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Alternative and Renewable Fuel and Vehicle Technology Program

California Electric Vehicle Infrastructure Project
Future Equipment Requirements Webinar
June 28, 2018

Brian Fauble
Energy Commission Specialist II

Agenda

- Welcome
- CALeVIP Background
- New Energy Star Commitment Process
- Future Level 2 Charger Requirements
- Mobile Charging Requirements
- DCFC Site Requirements
- Adjourn

Background

- Released solicitation November 2016
- Awarded recipient CSE February 17, 2017
- Agreement Executed June 27, 2017
- Fresno County Incentive Project launched December 2017 – Level 2 chargers only
- Southern California Incentive Project launches early August 2018 – DC fast chargers only

Background

- Goals:
  - Implement targeted incentive projects throughout California that address a specific region's EV charging needs.
  - Provide a mechanism that speeds up the installation, reporting, and funding processes.

Background

- CALeVIP vs Incentive Projects
  - CALeVIP = Home for all Incentive Projects
  - Incentive Project = Geographical targeted project
- Current Funding: $39 million
  - Up to $200 million in future funding
- Planning on 3-4 projects in 2019
  - Tentatively planning to workshop the projects in September

ENERY STAR® Certification Requirement

Energy Star Requirement

- Energy Star will be a requirement for CALeVIP
- New Energy Star process for CALeVIP
  - Allows EVSE manufacturers that are committed to becoming Energy Star certified to be temporarily eligible.
  - Allows non Energy Star certified chargers, that meet the other CALeVIP minimum requirements, to be eligible until the mandatory requirement is reinstated.

Energy Star Requirement

1a) Energy Star Partnership Agreement (Energy Star)
https://www.energystar.gov/sites/default/files/asset/document/ENERGY%20STAR%20Partnership%20Agreement.pdf

1b) Energy Star Participating Form for Product Brand Owner (Energy Star)
https://www.energystar.gov/sites/default/files/asset/document/ENERGY_STAR_Participation_Form_Prod_Brand_Owner.pdf

2) Complete the Energy Star Commitment form (Energy Commission)
https://calevip.org/sites/default/files/docs/calevip/CALeVIP_ENERGY_STAR_Commitment_Form.pdf

3) Docket the Energy Star Commitment Form (Energy Commission)
https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=17-EVI-01

4) Download and submit the Equipment Self-Validation Form (CALeVIP)
https://calevip.org/equipment-self-validation-form

5) Complete your Energy Star testing and Certification with a laboratory and certification body

Energy Star Requirement

Questions and Comments

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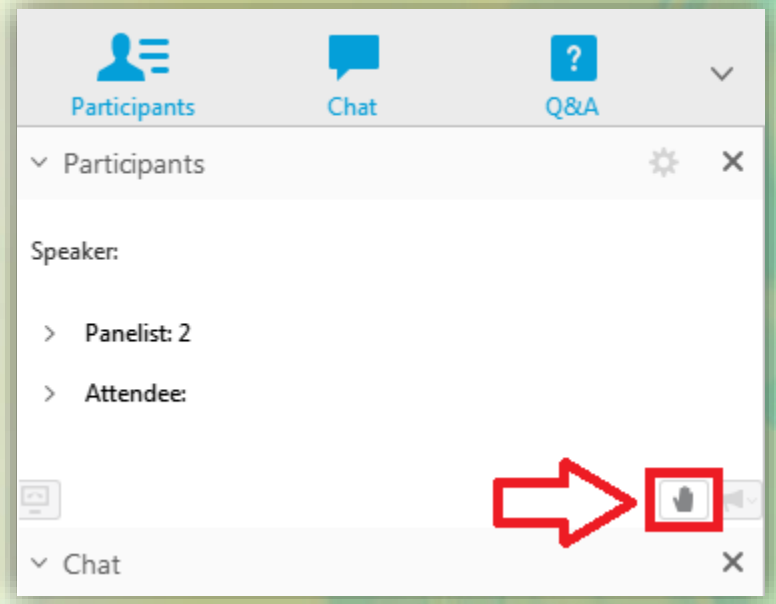

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Future Tech Requirements

Smart Charging Equipment & Network Interoperability

Advanced technology considerations for CALeVIP

Matthew Fung, Research and Development Division

Noel Crisostomo, Fuels and Transportation Division

Topics

- Energy Commission purpose, policy objectives, and needs for “Global Interoperability”
- Communicating with Electric Vehicle Service Equipment (EVSE)
  - Open Charge Point Interface
  - ISO/IEC 15118
- Implementation supply chain
- Market goals and solutions
- Recommendations and next steps
- Q&A

Purpose & Feedback

ARFVTP Workshop on Supporting Interoperability for EVSE (2013)

How can [CEC] best support the development of EVSE interoperability in California and what interoperability criteria should be considered?

California Vehicle-Grid Integration Roadmap (2014)

Stakeholder Feedback: Snapshot 2

Communication and control technologies and consistent technology platforms are essential for the VGI market to grow. Varying design standards for EVSE could lead to limited access for VGI services. Consistent requirements for EVSE should be established. In addition, the current EVSE technology lacks proper capabilities to provide seamless two-way communication between vehicle and grid. It is important that intelligent control solutions are devised for individual and aggregator use cases. Non-uniform communication protocols must be overcome and issues with UL standards must be resolved.

