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Electric Vehicle Charging Interoperability

This issue brief focuses on key considerations pertaining to electric vehicle (EV) charging interoperability. "Interoperability" refers to the ability of EVs to interact with a range of different chargers, for those chargers to interact with each other and with other charging management systems, and for payments to be processed between charging service providers operating different charging networks. These can be split into two categories: *consumer-facing interoperability*, which is centered around the charger itself and refers to the compatibility of plugs and connectors with different vehicles as well as accessibility of charging infrastructure (which can be affected by constraints such as subscriptions, membership requirements, lack of certain payment methods, and gated off chargers); and *systems management interoperability*, which encompasses the requirements of communication between vehicle and charger, between charger and the "cloud," compatibility across charging networks, and software and systems to manage and share data from vehicles and chargers. These and related functions will be increasingly important as EV adoption accelerates and becomes increasingly reliant on charging networks for charging away from home and distance travel. A focus on interoperability and compatibility now can help to make this system of chargers more accessible for drivers, reduce common barriers to EV adoption such as range anxiety, and reduce the risk of stranded assets and technology obsolescence.

This issue brief explores key standards and initiatives that are underway to help improve interoperability across the U.S. The issue brief first explores why interoperability plays an important role in supporting a robust EV ecosystem, followed by an explanation of the standards that are in place and developing across the U.S. to encourage and support interoperability. In conclusion, the brief details recent partnerships between charging providers and other market players as well as regulatory and legislative activity in states to implement interoperability and standards.

Background

There are over 100,000 gas stations in the U.S. and just 10 companies own half these stations.[1] A driver can fill up at any station he or she comes across, anywhere in the country, using cash or a credit card. There are no requirements for memberships or mobile apps to gain access or to facilitate payment methods. Public charging of EVs is not yet as easy or accessible—with only 20,000 public charging stations in the U.S., EV drivers can have a much more difficult time finding a charger, let alone one they have access to.[2] Though today EVs tend to "fuel up" at home and work, public fueling—charging—stations will remain a critical feature of a fueling network for

1 https://247wallst.com/retail/2017/04/21/10-retailers-that-control-americas-gasoline-sales/
2 https://afdc.energy.gov/stations/#/analyze?fuel=ELEC&country=US

EVs to enable long-distance travel, flexibility, and a growing EV fleet. As EV growth accelerates, interoperability will make it as easy as possible for the consumer to charge and enable market transformation.

Different EV charging business models have emerged across the United States,[3] including a proprietary network for Tesla drivers only, commercial public and workplace networks owned and operated by network operators (e.g., Greenlots, ChargePoint, and EVgo) who provide individual station hosts with hardware and software to manage their stations, and non-networked stations owned and operated by private or public parties (such as municipal or state agencies or chains of businesses). To access almost all of these public stations, EV drivers must create accounts with each EV charging provider (i.e., sign up online or through an app and provide a credit card for billing purposes). Many networks also require the use of a membership card (RFID card) and/or use of their own smart phone app to access their stations. This requires EV drivers to research the EV charging providers that have chargers in and around where they typically travel, potentially sign up for multiple providers, and have a smart phone and cellular coverage at the charger site. Even with multiple memberships, a consumer is likely to only have access to a partial segment of the U.S.'s growing charging network.

The ability for EV drivers to utilize different EV charging networks is likely a critical factor in the success of the growth of the EV market. Many vehicles will be able to avoid a "gas station" public charging experience most of the time, with a majority of EV charging taking place at homes and work places. However, access to publicly available chargers is nevertheless important in numerous critical scenarios: long distance travel; for those without access to home charging; and in future high penetration scenarios in which home charging may become more expensive or less realistic. In the same way that cell phone users can "roam" across and among different networks, EV drivers will want the assurance of easy charging access and payment options. Although approximately 80 percent of EV charging occurs at home, drivers must have the confidence that can charge a low battery on long distance trips or at central locations like shopping centers or grocery stores.[4]

The Role of Standards

According to the U.S. Department of Energy, one of the critical components of infrastructure deployment necessary for EV market success is "… standardized, open charging systems that ensure easy access by all in a competitive and highly-innovative market."[5] This section explores a range of standards that are in use and under development in the United States.

