

# Grid-integrated EV Charging: Current Issues and Prospective Solutions

**Date/Time – November 17, 2022 at 09:00 – 03:00 PM MST**

**Location: MS Teams videoconferencing**

## MEETING INFORMATION & AGENDA

### Agenda

Time	Topic
<b>09:00 – 09:10 (10 min)</b>	<b>Introduction</b>
<b>09:10 – 09:40 (30 min)</b>	<b>Introduction to EV charging infrastructures</b> <ul style="list-style-type: none"> <li>● Fundamentals</li> <li>● Basic architectures</li> <li>● Role of renewable energy in transportation electrification;</li> </ul>
<b>09:40 – 10:10 (30 min)</b>	<b>Electric vehicle charging infrastructure design</b> <ul style="list-style-type: none"> <li>● Fundamentals to be considered before installing EV charging stations</li> <li>● Site electric service size and spare capacity</li> <li>● New CSA standards for certification of EV charging stations</li> </ul>
<b>Break (10 minutes)</b>	
<b>10:20-10:50 (30 min)</b>	<b>Power converters to enable DC fast charging and V2G</b> <ul style="list-style-type: none"> <li>● Enabling EVs with bidirectional (two-way) charging/discharging power flow capability</li> <li>● Enabling V2G, V2H, and V2L</li> <li>● AC/DC/AC power converter topologies</li> <li>● Solid-state transformer topologies.</li> </ul>
<b>10:50-11:20 (30 min)</b>	<b>Integrated Solar-PV/EV/Grid-based charging</b> <ul style="list-style-type: none"> <li>● Technical differences between regular PV-grid-tied systems and PV systems for public or semi-public EV charging</li> <li>● Power converter design and test/use cases.</li> </ul>
<b>11:20-11:35 (15 min)</b>	<b>Breakout session</b>
<b>11:35-12:05 (30 min)</b>	<b>Grid interaction issues with EV</b> <ul style="list-style-type: none"> <li>● Line stability</li> <li>● Inverter distortion and DC injection</li> <li>● Local distribution configuration.</li> </ul>

	<ul style="list-style-type: none"> <li>• Mitigate the impacts of EV charging on residential grids;</li> <li>• Impacts of voltage magnitude regulation and distribution transformer loading.</li> </ul>
<b>12:05-12:50 (45 min)</b>	<b>Lunch</b>
<b>12:50-01:20 (30 min)</b>	<b>Battery energy storage and battery management systems (BMS):</b> <ul style="list-style-type: none"> <li>• The use of energy storage with EV chargers</li> <li>• System requirements and ratings; smart BMS design</li> </ul>
<b>01:20-01:50 (30 min)</b>	<b>Wireless power transfer (WPT):</b> <ul style="list-style-type: none"> <li>• Wireless charging power levels</li> <li>• bidirectional WPT; power converters/grid interface</li> <li>• WPT for shared automated EVs.</li> </ul>
<b>01:50-02:00 (10 min)</b>	<b>Break</b>
<b>02:00-02:30 (30 min)</b>	<b>Conclusions and future directions:</b> <ul style="list-style-type: none"> <li>• Ongoing work with industry</li> <li>• Forthcoming projects</li> <li>• Future of EV charging and role of power electronics</li> </ul>
<b>02:30-02:45 (15 min)</b>	<b>Breakout session</b>
<b>02:45-03:00 (15 min)</b>	<b>Q&amp;A</b>