CAL eVIP

Policies & Needs

"Ensure technology research is coordinated with the development of standards, procurement policies and tariffs."

- Zero Emission Vehicle Action Plan (2016)

Need for action on: "Lack of standard methodology for aggregating PEVs into larger, controllable resources."

- 2018-2020 Electric Program Investment Charge Investment Plan

"Standardize electric vehicle charging equipment to enable resource dispatch."

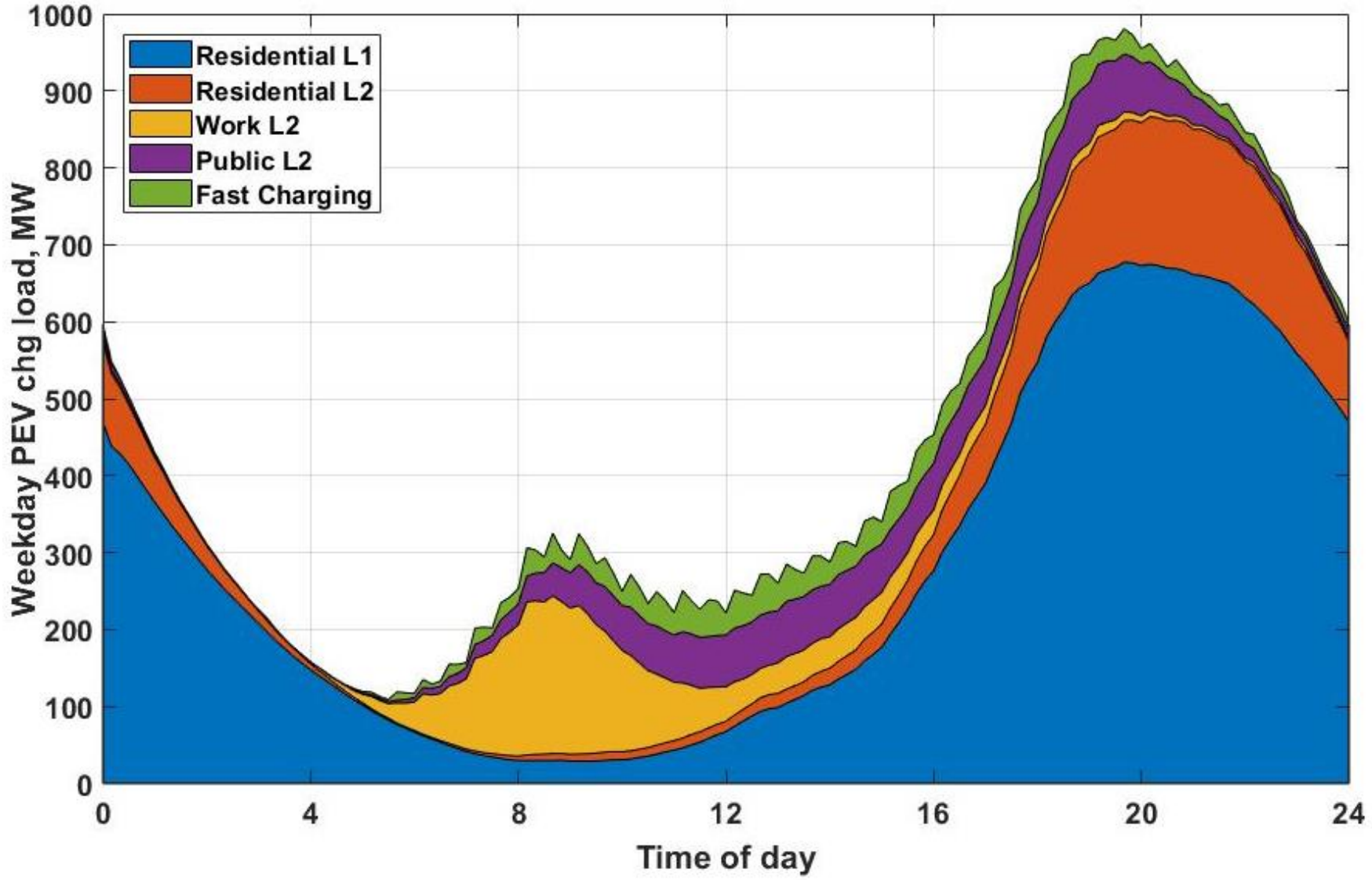
- Integrated Energy Policy Report (2017)

"Spur the construction and installation of … 250,000 EV chargers by 2025."