Standards that enable both consumer facing and systems management interoperability can help make the EV experience better for drivers. Level 2 chargers commonly use the standardized SAE J-1772 connector which is widely compatible with different vehicles, leading to strong consumer facing interoperability across this segment of the market. There is more variation in standards for direct current fast chargers (DCFC): Nissan and Mitsubishi developed and use the Charge de Move (CHAdeMO) connector, while remaining Asian and all American and European manufacturers (i.e., General Motors, Mercedes-Benz, and Volkswagen) use SAE Combined Charging System (CCS), which features a double-plug that allows drivers to charge DCFC or a J-1772 plug. Tesla also uses

[3] In Europe, where EVs have taken off faster than in the U.S. as a result of high gas prices and country and city goals of banning internal combustion engines, there are approximately 50 major charging providers along with 100 smaller names. Due to this fragmented charging system, the conversation around and the need for systems management interoperability began in Europe, but the topic has been gaining momentum in the U.S. in recent years. (https://www.businessinsider.com/countries-banning-gas-cars-2017-10#cities-like-barcelona-copenhagen-and-vancouver-all-plan-to-ban-gas-and-diesel-powered-cars-by-2030-7)

[4] https://www.energy.gov/eere/electricvehicles/charging-home

[5] https://www.energy.gov/eere/vehicles/public-plug-electric-vehicle-infrastructure-guiding-principles

its own proprietary connector, though it has announced it will conform to CCS for the Model 3 in Europe and is providing CCS adapters for all vehicles.[6] Plug adapters and dual plug chargers for non-Tesla chargers, however, are becoming more commonplace, thus ameliorating the charging device interoperability challenges that plagued the EV market early on. The remaining difference in approach is largely focused around automaker decisions and technology.

As discussed more below, achieving remaining consumer-facing and systems management interoperability is less resolved. Issues in which conflicting standards and approaches still exist include open access and payment, charger to network communication, network to network communication, and vehicle to charger communication. There is a debate among proponents of different approaches, with vehicle manufactures, charging providers, state regulators, and standard-setting organizations each having a unique perspective.

Open Access and Payment

Many definitions of interoperability start with consumer facing systems, focusing on how EV drivers pay for and access their charging stations. One definition from Plug In America describes "open access" payment standards as those that have two components making public chargers accessible: 1) access to public chargers must not be restricted behind a gate or wall and 2) one or more method of payment is available to enable charging.[7] However, this definition remains fairly limited: under this definition, the charging operator can—and almost all do—require drivers to belong to an operator's proprietary network and use online payment.

A more expansive open access standard would allow any driver to use any public charging station, regardless of which network a driver belonged to. For example, in the small, homogenous country of the Netherlands, a single, universal RFID card is used for all public charging stations, which are operated by scores of different network operators. So far, a provider of such an option has not substantially materialized in the U.S. However, an open access standard could allow any driver to use a charger without memberships or subscriptions, without having to enroll online, and possibly through a range of payment options, such as credit cards, toll-free phone numbers and call centers, mobile apps, or Apple Wallet and Android pay. Multiple forms of payment could balance ease and comfort with ensuring that charging stations are accessible to all drivers, including, for example, the roughly 30 percent of Americans who do not own a credit card or the nearly 25 percent who do not own smartphones and help create a more equitable transition to transportation electrification.[8] Impediments to open access may include competing charging network business models, parking locations that are in restricted areas (such as parking lots that require payment or gate access), costs of implementing and maintaining credit card readers, and upfront and ongoing costs to manage more than one payment mechanism. Jurisdictions may also choose to define open access differently, such as allowing "public" stations to be in gated or paid parking areas or to refine which payment options are considered "accessible."

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6 https://electrek.co/2019/02/02/tesla-ccs-adapter-standard-model-s-x-europe/

7 https://pluginamerica.org/wp-content/uploads/2018/06/AchiEVe-Policy-Toolkit-2.0_2018.pdf

8 https://news.gallup.com/poll/168668/americans-rely-less-credit-cards-previous-years.aspx and https://www.pewinternet.org/fact-sheet/mobile/

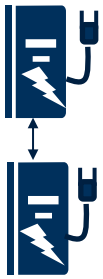
Charger to Network Communication

Charger to cloud network communication would utilize standardized communication between charging stations and the central control system (e.g., a charging network provider or utility) that supports them. Data communication allows network providers and site hosts to better manage chargers and charging activity, ultimately enhancing flexibility and increasing charger utilization. Standardizing this data sharing can also enhance the experience for all EV drivers by enabling databases—like the Alternative Fuels Data Center or charging provider cell phone apps—to collect, process, and display data on charging station locations and availability across North America.

