Who is NEMA?

NEMA is the trade association of choice for the electrical manufacturing industry. Founded in 1926 and headquartered near Washington, D.C., its approximately 450 member companies manufacture products used in the generation, transmission and distribution, control, and end-use of electricity.
Electric Vehicle Supply Equipment/System Section

The Electric Vehicle Supply Equipment/Systems Section represents manufacturers of products or assemblies installed for the purpose of safely delivering and managing electrical energy between an electric vehicle and an electrical source.

Purpose:

- Support the development of the electric vehicle supply equipment market
- Educate the market on the features and value of the electric vehicle supply equipment infrastructure around the world
- Develop the technology and application and product standards.
More than 30 global auto manufacturers are planning PHEV or BEV products by 2014.
Electric Vehicle Types

**BEV**
(Battery electric vehicle)

- Propelled solely by a battery-powered electric motor
- Typically operates up to 100 miles on a single charge

Example: Nissan Leaf, Tesla Roadster

**PHEV**
(Plug-in hybrid electric vehicle) or range extender

- Propelled by a combination of a battery-powered electric motor and a gas-powered internal combustion engine (ICE).
- Operates up to 40 miles on battery power then switches to the ICE to propel the vehicle either directly or through the electric motor.

Example: Chevrolet Volt

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*Courtesy of EPRI*
EV Adoption Expected to Grow Rapidly

It is estimated that 1.4 charging stations will be required for each EV on the road.
EVSE Types

**Level 1**
In the US, standard outlets are at 120 volts. All Level 1 charging is done at this voltage. Depending on the car and the level of charge on the battery, Level 1 charging can take 8 – 16 hours to charge. Level 1 charging would typically take place in the home. All new EVs will come with a Level 1 charging cord.

**Level 2**
Level 2 charging uses 208 or 240 volts and is able to fully charge a battery in 4 – 6 hours. This charge time is optimal for overnight or long-length charging. This is the preferred EV charging method for both public and private facilities. They will be typically found in public areas, parking garages and commercial businesses.

**Level 3 (Options for AC and DC)**
Level 3 or Fast Charging and can provide 80% of a full charge in fewer than 30 minutes. They are the EV equivalent to the commercial gas station. These units are very expensive and require significant facilities and training. Initially, only trained specialists will be able to operate Level 3 chargers. At this time exact voltage and load specifications for Level 3 charging have not yet been defined. The vehicle must be properly equipped to accept a Level 3 charge.
Where will charging take place?

- It is estimated 80% of charging will take place at home.
- It is estimated 20% of charging will take place in public spaces (workplace, city streets, retail).
- Charging in public spaces will consist of predominantly level 2 charging with supplemental level 3 charging.
EVSE Infrastructure Impact

EVSE – an extension of the distribution system

- Enabling a premise for EV charging is more than just installing an EVSE
- NEC 625 contains specific requirements for EVSE Electrical installation
- Installation scenarios will vary significantly from customer to customer
- For some customers it may be simple
  - Install a new two-pole circuit breaker, wiring, and the EVSE
- For other customers it can get complex
  - Upgrade of service, new load center, getting up to code, long wiring distances, conduit through walls, transformer upgrades etc.
Single Unit Wall Mount
Residential level 2 Installation Example

Note: some local utilities are suggesting 2 utility meters: 1 for the home, 1 dedicated to the EVSE
Multiple EVSE Units
Commercial Example
“EV READY”

EV Ready buildings will facilitate the deployment of EVs by lowering installation and EVSE infrastructure costs
What is the benefit of a building being “EV Ready?”

It is estimated that it is significantly less expensive to make a building EV Ready than to install a charging system in an existing building or parking location.
Ensuring my building is “EV Ready”

• Example

• Install a wiring raceway from the electrical panel to an appropriate location in the garage or anticipated parking space

• Install a 240V, branch circuit from the electrical panel to a receptacle or outlet box (for connection to EVSE) in the garage or anticipated parking space
Current Government Funding and Support

• Federal

EVSE Tax Credit (Section 30C)

- Commercial: Tax credit for 30% of the cost of charging station installation, up to $30,000
- Residential: Tax credit of 30% of the cost of charging station installation, up to $1,000
- Unless Congress extends credits, they will not apply for equipment installed in 2012.
- NEMA advocating for multi-year extension of the credit and a return to a 50% value capped at $2,000 for individuals and $50,000 for businesses that was in place in 2009 and 2010.
Current Government Funding and Support

• **Federal**

  **EV Tax Credit**
  - Valued at up to $7,500, depending on the battery capacity
  - Available for first 200,000 vehicles sold per manufacturer
Current Government Funding and Support

• **State**
  
  • Incentive Programs: CA, HI, MD, and others signing additional EV tax credits into legislation and some utilities putting rate reductions in place for EV charging.
Business Model

Making a business out of vehicle charging

- **Revenue Opportunities**
  - Pay for charging
  - More desirable places to charge
    - Driver support, fleet support
  - Advertising
  - Integrated AMI meters for utilities
Success Stories

22,000 Level II and 350 (Level III) Fast Chargers will be installed as part of the EV Project and Charge Point Programs

- **Seattle, WA**: 50 Level II
- **State of California**: 13K Level II
  - **Oakland Airport**: 8 Level II
  - **Tucson**: 300 Level II
  - **Phoenix**: 920 Level II
- **State of Oregon Highway**: 1100 Level III
  - **Portland, Salem, Eugene, Corvallis**
- **Texas**: 12 Level II
  - **Austin, TX**: 100 Level II
- **Chicago**: 280 Level II
- **West Palm Beach**: 7 Level II
- **Houston**: 10 Level II
Getting Seattle Plug-In Ready

The City has been working to ensure that Seattle is “plug-in ready.” The Plug-in Ready Team is working to:

- Streamline the permitting process and provide consumer information for installing home and commercial charging stations.
- Identify code changes for new construction to make it easier to install charging stations.
- Simplify the process for establishing charging stations in the public right-of-way.
- Developing charging stations on City property for city fleets and public charging.
- Coordinate with surrounding cities and King County to develop a regional EV infrastructure strategy.
- Explore market demand for plug-in vehicles, and the infrastructure needs for likely EV purchasers.
- Provide education on the benefits of electric vehicles
Making EVSE Work For You

- Encourage “EV Ready” in new buildings and retrofits
- Promote city permitting, codes and policies
- Advocate for tax credits and other incentives
- Investigate potential business models
Thank You
NEMA EVSE Section Members
Questions?
For more information, contact: evse@nema.org

Check out www.nema.org/evse