- Executive Order B-48-18

CAL eVIP

PEVs may add 1 GW on peak

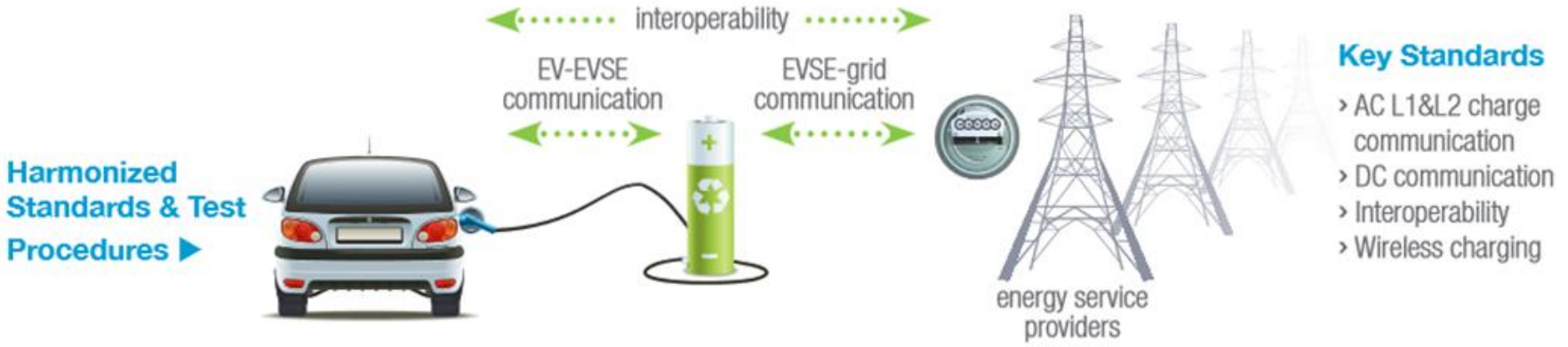


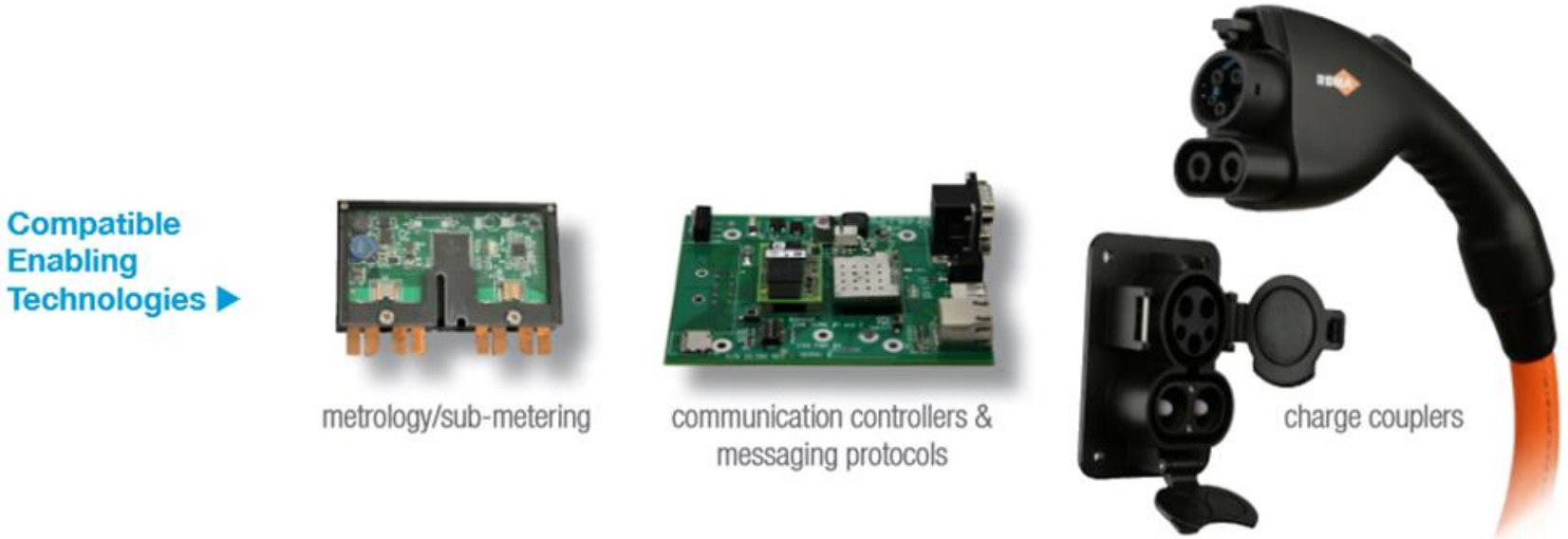
"Networking technologies that enable shared use should be leveraged to automate demand responsive charging."

- California Plug-In Electric Vehicle Infrastructure Projections (2018)