Open Charge Point Protocol (OCPP) – OCPP is the dominant charger to cloud network open communication protocol in place in the United States, though it has not technically been adopted as a standard.[9] Use of this open protocol, rather than a priority protocol, may provide hosts flexibility in the long run: if a station provider goes out of business or a site host dislikes his or her current provider, it can be replaced by a new network provider as long as the charger is OCPP compliant (not all are), without replacing the entire unit.[10] This can help minimize the risk of stranded assets because other service providers can support the charging functionality and communications.

OCPP is typically implemented with other protocols, especially the Open Automated Demand Response (OpenADR 2.0b) demand response standard,[11] which facilitates communication among utilities and system operators with customer load—chargers with this capacity are also referred to as "smart" chargers. Demand response will likely become a more important tool for utilities to manage the integration of EV charging as it scales up over time in order to minimize grid impacts and costs and maximize benefits.

Network to Network Communication



Network to network communication enables coordination and data sharing among charging providers, which can facilitate network "roaming"—Charging Network A can make it easy for its members to charge on a different Charging Network B directly through the Charging Network A app, payment system, and membership; the driver would not need to belong Charging Network B. The same is true in reverse for members of Charging Network B, who now could also utilize Charging Network A. This data sharing process can also allow Charging Network A to provide to its customers charger location and availability data for Charging Network B (and visa-versa) and allow these two charging providers to share customer billing and payment data to facilitate settlement of roaming charging sessions. Through roaming, drivers would potentially only need to have one membership but may access a larger network of chargers across a broader geographic area. Below we highlight two models for facilitating network to network communication: bilateral peer-to-peer agreements and a central hub model. These network communication structures are not mutually exclusive; charging providers can pursue both types with different partners.

Open Charge Point Interface (OCPI) – Bilateral or peer-to-peer agreements – OCPI is a network communication standard that has been utilized by charging networks to form bilateral or peer-to-peer agreements to institute network to network communication and allow roaming. OCPI has also been used between providers

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9 There are other communication protocols recognized and available, such as OpenADR, which recently became an IEEE standard, and IEC 63110, which is still under development. We have focused on OCPP due to its prominence in the U.S. market.

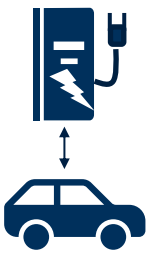
10 https://www.semaconnect.com/blog/introducing-ocpp/

11 http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442460144

and auto manufacturers. Network providers and manufactures can and do sign peer-to-peer agreements with multiple parties, creating a web of interoperable charging stations (see section on recent announcements below). Possible downsides to this approach include that it may take more time and resources to set up and maintain a series of bilateral agreements, introducing complications to settlement and potentially making it more expensive and restrictive for smaller players to enter the market.

Open InterCharge Protocol (OICP) – Central hub – Instead of bilateral agreements, charging networks can also join a central hub to facilitate network to network communication and allow roaming, billing and settlement. One hub standard is OICP. European eRoaming platforms include e-clearing.net, GIREVE SAS, MOBI.E S.A., Enel, and Hubject (which is in 26 countries and now present in the U.S.). These providers typically charge a fee to the operators of customer-facing apps to recover their costs. The hub-based model has been particularly successful in Europe, where it began more than five years ago as EVs were just being introduced and the wide array of providers in the charging market would require potentially dozens of peer-to-peer agreements to effectuate meaningful roaming (which is possible but could be more difficult to manage). However, some U.S. charging network providers indicate concerns with the hub model, such as increased costs for EV drivers as well as sharing data with a third-party and contend that peer-to-peer agreements (bilateral) are a sufficient platform with fewer major players today. However, as more utilities and service providers enter the market, the ease and simplicity of a hub-based model could prove attractive.

Vehicle to Charger Communications



Additional standards are under development to help to further streamline EV charging payment and to prepare for advancing technologies. Under current conditions, the flow of energy between charger and vehicle is generally one directional—the EV plugs in and receives electricity with the sole purpose of charging the vehicle. This is referred to as V1G. Under V1G and OpenADR as discussed above, it is possible for vehicles to act as demand response, reducing or increasing charging level in response to grid signals. Vehicle to grid (V2G), on the other hand, allows for the vehicle to receive signals from the grid to push stored electricity *back* onto the grid, providing local and system grid services such as frequency regulation.[12] Although this may not be widely feasible with today's grid and EV battery systems, additional standards or platforms could help better manage EV charging and the increased load that will accompany it.

