ENERGY STAR® Certified Electric Vehicle Charging Stations

Peter Banwell, U.S. EPA

September 10, 2019
## Electric Vehicle & Charging Basics

<table>
<thead>
<tr>
<th>Power Source</th>
<th>All-Electric Range*</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug-in hybrid electric vehicle (PHEV)</td>
<td>10-50+ miles</td>
<td>Chevy Volt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BMW i8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prius Prime</td>
</tr>
<tr>
<td>All-electric or battery electric vehicle (BEV)</td>
<td>Up to 300+ miles</td>
<td>Tesla models</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nissan Leaf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BMW i3</td>
</tr>
</tbody>
</table>

*as of August 2019
# Electric Vehicle & Charging Basics

<table>
<thead>
<tr>
<th>Electric Current</th>
<th>Charging Rate</th>
<th>Connector(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternating current (AC)</td>
<td>2 to 5 miles of range per hour of charging</td>
<td>J1772</td>
</tr>
<tr>
<td>120 volt (V), 20 amp (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC</td>
<td>10 to 20 miles of range per hour of charging</td>
<td>J1772</td>
</tr>
<tr>
<td>208/240V, 30A</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC Fast</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct current (DC)</td>
<td>60 to 80 miles of range per 20 minutes of charging (for 50kW)</td>
<td>J1772 Combo (CCS)</td>
</tr>
<tr>
<td>208/480V, 80-200A (and higher)</td>
<td></td>
<td>CHAdeMO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tesla</td>
</tr>
</tbody>
</table>
Electric Vehicle Market Indicators

EEI and IEI say nearly 19 million EVs on the road by 2030...

Source: EEI and IEI, Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030, November 2018

...and more than 9.5 million charge ports needed to support them.
Efficiency Opportunities in AC Charging

Level 2 EV chargers are 98%+ efficient during steady state charge

Efficiency Opportunities in AC Charging

Opportunity for energy savings in standby mode, when the vehicle is not actively charging
ENERGY STAR Version 1.0 Specification Today

Scope:
✓ AC Level 1
✓ AC Level 2
✓ AC Dual Input L1/L2

Key Features:
1. Energy Savings, 40% in Standby Modes
2. Safety
3. Open Communications

Communications Details:
• Grid Communications
• Open Access
• Consumer Override
ENERGY STAR Charging Partners

as of August 2019
Marketing Efforts

Increasing Brand Awareness + Visibility

- Label use by partners (e.g., EVBox)
- Industry media (e.g., CHARGED Magazine)
- Conference, webinar participation (e.g., Roadmap, EPA State & Local)
- Materials development (e.g., EV-ready homes bulletin)
Partnerships & Collaborations

California Energy Commission

• California Electric Vehicle Infrastructure Project (CALeVIP)
• All Level 2 EV charging equipment must be ENERGY STAR certified
Partnerships & Collaborations

- **State Agencies** (additional examples)

- **Utilities** (examples)
ENERGY STAR Version 1.1 Specification

• Key topics that will be addressed in the specification:
  – **Criteria to recognize energy efficiency in DC EV charging stations:**
    ✓ Active charging % efficiency
    ✓ Minimizing heating and cooling
    ✓ Standby losses – display, lighting, network

• Progress to date:
  – Draft 2 test method released June 2019
Collaboration Opportunities

• **Educate Others about ENERGY STAR EV Chargers**
  – link to resource, qualified products list
    (www.energystar.gov/products/other/evse)

• **Incorporate the ENERGY STAR into EV Programs**
  – procure ENERGY STAR EV chargers
  – highlight ENERGY STAR certified equipment on vendor lists, RFPs

• **Inform Program Developments**
  – Version 1.1 DC EVSE stakeholder process
    • Provide comments on test method
    • Contact evse@energystar.gov to be added to the distribution list
Contact the ENERGY STAR EV Charger Team with Questions

• Questions related to ENERGY STAR marketing/promotion:
  – Peter Banwell: Banwell.Peter@epa.gov
  – Stacy Noblet: Stacy.Noblet@icf.com

• Questions related to ENERGY STAR specification development:
  – James Kwon: Kwon.James@epa.gov
  – Emmy Feldman: Emmy.Feldman@icf.com
EV Charging Services

ENERGY STAR For Electric Vehicle Charging
Tuesday, September 10, 2019
What We Do

Design, manufacture, sell and deploy Blink EV charging stations, creating destinations for EV drivers.

Own, operate, and maintain a nationwide network of EV charging stations under long-term agreements with property partners and have deployed over 15,000 units.