Vision for Global Interoperability

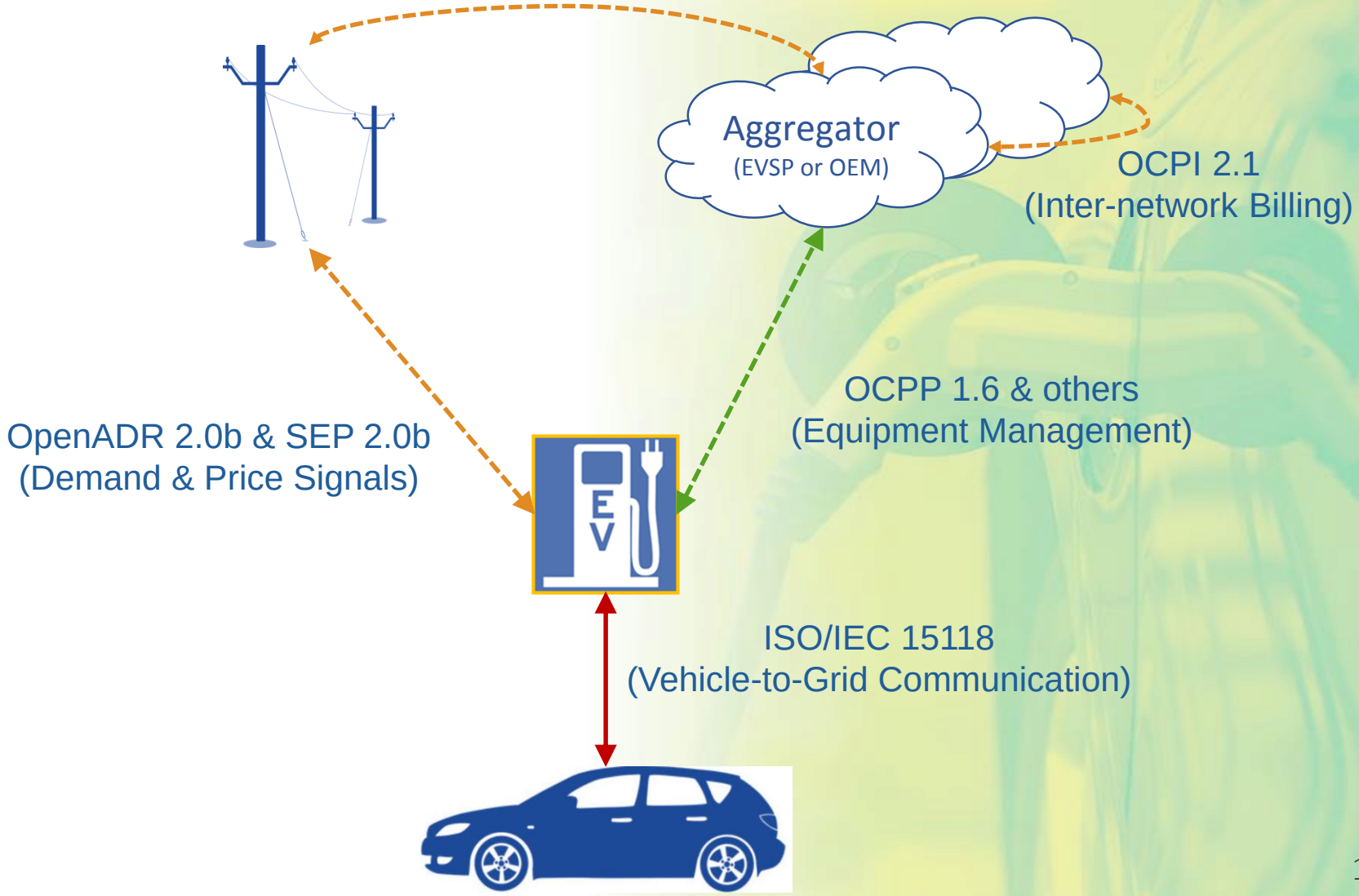
Interoperability will provide standardized devices that are capable of functioning as intended with each other — without special effort by the user.





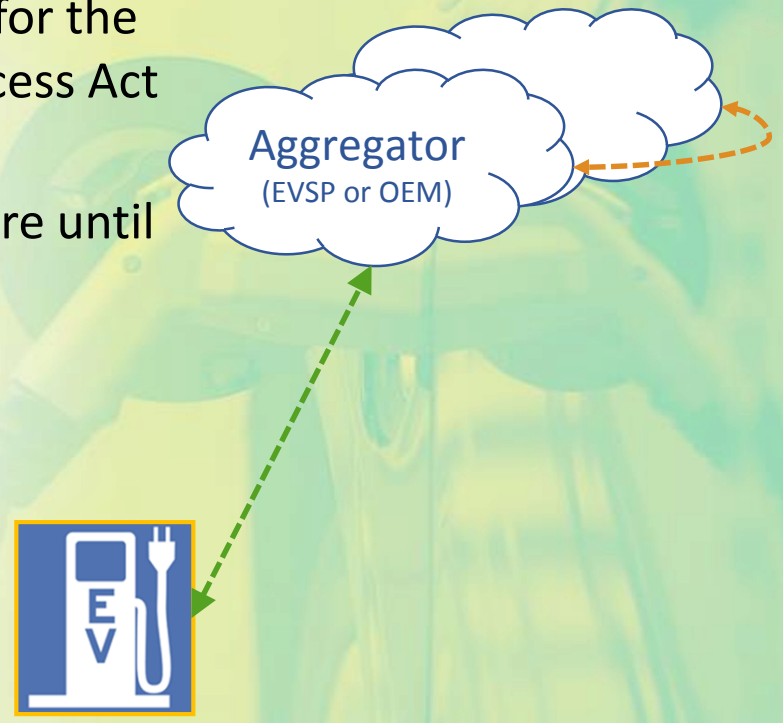
U.S. Department of Energy and E.U. Joint Research Center – EV/Smart Grid Interoperability Research Center