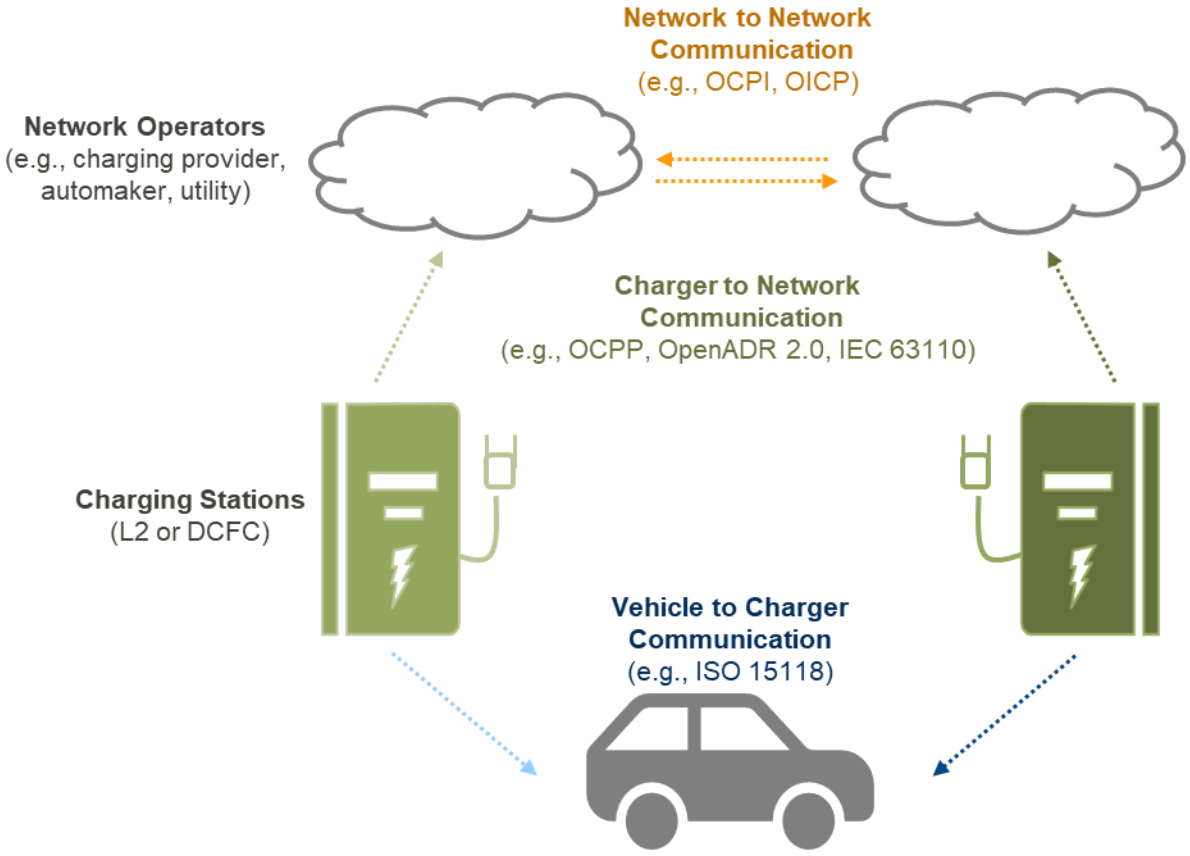
ISO 15118, first released in 2014, details the communication protocol between the electric vehicle and the EV charging station. It lays the foundation for V2G communication. ISO 15118 can be utilized with AC and DC fast charging with the CCS plug. Although few EVs and chargers are currently compliant with ISO 15118, more are anticipated to become available in 2019 and onwards and several automakers, including Volkswagen, Ford, Daimler, Audi, and BMW have announced they will implement the standard in coming years.[13] ChargePoint has also conducted detailed testing of the standard in its home equipment with success.[14]

One emerging application of ISO 15118 is "Plug&Charge." It allows a customer to start the charging process simply by plugging in the cord—RFID cards, mobile apps, or credit cards are not needed and are instead replaced by vehicle "digital certificates." Within five seconds of plugging an EV into a charger, the back-end software

12 https://www.greentechmedia.com/articles/read/why-is-vehicle-to-grid-taking-so-long-to-happen#gs.w38paeNZ
13 https://www.hubject.com/iso15118/plugcharge/#1520007086843-43cb7e80-276b
14 https://www.energy.ca.gov/2019publications/CEC-500-2019-009/CEC-500-2019-009.pdf

platform authenticates, authorizes, and bills by matching an EV's certificate with a contract between the charging station operator and the driver.[15] If the charger is part of a charging network that is interoperable with other charging networks, it could also help to facilitate roaming and, in the words of some supporters, make it "easier to charge an EV than use a gas pump."[16]

