Electric connection considerations for eVTOL charging infrastructure

David Sawaya

01/18/2018
Outline

- Transportation electrification activities
- Charging infrastructure
- Utility service connections
- Electric rates
For the first time in recent history, CO2 emissions from transportation outpaced the electric sector in the US.

Source: Energy Information Administration
Electric vehicle charging infrastructure

Utility distribution infrastructure

Make-ready infrastructure

Utility meter

Plug-in Electric Vehicle

Charger
Large charging loads can impact the distribution system

- Electrification is leading to a higher frequency of high load deployments, notably in urban areas.
- Location specific factors will determine costs and timelines for site development and site location flexibility can be beneficial in some cases.
- Early dialogue with the utility can help with preferred siting.
<table>
<thead>
<tr>
<th>Rate component</th>
<th>Load management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy charge (time-of-use)</td>
<td>▪ Avoid “peak” time-of-use hours</td>
</tr>
<tr>
<td>Demand charge (time-of-use)</td>
<td>▪ Reduce maximum demand (e.g. scheduling software and behind-the-meter technology)</td>
</tr>
<tr>
<td>Meter fee / customer charge</td>
<td>▪ N/A</td>
</tr>
</tbody>
</table>

Sample "en-route" charging load profile
Challenges of Urban Aviation
Ground Infrastructure

Moderator: Stan Swaintek, Head of Operations, Aviation – Uber
Paul Stith, Director of Strategy and Innovation – Black and Veatch
Alan Dowdell, VP of Business Development – Chargepoint, Inc
David Sawaya, Clean Transportation Principal – PG&E