Communicating with EVSE

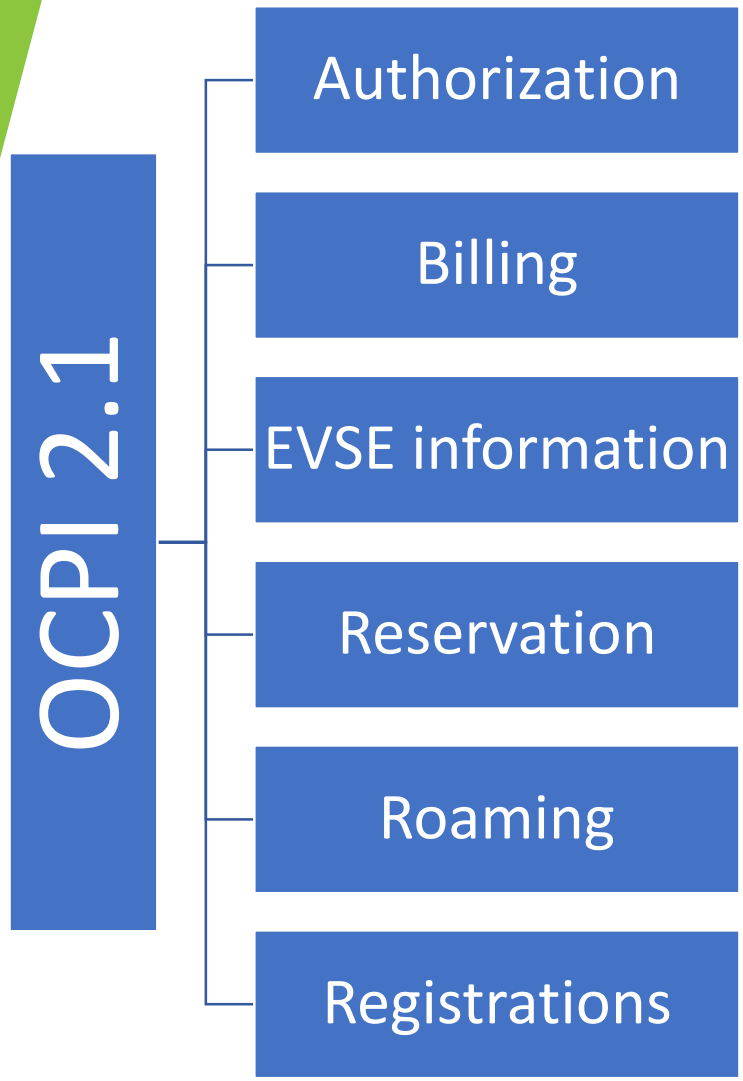


Open Charge Point Interface

- Communication between charging networks
- Air Resources Board's ongoing rulemaking for the Electric Vehicle Charging Stations Open Access Act (SB 454)
- Version 2.1, incorporated as a test procedure until finalized through a standards body
- Proposed compliance for EVSE:
  - New: No later than 1/1/2020
  - Existing: No later than 8/1/2020