Figure 1. Summary of Interoperability Communication Types



Recent Industry Agreements and Trends

OCPI is gaining traction throughout the U.S. market through recent bilateral agreements amongst charging providers or between providers and auto manufacturers. Providers using OICP, such as Hubject, have been successful developing a hub-and-spoke platform in Europe where there are many more charging providers and therefore more substantial market diversity, making it more important to connect a large number of charging networks. It is not clear when or on what scale OICP could play a larger role in the U.S. given the comparatively consolidated market structure with fewer charging network providers today.

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15 https://www.hubject.com/en/iso15118/plugcharge/#1520257145635-227e9275-c963

16 https://elam-cms-assets.s3.amazonaws.com/inline-files/Electrify%20America%20and%20Hubject%20to%20Provide%20Plug%26Charge%20ISO%2015118%20Feature%2001082019.pdf

While the U.S. has lagged behind Europe,[17] interoperability has been gaining momentum in recent months due to collaboration between industry stakeholders.

- In January 2018, Hubject announced its first U.S. partnership with Volta Charging. Since then, Hubject has partnered with Blink to make roaming possible in 2019.[18]
- In May 2018, adopting a proposal from a coalition including charging equipment providers and environmental advocates,[19] the California Public Utilities Commission (CPUC) required San Diego Gas & Electric to establish minimum network requirements for the 60,000 Level 2 chargers in its residential charging program, including a communication and data transfer protocol that allows for dynamic charging and flexibility.[20]
- In October 2018, Electrify America (EA) created an interconnected network of 12,500 chargers through a partnership between its network and SemaConnect, Greenlots, and EV Connect. This partnership is slated to become operational on June 30, 2019.[21]
- In November 2018, EA released an updated version of its Cycle 2 California ZEV Investment Plan, adding OICP to its plan: EA "public stations will be equipped with back end systems that can use [OCPI 2.1] to communicate with other networks and [OICP] to be able to connect roaming platforms."[22] The initial California ZEV Investment Plan included OCPI, but the updated Plan is one of the first applications that uses OICP as a standard. A sign of their partnership with Hubject, this would be the first widescale application of OICP in the United States. Since the update of California's ZEV Plan in November, EA's National ZEV Investment Plan: Cycle 2, released on February 4, 2019, also specified that EA's public stations will be equipped with backend systems that can use both OCPI and OICP.[23]
- In December 2018, Greenlots and ChargePoint announced a roaming partnership that will begin mid-2019.[24]
- In January 2019, General Motors announced a collaboration with Greenlots, ChargePoint, and EVgo.[25] This will enable customers to access more than 31,000 ports and updating dynamic charging information

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17 Europe has been focusing on and advancing interoperability for over a decade, even establishing the European Interoperability Centre for Electric Vehicles and Smart Grids. In April 2018, Daimler announced the first vehicles with Plug&Charge capacity.

18 https://www.hubject.com/en/volta-charging-first-u-s-partner-of-hubjects-global-open-ev-charging-network-intercharge/ ; https://www.blinkcharging.com/single-post/2018/10/29/BLINK-AND-HUBJECT-FORM-PARTNERSHIP-INCREASING-ACCESS-TO-ELECTRIC-VEHICLE-CHARGING-NETWORKS-IN-THE-US

19 The coalition members included: Alliance of Automotive Manufacturers, Coalition of California Utility Employees, Greenlining Institute, Greenlots, eMotorWerks, the Environmental Defense Fund, the Natural Resources Defense Council, Plug in America, the Sierra Club, and Siemens.

20 Opening testimony filed in Application 17-01-020, California Public Utilities Commission, August 7, 2017 and Application 17-01-020, California Public Utilities Commission Decision 18-05-040, June 6, 2018 http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442457637

21 https://www.electrifyamerica.com/sites/default/files/inline-files/ElectrifyAmericaAnnouncesInteroperabilityNetwork.pdf

22 https://www.arb.ca.gov/msprog/vw_info/vsi/vw-zevinvest/documents/c2zevplan_errata_111218.pdf

23 https://www.epa.gov/sites/production/files/2019-02/documents/cycle2-nationalzevinvestmentplan.pdf

24 https://greenlots.com/greenlots-and-chargepoint-partner-to-increase-access-to-ev-charging-throughout-north-america/

25 https://media.gm.com/media/us/en/gm/home.detail.html/content/Pages/news/us/en/2019/jan/0109-charging.html

on the myChevrolet app. This announcement may signal increasing cooperation between auto manufacturers and charging providers.

