Transportation and Equipment Electrification Panel

Stephen Russell       Moderator
Massachusetts Clean Cities Coordinator and Alternative fuel Program coordinator for Massachusetts
Why BEVs (Battery Electric Vehicles)

1. Better for the environment
   - Reduce carbon emissions, even when energy is sourced from coal
   - Help the nation transition to renewable energy
   - Reduce use of oil, transmission fluid and other hazardous fluids
   - Cut noise pollution
   - Fun to drive

2. Energy independence
   - Keep our energy dollars here
   - Keep and grow jobs here
   - Stabilize transportation costs

3. Future benefits
   - Use of “smart grid” during peak demand
   - Used batteries for a second life as an uninterrupted power supply
Future of EVs

- Electric vehicles expected to grow from 1 million in 2018 to 125 million in 2030. – International Energy Agency

- By 2025, 13 automakers expect to have more than 300 electrified models available and of those models, 105 being battery electric vehicles.
Charging the EV

**Electric Vehicle Supply Equipment (EVSE):**

- The conductors, attachment plugs, and all other equipment specifically installed to transfer energy between premises wiring and the electric vehicle, as well as exchange information.

<table>
<thead>
<tr>
<th>Charging Level</th>
<th>Setting</th>
<th>Supply Power</th>
<th>Representative Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Level 1</td>
<td>Residential/Parking Lot 5 mi/hour @ 1.7 kW</td>
<td>120vac/20A (16A continuous)</td>
<td>![AC Level 1 Example]</td>
</tr>
<tr>
<td>AC Level 2 (minimum)</td>
<td>Residential/Commercial 10 mi/hour @ 3.4 kW</td>
<td>208/240vac/20A (16A continuous)</td>
<td>![AC Level 2 Example]</td>
</tr>
<tr>
<td>AC Level 2 (maximum)</td>
<td>Commercial (up to) 60 mi/hour @ 19.2 kW</td>
<td>208/240vac/100A (80A continuous)</td>
<td>![AC Level 2 Example]</td>
</tr>
<tr>
<td>DC Level 1</td>
<td>Commercial up to 500v @ 80Adc (up to) 120 mi/hour @ 40 kW</td>
<td>208vac/480vac 3-phase (input current proportional to output power; ~20A-200A AC)</td>
<td>![DC Level 1 Example]</td>
</tr>
<tr>
<td>DC Level 2</td>
<td>Commercial up to 500v @ 200Adc (up to) 300 mi/hour @ 100 kW</td>
<td>208vac/480vac 3-phase (input current proportional to output power; ~20A-400A AC)</td>
<td>![DC Level 2 Example]</td>
</tr>
</tbody>
</table>
Electric trucks are coming

- F 150 all electric
  - [https://www.youtube.com/watch?v=bXFHgoon7lg&feature=youtu.be](https://www.youtube.com/watch?v=bXFHgoon7lg&feature=youtu.be)
AltWheels Fleet Day
Monday, October 7th, 2019

Sheraton Four Points
Norwood, MA

AltWheels Fleet Day is the largest meeting of corporate and municipal Fleet Managers on the East Coast and consists of panels, exhibits, and vehicles offering a showcase of alternative transportation solutions.

AltWheels Fleet Day will host the NAFA October Meeting
Billing Options

*Smart EVSE provides multiple, adjustable billing options.*

**Free**
- Many businesses have provided free charging as a loss leader

**kWh Usage**
- Drivers can be charged by how much electricity they use. The amount per kWh is set by the station owner

**Time**
- Drivers can be charged by arbitrary time at the station (e.g. $ per minute or hour)

**Parking Fee**
- Fee for charging can be embedded in a parking fee
Why should we care about EV Charging Infrastructure?