Benefits of Interoperability between charger networks



Secure identification

Simplified payment

Improved transparency

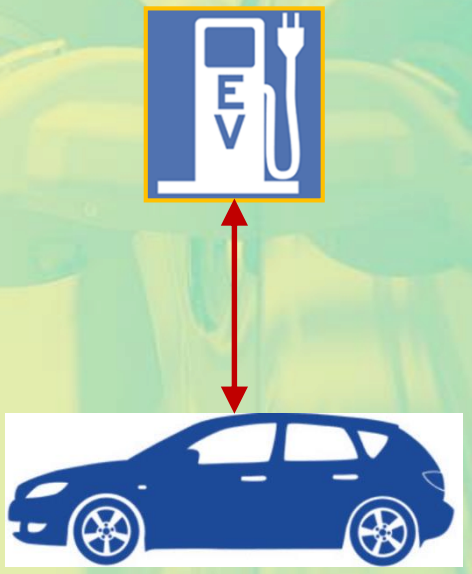
Manages queueing

Expands travel range

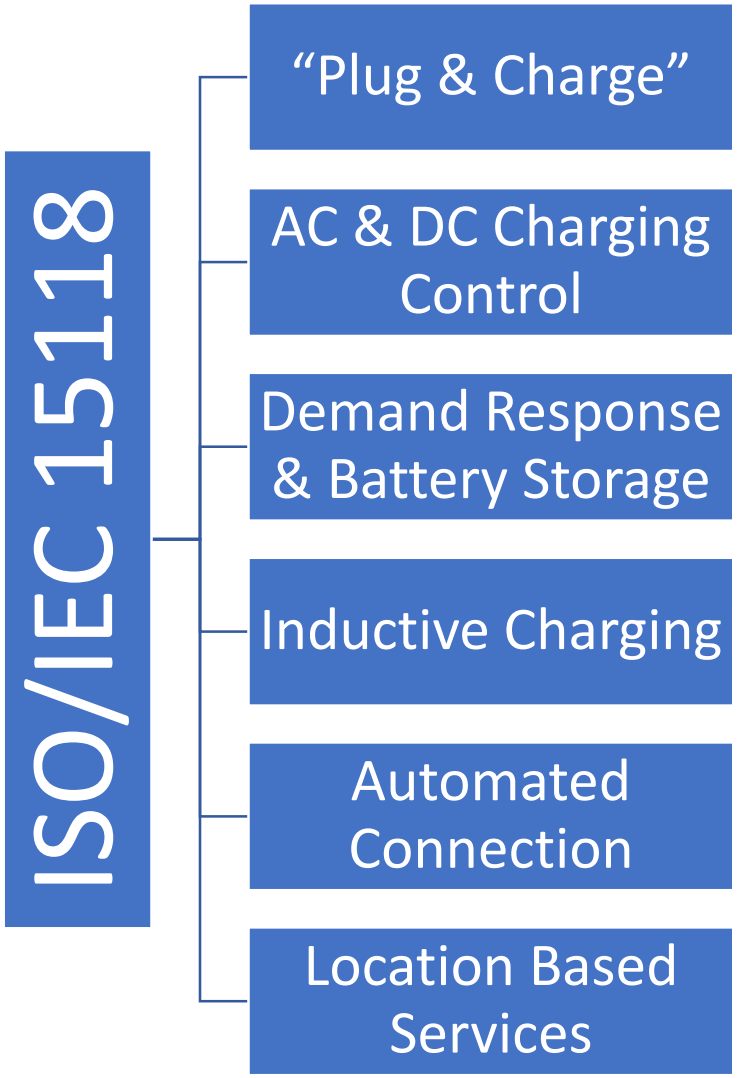
Ensures accessibility

ISO/IEC 15118 – "Vehicle to Grid Communication Interface"

- International Standards Organization / International Electrotechnical Commission
  - Initiated by OEMs and utilities in 2008, published 2013, improvements continuously developed with industry and in coordination with SAE.
- Communicates between charge controllers on Electric Vehicle and the Supply Equipment
- Securely automates transfer of driver-specific payment preferences, AC/DC charging, and negotiates with utility prices for "smart" charging.
- Deployed and encouraged globally across many advanced PEV markets.



Benefits of interoperability between the EV and charger



Easy & Convenient

Transparent & Secure

Reduces Utility Cost

Useful for Automated EV

Handling safety

Enables new value

Implementation Supply Chain

- Market Traction
  - At least 8 automakers and nearly a dozen (known) EVSPs are developing ISO 15118 products, as supported by a robust electrical and information technology supply chain.
- Software
  - American National Standards Institute: Road Vehicles Communication Package
  - Open-source reference implementation
- Hardware
  - High-level communications controllers are commoditizing
  - 1 mo. payback for $5-25 hardware cost (varies based on base EVSE function), if smart charging can arbitrage -$0.10/kWh for average EV load in CA
- Interoperability Testing
  - Semi-annual testing symposiums for device conformance
  - Commercially-available simulation and testing equipment and services for EVSE

CAL eVIP

Market Need & Solutions

- Automotive industry interoperability technologies have advanced, and public funds spurring the construction of chargers can accelerate adoption by ***utilizing these capabilities to create seamless charging experiences***.
- CALeVIP will be deploying EVSE concurrently to the deployment of PEVs that will be designed with ISO 15118. Without interoperable EVSEs, drivers' charging experience and costs will be needlessly onerous and expensive.

- Implementation and integration takes about 1.5 years.
  - EPIC grant funding supported manufacturer ISO 15118 EVSE integration in advance of PEVs with ISO functions ***anticipated for U.S. deployment in 2019***.
- Potential solutions supported by Energy Commission additional to CALeVIP
  - Research – creation of vehicle/charger testing devices
  - Development – augmentation of OEM charge controller/software design
  - Manufacturing – grant for component integration or infrastructure assembly

Recommendation & Next Steps

- Consistent with B-16-2012, "…achieve by 2020: […] electric vehicle charging will be integrated into the electricity grid;"
- Leverage CALeVIP, in alignment with the IEPR and ZEV Action Plan, to transform the market and "ensure convenient charging infrastructure to greatly expand the use of ZEVs."
- CALeVIP Electric Vehicle Service Equipment requirement for future projects:
  - Level 2 conductive or inductive, AC and DC chargers shall have the capability of communication with the PEV, based on ISO/IEC 15118
  - Require for equipment installed after January 1, 2020*, implementation of;
    - ISO/IEC 15118
    - Open Charge Point Interface

      *Consistent with proposed SB 454 compliance timeframe for OCPI
  - Validate proof of implementation