- In January 2019, EA partnered with Hubject to focus on implementing Plug&Charge using ISO 15118. This partnership will bring Plug&Charge to more than 2,000 high-powered public chargers by the end of 2019.[26]
- In February 2019, Shell New Energies acquired Greenlots, a move that may signal oil and gas industry interest in the development of charging infrastructure. Through this partnership, Greenlots' "technology and team will become the foundation for Shell's continued expansion of electric mobility solutions in North America."[27] Shortly thereafter, Greenlots and Hubject announced a collaboration enabling Plug&Charge on Greenlots' SKY™ network.[28] The collaboration will enable Greenlots' stations to securely authenticate and authorize EV charging simply by plugging into the vehicle.
- Since 2012, the Electric Power Research Institute (EPRI) has led the Open Vehicle-Grid Integration Platform (OVGIP) initiative, collaborating with utility and automotive industry partners to create a software platform "that connects various nodes involved in providing and managing energy to plug-in electric vehicles."[29] By focusing on load-management of large-scale EV penetration, the platform allows OEMs the flexibility to use existing on-vehicle communications technologies (e.g., ISO 15118) with utility standard interface protocols and EV charger application program interfaces (e.g., ISO 15118, OCPP) through a common platform.[30] Ultimately, OVGIP could help further EVs role as a flexible distributed energy resource and support time of use and real time pricing offerings as well as targeted demand response initiatives.

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26 https://elam-cms-assets.s3.amazonaws.com/inline-files/Electrify%20America%20and%20Hubject%20to%20Provide%20Plug%26Charge%20ISO%2015118%20Feature%2001082019.pdf

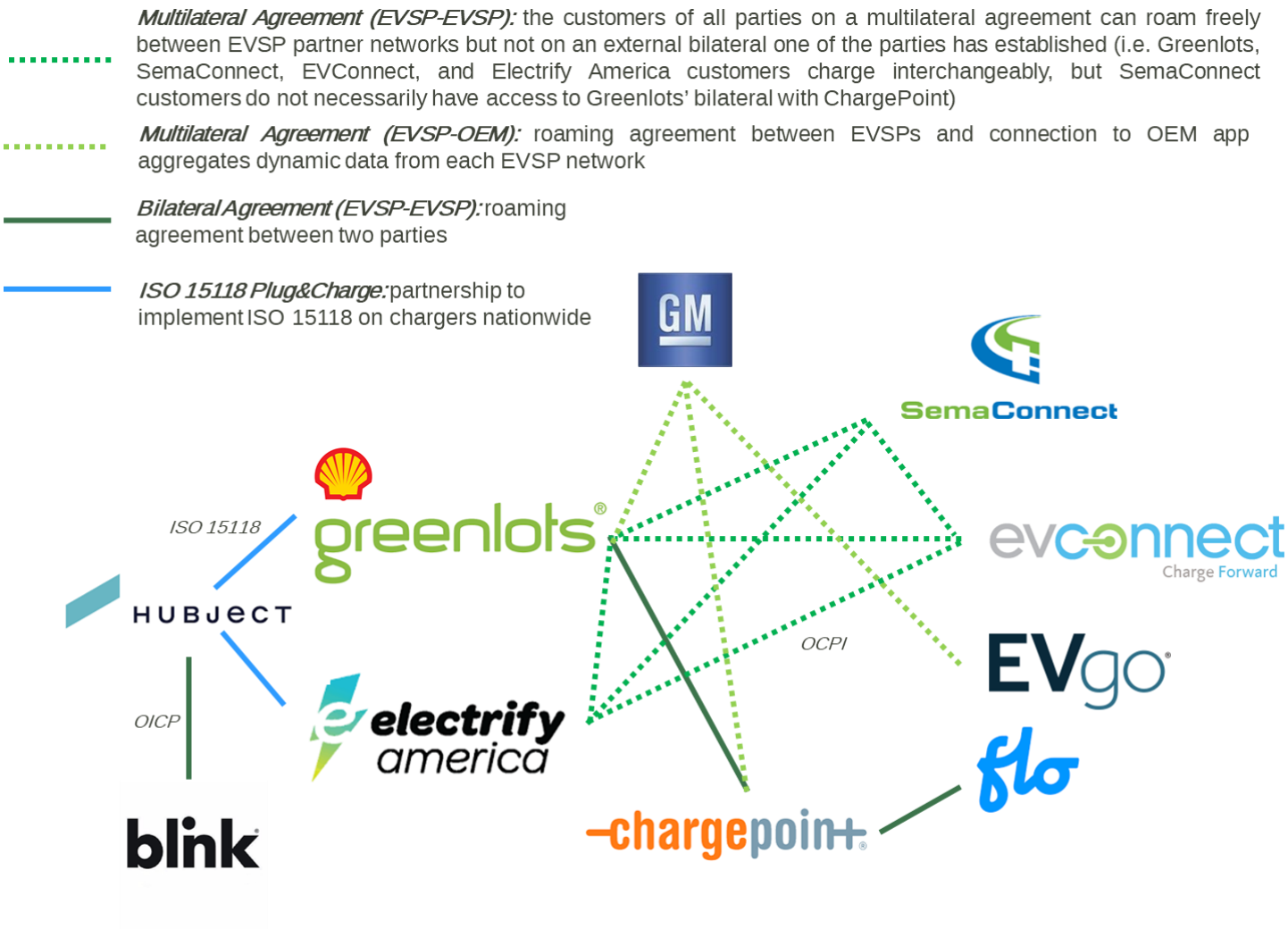
27 https://greenlots.com/greenlots-announces-acquisition-by-shell-one-of-the-worlds-leading-energy-providers/

