Transportation Electrification
Smart Charging EVSE Standards
The need for standards

To **drive down development costs and consequently, prices to consumers** by having manufacturers compete to deliver products to the same specification

(Note: Standards are for minimum functionality, manufacturers can always add more features)

To **lower the stranded asset risk** by ensuring that different EVSPs can interface to EVSE in a vendor-neutral manner (critical in case of business failure/exit of an EVSP)
Publicly-funded EVSE – whether by taxpayers or ratepayers – should be “smart” and comply with open technical and payment standards

A smart charger is one that has a sub-meter, is networked, and is integrated to back-end IT systems, including billing, charger management, demand response, and consumer apps, be they provided by a utility, EVSP, ESP, aggregator, or other entity.

The EVSE-utility link (the communications from a utility application such as DERMS or ADMS to the EVSE) is foundational to grid integration.

The EVSE acts as the main circuit protection and safety device between the EV and the grid, providing the function of detecting, reporting, and repairing fault conditions necessary to maintain uptime for EVSEs. Therefore, EVSE manufacturers must comply with the National Electric Code and UL requirements.

Standards are driven by the procurer of the equipment. Utilities can procure EVSEs in quantity, either directly or via rebates and, therefore, can drive EVSE standards.

EVSE manufacturers tailor their products for local markets (utilities and regulators of those utilities) and are, thus, responsive to standards demands from utilities.

EVSE manufacturers have also made major headway in replacing the need for secondary utility meters equipment to be installed alongside an EVSE by putting a revenue-grade sub-meter inside the EVSE.

Policymakers have the ability to direct utilities or state funding agencies to adopt standards developed by open and transparent standards development organizations for ratepayer- or tax-payer-funded projects, including rebates.
Suggested “best practices” standards

Data center to EVSE communications link
A port in the EVSE with the ability to plug in a Network Interface Card with minimum options of WiFi and cellular

Data center to EVSE data communications protocols
OpenADR for DR signal and OCPP for other data types

Data center to data center protocol
OCPI for sharing customer billing and payment data (interoperability) between EVSPs

EV to EVSE for “Plug and Charge”
ISO/IEC 15118

EVSE meter accuracy
ANSI C12.20 (+/-0.2%) or NIST Handbook 44 Sec. 3.20 (+/-1.0%)
Technical (Metering and Communications) Standards
Home, MUD, Workplace Charging

- Smart Meter Communications Network
- Smart Meter
- Smart Phone
- Home Router
- WiFi
- Radio
- EVSE
- EV
- Utility Data Center
- EVSP Data Center
- Broadband
- Cellular

1. OCPP protocol
2. OCPP and OpenADR
3. SAE J1772 (plug), ISO/IEC15118 (EV to EVSE)
4. IP
Technical and Payment Standards – Public Charging

1 OCPP protocol
2 OCPP and OpenADR
3 SAE J1772 (plug), ISO 15118 (EV to EVSE)
4 Credit Cards
5 OCPI