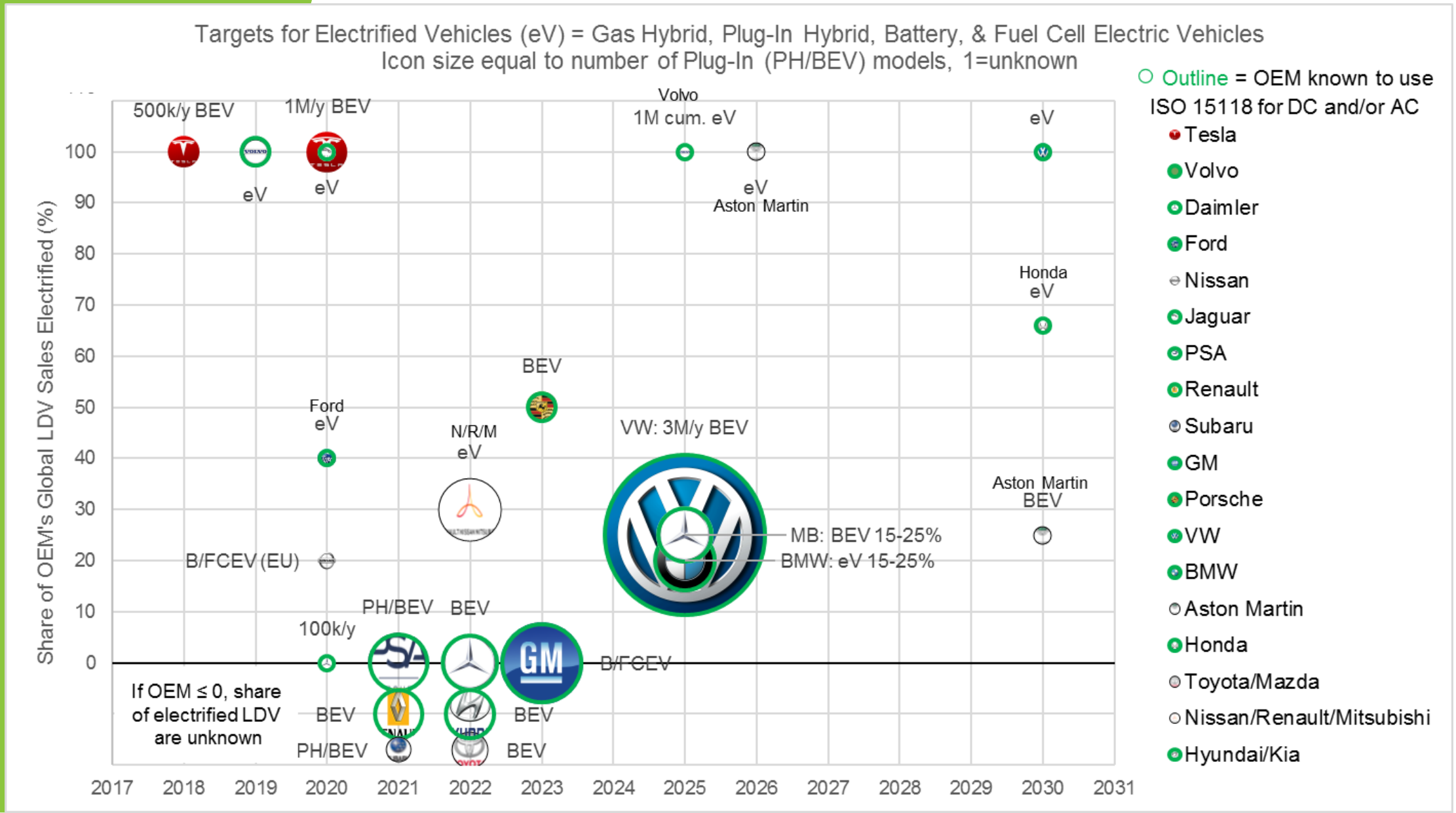
Questions for Discussion

- How to validate proof of implementation? (e.g. specification sheets, completed testing procedure with multiple vehicle types)
- What are other ways for the Energy Commission to support the industry to develop interoperable smart charging equipment?
- Are there other advanced technologies that should be considered?

Appendix

Non-exhaustive list of companies with completed projects, that intend to deploy, recommend implementation, or have supplied components for ISO/IEC 15118 chargers.

Appendix


Targets for Electrified Vehicles (eV) = Gas Hybrid, Plug-In Hybrid, Battery, & Fuel Cell Electric Vehicles
Icon size equal to number of Plug-In (PH/BEV) models, 1=unknown
Share of OEM's Global LDV Sales Electrified (%)
500k/y BEV
1M/y BEV
eV
eV
Volvo
1M cum. eV
eV
Aston Martin
eV
Honda
eV
BEV
Ford
eV
N/R/M
eV
VW: 3M/y BEV
Aston Martin
BEV
MB: BEV 15-25%
BMW: eV 15-25%
B/FCEV (EU)
PH/BEV
BEV
100k/y
B/FCEV
If OEM ≤ 0, share of electrified LDV are unknown
BEV
PH/BEV
BEV
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
Outline = OEM known to use ISO 15118 for DC and/or AC
Tesla
Volvo
Daimler
Ford
Nissan
Jaguar
PSA
Renault
Subaru
GM
Porsche
VW
BMW
Aston Martin
Honda
Toyota/Mazda
Nissan/Renault/Mitsubishi
Hyundai/Kia