28 https://cleantechnica.com/2019/02/07/hubject-greenlots-new-card-less-system-makes-ev-charging-easier-than-pumping-gas/

29 https://publicdownload.epri.com/PublicDownload.svc/product=000000003002008705/type=Product

30 https://sepapower.org/resource/ev-managed-charging/

Figure 2: Bi- and Multi-Lateral Interoperability Roaming Agreements



Source: MJB&A research (as of May 1, 2019)

Emerging State Policy and Activity

While industry action has increased, reflected in recent announcements, states are also engaging in legislative and regulatory efforts to improve interoperability. Some states have laws requiring components of interoperability. For example, in Massachusetts, Chapter 448 of the Laws of 2016 include provisions on open access and prohibitions on subscription fees of public charging stations.[31] New Hampshire's SB 575 prohibits owners and operators from charging membership subscription fees, requires multiple payment options, and mandates reporting of data and location information.[32]

In February 2019, the New York Public Service Commission authorized demand charge discounts for publicly accessible DCFC stations. The PSC defined "publicly accessible" as those DCFC stations that utilize both a CCS and a CHAdeMO connector and are "usable without requiring a paid membership in a charging station network."

31 https://malegislature.gov/Laws/SessionLaws/Acts/2016/Chapter448
32 https://legiscan.com/NH/text/SB575/id/1685285

The Public Service Commission noted that qualifying stations would include "networked stations that offer single per-use charging fees payable through a commonly accepted payment method such as cash, credit, or debit," and that payment through a smartphone app is allowed only if it is not the only form of payment that the charging station accepts."[33] In response, Tesla submitted a petition for rehearing, arguing the decision's definition of "publicly accessible," which excludes Tesla chargers, is "unlawful and arbitrary and capricious….and discriminatory," illustrating the ongoing debate to define open access and standards.[34]

California has begun to address interoperability by mandating consumer protection principles through implementation of Senate Bill (SB) 454, the Electric Vehicle Charging Stations Open Access Act.[35] SB 454 originally passed in 2013 and primarily focusses on open access and payment mechanisms as well as interoperability for billing purposes. It prohibits stations from implementing a subscription fee or requiring membership to charge and specifies that stations are required to provide (at least) two options of payment. The bill concludes that "if no interoperability billing standards have been adopted by a national standards organization by January 1, 2015, [the bill] would authorize the state board to adopt interoperability billing standards, as defined, for *network roaming payment methods* for electric vehicle charging stations" (emphasis added). Per this clause, the California Air Resources Board (CARB) is now in the process of standard implementation and has held workshops on the subject. In a May 2018 proposal, CARB suggested requiring the use of OCPI and, at a minimum, credit card readers and toll-free numbers for payment on all stations.[36] In addition to exploring open access payment mechanisms, various California state agencies have also led a working group in 2017 to evaluate "existing communication protocols utilized to enable Plug-In Electric Vehicle-Grid Integration (VGI) use cases in an effort to understand whether one protocol, or a specific combination of protocols, is mandatory to enable VGI economically and at scale."[37] Through this process and the synthesis of stakeholder feedback, the Working Group determined it is not suitable to require a single protocol or a specific combination but would provide recommendations to enable market success and "potentially converge on a protocol in the future." Some stakeholders are concerned that this could increase costs of charging infrastructure deployment. Standards development has not been finalized and CARB is continuing its implementation process. Many states are closely observing the specifics of California standards, given its importance in the EV market.

