



# ASEAN-U.S. Electric Vehicle Workshop on Technical Standards - Standards for Common and Smart Charging Infrastructure

Electric Vehicle Conductive Charging standards – Trends and Implications

Joe Bablo  
January 18, 2023

# Meet your Presenter



## **Joe Bablo**

- Principal engineering manager, Energy Storage and e-Mobility.
- Principal engineer, Automotive Equipment and Associated Technologies.
- Responsible for technical standards development for electric vehicle (EV) charging, including EV supply equipment, EV chargers and EV couplers.
- Serve as a technical representative for all UL Solutions charging-related standards, as well as all IEC committees for EV charging.
- Serve as Code Making Panel 12 Chairperson for the National Electrical Code®.
- Distinguished Member of Technical Staff, W. H. Merrill Society, with 27 years at UL Solutions.

# Current State

## North American Standards

### ➤ AC Output Devices (EVSE):

- UL 2594/CSA C22.2 No. 280/NMX-J-677-ANCE

### ➤ DC Output Devices (Chargers):

- UL 2202/CSA C22.2 No. 346/NMX-J-817-ANCE

### ➤ Charge Couplers:

- UL 2251/CSA C22.2 No. 282/NMX-J-678-ANCE

### ➤ Bi-Directional Chargers (EVPE):

- UL 9741/CSA C22.2 No. 348 (In development)

## IEC Standards

### ➤ AC Output Devices (EVSE):

- IEC 61851-1 **or** IEC 62752

### ➤ DC Output Devices (Chargers):

- IEC 61851-1 **and** IEC 61851-23

### ➤ Charge Couplers:

- IEC 62196-1 **and** IEC 62196-2 (AC rated)
- IEC 62196-1 **and** IEC 62196-3 (DC rated)
- IEC 62196-1, IEC 62196-3, **and** IEC 62196-3-1 (Cooled)

### ➤ Bi-Directional Chargers (EVPE):

- Under development

# Future Trends and Technologies

- Megawatt Charging – New systems, new ratings, new couplers, new communication protocol.
- Non-grid tied charging systems – remote located, solar/wind systems
- Automatic connection devices – Pantograph or connector-based systems for vehicles



# Potential Implications

- Limitations of available infrastructure – the more cars charging, the more infrastructure that will be needed. Lack of infrastructure could cause “work arounds.”
- Building preparation in anticipation of EV charging – Some building codes, such as in California, require all new construction to be EV ready.
- Concerns around fire in established buildings – In buildings that were constructed prior to EV charging, there is some concern that they are not prepared to interact with EV charging
- Lessons to be learned – Lessons around flame propagation and first responder awareness have been in the news.
- General public safety perception – the more incidents occur, the more public perception is damaged