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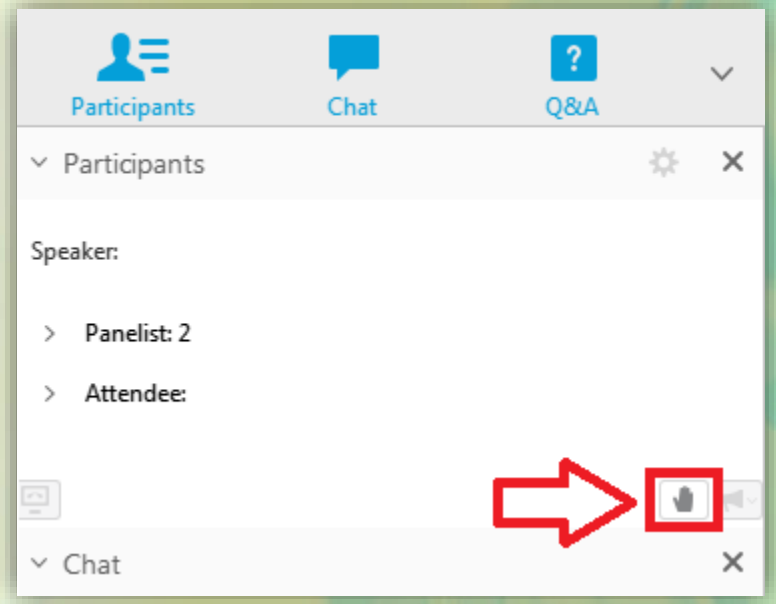

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Mobile Chargers & Eligible DCFC Sites

Mobile Charger Descriptions

- Inter-Site Charger: Does not move at the site on a daily basis.
- Intra-Site Charger: Can easily move on the site on a daily basis to charge cars in different parking stalls.

Inter-Site Charger Requirements

- Must stay at address listed on the application
- Only level 2 chargers will be eligible
- Must follow all other level 2 charger requirements
  - J-1772 Connector
  - Capable of 6.2kW
  - Networked with minimum 1 year network agreement
  - Certified by a Nationally Recognized Testing Laboratory
- Rebate amount will be equal to the level 2 charger rebate

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Intra-Site Charger Requirements

- Must stay at the address listed on the application, cannot be mounted in a vehicle for mobile servicing
- Must follow all other Level 2 or DC fast charger requirements
  - Level 2: J-1772, 6.2kW+, networked, NRTL
  - DCFC: Both CHAdeMO & SAE CCS connectors, 50kW+, networked, NRTL
- Rebates will be equal to the general Level 2 and DC fast charger rebates

CAL eVIP

Eligible Mobile Charger Sites

- Intra-Site Mobile Charger
  - Possible Mobile Charger Eligible Sites
    - Hotels, Airports, Private Workplaces, Fleets, Valet Service
  - Other Possible Requirements
    - Must be at a permanent site address and can’t leave the property
    - Must be secured at night
    - Must have an attendant
- Inter-Site Mobile Charger
  - Same requirements as the general Level 2 chargers

Eligible DCFC Sites

- Primary: Shopping Centers, Restaurants, Gas Stations, Hospitals, Airports, Police or Sheriff Stations
- Secondary (1/4 mile from Primary): Hotels, Parking Garages, City or County Owned Properties
- Must be available to the public 24 hours a day, 7 days a week, 365 days a year.
- Must not be located behind a fence and/or gate

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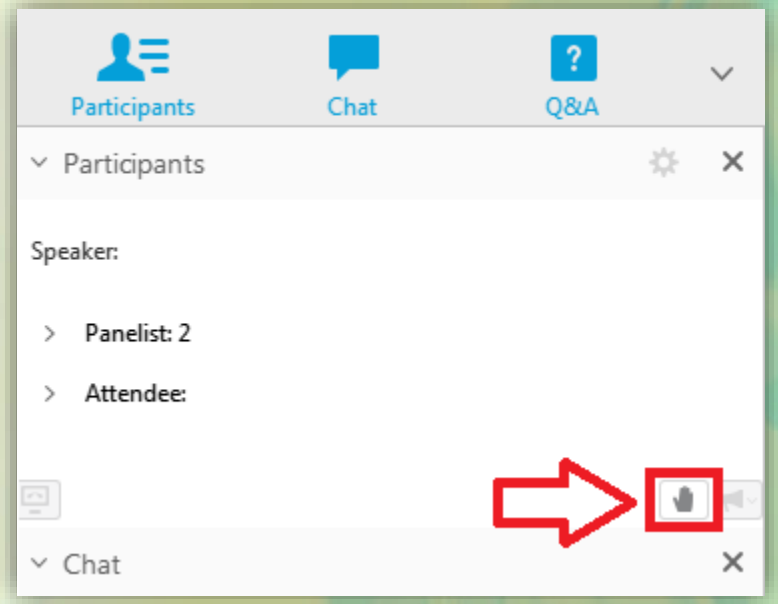

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Future CALeVIP Information

- CALeVIP Website www.calevip.org
- Energy Commission Block Grant/CALeVIP docket webpage http://www.energy.ca.gov/altfuels/zev/2017-EVI-01/
- Center for Sustainable Energy email calevip@energycenter.org

Thank You!

Comments Due 7/3/2018 by 5:00pm

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 17-EVI-01
1516 Ninth Street
Sacramento, CA 95814 -5512
(916) 654-4423

https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=17-EVI-01

Recommend all comments be submitted online.