Instead of advocating for one particular standard, industry experts have advocated more broadly that regulators require that publicly-funded charging infrastructure comply with open standards but leave the choice up to the "relevant organization."[38]

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33 Order Establishing Framework for Direct Current Fast Charging Infrastructure Program, February 7, 2019. http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={15AA7B65-DF8C-4511-8F3D-F19B37F3F48D}

34 Petition for Rehearing, February 28, 2019, http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={8318CC67-A595-43AB-8316-F318F0F1D02D}

35 http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140SB454

36 https://ww2.arb.ca.gov/sites/default/files/2018-06/sb-454-may30-workshop.pdf

37 http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442460144

38 "Relevant organizations" could include utilities that offer rebates or public agencies that give out grants. http://webcache.googleusercontent.com/search?q=cache:-GaOPOcb6sAJ:documents.dps.ny.gov/public/Common/ViewDoc.aspx%3FDocRefId%3D%7BA4B5CCE0-C844-44F7-A682-1656CBA71850%7D+&cd=1&hl=en&ct=clnk&gl=us

In 2018, NESCAUM released the Northeast Corridor EV Charging Infrastructure Strategy (2018 – 2021).[39] The comprehensive strategy is intended to provide guidance and direction to public and private infrastructure investors to ensure a coordinated, well-informed, complementary and reliable Northeast Corridor regional charging network. NESCAUM leads an EVSE Interoperability Workgroup of state policymakers with the goal to create a fair and open marketplace for charger site hosts and EV drivers, through universal compatibility between EVs, chargers, EVSPs, and electric utilities. In 2018, NESCAUM and Plug In America hosted a series of webinars and a workshop with key stakeholders on the issue of interoperability. NESCAUM is facilitating the ongoing state discussions with a goal of achieving consensus on approach and, where possible, model language for use in state grant and procurement contracts.

Conclusion

Currently, there is no existing arbiter who determines which standards are implemented. There are, however, organizations that help develop and update the standards: the Open Charge Alliance fosters "global development, adoption, and compliance of" the OCPP, which they invented and refer to as the "de facto protocol."[40] Given this dynamic, good faith interaction, continued dialogue, and transparency are essential for working towards mutually agreeable good outcomes. Charging providers can prepare for future developments by using open standards (the selection of particular standards can vary depending on equipment owners' preferences), such that as markets develop and converge on a specific standard, transitions to a single standard are less restricted.

Utilities can play a role in helping to reach these outcomes. At a minimum, utilities will need to keep both consumer facing and systems management interoperability in mind as they develop their charging networks and invest in chargers. Utilities may include interoperability requirements in their investment programs. For example, Pacific Gas and Electric's (PG&E) Charge Network program for multi-unit dwellings and workplaces categorizes requirements by hardware (J1772, network ready with OCPP 1.5 or later) and software (Open ADR 2.0b) features.[41] In addition, utilities could consider developing proactive relationships to help develop customer- and driver-friendly standards that support the goal of reducing barriers to EV adoption and encouraging market transformation.

39 http://www.nescaum.org/documents/northeast-regional-charging-strategy-2018.pdf/view
40 https://www.openchargealliance.org/about-us/background/
41 https://www.pge.com/pge_global/common/pdfs/solar-and-vehicles/your-options/clean-vehicles/charging-stations/program-participants/EVCN-Hardware-and-Software-Guide.pdf

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About Us

MJB&A provides strategic consulting services to address energy and environmental issues for the private, public, and non-profit sectors. MJB&A creates value and addresses risks with a comprehensive approach to strategy and implementation, ensuring clients have timely access to information and the tools to use it to their advantage. Our approach fuses private sector strategy with public policy in air quality, energy, climate change, environmental markets, energy efficiency, renewable energy, transportation, and advanced technologies. Our international client base includes electric and natural gas utilities, major transportation fleet operators, investors, clean technology firms, environmental groups and government agencies. Our seasoned team brings a multi-sector perspective, informed expertise, and creative solutions to each client, capitalizing on extensive experience in energy markets, environmental policy, law, engineering, economics and business. For more information, we encourage you to visit our website: www.mjbradley.com.