug-in electric vehicles (PEVs) can provide significant benefits to ratepayers in utility service territories, the electric grid and to each state. Given the number of benefits, it's no surprise that states and utilities around the country are preparing for the accelerated growth of this market through supportive state level PEV policies and utility PEV programs. The American driver simply wants more of these convenient, clean vehicles that save consumers money today.

PEV sales are increasing at a rapid pace, and the infrastructure to meet these vehicles' needs will need to be deployed rapidly as well. As the PEV market continues to grow and transitions from the early adopter stage to the mass market phase, it is important to ensure that the transition to an electric driving future is as seamless as possible.

The Problem of Current Charging Station Access
One of the biggest obstacles to greater ease of use with public charging stations is the access to the charging station. With the current charging ecosystem, multiple companies operate on their own individual network, and the PEV driver must adapt to the payment method for each of the different charging stations. This can pose several problems:

- The driver may arrive at a public charging station outside of his normal network. For example, the driver may usually charge at a Blink station, but pulls up to a Chargepoint station. The driver will be required to sign up for membership in the network first before accessing the station, which takes time and can be an onerous process.
- The driver may need to use multiple phone apps to find and use the station. It might also be unclear if the station will be in use or not.
- The driver may forget his RFID card(s).
- Maintaining multiple network memberships carries an unreasonable cost.

Therefore, Plug In America strongly supports policies and solutions that promote open access at any public charging station as a remedy to these problems.

Solutions to Open Access
Open access can be simply defined as the way PEV drivers can start the charge. A more specific definition of open access is the ability to use a single credential (i.e. an RFID card) at any charging station requiring authorization. This can be compared to the way drivers of gas vehicles can pull up to any gas station around the country and pay with cash; this ease of access is not currently ubiquitous across charging stations. Open access is not to be confused with network access, which is when the network requires a membership fee or subscription to access the charging station. Major electric vehicle service providers (EVSP) networks includes Blink, ChargePoint, EVgo, Greenlots, SemaConnect, Tesla and Webasto.

The two problems to solve are:
1. What is the method of payment accepted at the charging station? I.e. cell phone, credit card, RFID card

2. How is the consumer charged by different service providers? I.e. memberships, subscriptions, in network vs. out of network charges

Methods of Payment

There are numerous ways to pay for a charge. Some options include the following:

- Credit Card: swipe, chip, tap
- EMV chip card readers: credit cards, debit cards, prepaid cards
- RFID
- Apple wallet / Android pay: (cc through cell phone)
- Cell phone app
- 1-800 number
- Pay by text
- Vehicle-based credentialing
- 3rd party e-mobility interoperability network (i.e. Hubject used in Europe)
- Refillable pre-paid card

There are advantages and disadvantages to each payment option. It is important to evaluate each method with a series of criteria which could include the ease of use for the driver, the ongoing cost to the driver, how secure the method of payment is, any retrofit costs to current charging stations, and whether or not the option is suitable for low-income PEV drivers. Also, given the rapid pace of developing technology, another consideration is how "futureproof" the method of payment may be. Finally, whether or not the charging station is networked (connected to the internet) or not might also be a consideration. For example, there may be a charging station at a National Park where there is limited cell phone coverage, so paying by a 1-800 number, by text, and by a cell phone app would not be suitable solutions. There can also be a combination of payments used at a charging station.

Plug In America supports the credit card method of payment as one standard method of payment that all charging stations should have. As the PEV market transitions from the early adopters to the mass market stage, most drivers will look to a refueling experience similar to a gas station. The credit card is the simplest way to ensure a smooth transition to driving electric. Furthermore, credit cards are a suitable option for low-income PEV drivers. Finally, retrofitting current charging stations with a credit card reader is likely minimal at this stage of the market.

Legislation in California under the Electric Vehicle Charging Stations Open Access Act (SB 454) states that, "An electric vehicle charging station that requires payment of a fee shall allow a person desiring to use the station to pay via credit card or mobile technology, or both."[1] This means that in order for the consumer to have a choice of payments methods, they must all be provided by the EV charging station. Our recommendation for a minimum access standard is 1) an EMV chip card reader and 2) NFC/RFID card reading, similar to what is available at any gas station. A 1-800-number should be provided for customer service issues and as a backup in case the driver is unable to charge. New Hampshire legislation SB 575 states that, "The owner or operator of a public electric vehicle charging station that requires payment of a fee shall provide multiple payment options that allow access by the public."[2]

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[1] http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140SB454
[2] https://legiscan.com/NH/text/SB575/id/1685285

Network Roaming and Billing Interoperability

With a standard method of payment(s) on the charging station, the consumer needs to know if the EVSP will require a membership to access the station, or a subscription. Currently, the consumer needs to keep track of multiple memberships and subscriptions, as there might not be just one EVSP that the consumer uses. This is particularly the case when the consumer travels someplace new - the consumer might need to charge with a different EVSP than one normally used.[3]

The ability to travel between charging stations operated by different EVSPs while being billed to one account is called roaming. Roaming is also called billing interoperability, or front-end electric vehicle supply equipment (EVSE) interoperability. Billing interoperability is analogous to how an ATM works with various banks and vendors; for example, a customer may use an ATM from a different bank, receive the services needed, a convenience fee is assessed, but the fee appears on the customer's regular bank statement.

There are a few solutions to this problem to get EVSPs to "operate together." In addition to the credit card being an easy solution, there are 3rd party groups that work with all EVSPs. In Europe, Hubject is one such example that connects drivers with multiple EVSPs with one access card. Hubject also works with EVSPs on the back end with billing and data sharing. "No charge to charge" programs are also starting to become more popular. These programs partner an automaker (OEM) with various EVSPs. The driver can use one RFID tag to "open" multiple stations that is good for a number of years. The bill goes back to the OEM. This kind of program is usually offered as a perk by the OEM at the time of purchase. For example, Nissan offers this program in select markets and partners with Blink, Chargepoint, Greenlots, JNSH, EVGo and Webasto.

Alternatively, a state could require that EVSPs comply with standards that allow for front-end interoperability, and back-end interoperability, or network interoperability, such as the Open Charge Point Interface (OCPI) or ISO15118. The open charge point protocol (OCPP) is a communication protocol for PEV charging stations and a central management system. This is similar to cell phones and cell phone networks. Under this, the OPCI allows for a scalable, automated roaming setup between the EVSPs and 3rd party e-Mobility Service Providers. It supports authorization, charge point information exchange (including transaction events), charge detail record exchange and also the exchange of smart-charging commands between parties.

The ISO15118 standard doesn't necessarily help the EVSPs to working together, but it does move the point of billing interaction from the EVSP to the vehicle. This could eliminate the need for separate RFID cards, since the vehicle can plug in and be authorized to charge, but it still may require subscriptions to the EVSP.

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[3] See the July 2018 Plug-In Cars article on EVSPs here: http://www.plugincars.com/ultimate-guide-electric-car-charging-networks-126530.html