Generate revenue by charging EV drivers to power their cars, selling EV charging hardware, and providing network connectivity and payment processing for our property partners.
Nationwide Locations

Open to All Drivers

- Governmental
- Entertainment
- Retail
- Hospitality
- Realty

- Education
- Healthcare
- Energy
- Corporate
- Transportation

Nearly 100,000 registered Blink members

15,000+ EV charging stations deployed throughout the U.S.
84% of consumers prefer to buy from environmentally conscious businesses.  
Cone Communications/Ubiquity Global CSR Study

77% of renters report that it is important their building is green.  
Green Renters Survey, HD Supply Facilities Management

43% of electric car drivers are likely to return each week to retail locations with EV charging.  
Blink Charging Co. Network Data

92% of people looking for a new job would rather work for a company that is perceived as ‘environmentally friendly’.  
Monster.com
Types of Charging Stations - US

AC Charging Stations

AC Level 1:
- 120 Volts AC Single Phase
- Up to 16 Amps
- Up to 1.9 kW Charge Rate
- Typically Limited to 12 Amps
- ~4 miles Per Hour of Charging

AC Level 2:
- 208/240 Volts AC Single Phase
- Up to 80 Amps
- Up to 19.2 kW Charge Rate
- Typically 32, 40, or 80 Amps
- ~25 to 55 miles Per Hour of Charging

DC Fast Charging Stations (DCFC)

DC Level 1:
- 208 or 480 Volts AC 3-Phase In
- 200-450 Volts DC Out
- Up to 80 Amps
- Up to 36 kW Charge Rate
- ~80% Charge in 50 minutes

DC Level 2:
- 200-450 Volts DC Out
- Up to 200 Amps
- Up to 90 kW Charge Rate
- ~80% Charge in 30 minutes

DC Level 3:
- 200-600 Volts DC Out
- Up to 400 Amps
- Up to 240 kW Charge Rate

Sources:
https://www.deltaww.com/Products/
https://www.tesla.com/supercharger

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Family of New Generation 2 Products

RESIDENTIAL

Level 2

HQ 100 Home Charging Unit

COMMERCIAL

Level 2

Advanced

Kiosk

Smart

IQ 200 Commercial Charging Units

Pedestals

DC Fast Charger

DC Fast Commercial Charging Units
A New Generation of Level 2 Charging Stations

Blink IQ 200 Level 2 AC EV Charging Station Family

• Network connected charging stations
• Fastest Level 2 charging available: up to 80 Amps (19.2kW)
• Designs to suit different needs: Advanced, Kiosk, and Smart
• Tracks energy usage
• Flexible Installation: Wall or Pedestal Mount
• Blink OCPP and OCPP 1.6J support
• Flexible installation on any size circuit breaker from 15 to 100 Amps with 80% output at the port
• ENERGY STAR Certified

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Load Sharing / Management Capabilities

If a site has only 80A of service available, the current can be shared between multiple units.

Policies:
- Uniform Distribution
- FIFO
- Priority
- Others in Future
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Policies:
- Uniform Distribution
- FIFO
- Priority
- Others in Future
Working With Utilities

Source: https://jointventure.org/initiatives/mobility/ev-infrastructure-group/ev-use-case
Working With Utilities

Source: https://www.openadr.org
EV Charging Station
Market Drivers

• The cost of energy vs. the cost of fuel

• The availability and accessibility of incentives

• Education of potential hosts and drivers regarding infrastructure incentives and the benefits of electric vehicles

• The availability of affordable electric vehicles with longer ranges (200+ miles)

• Faster charging capabilities

• Interoperability between charging station providers
EV Charging Station Deployment Challenges

- State legislation and policies
- Standardized payment systems
- Permitting and approvals for load sharing designs
- The cost of energy
- Load management education
- Demand charges for high-power and highly-utilized charging stations
- Competing DC Fast Charging standards (CHAdeMO, CCS, and Tesla)
Benefits of ENERGY STAR Certified Products

• Access to purchase and installation incentives
  o CALeVIP Program (California Energy Commission)
  o $51M Budget
  o Up to $7,500 per connector for Level 2 AC Charging Stations
  o Up to $80,000 per charger for DC Fast Charging

• Energy-efficient products that are aligned with the climate change and the cost savings goals of the electric vehicle and infrastructure industry

• Increased confidence from site-hosts and drivers regarding the long-term standby energy costs to operate electric vehicle charging stations

• Improved product reliability
stay plugged in

Blink Charging. com
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Tel: (305) 521-0200

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Tel: (305) 521-0200 403
Email: jwinkler@blinkcharging.com
Web: www.blinkcharging.com

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Duke’s Engagement with ENERGY STAR

- ENERGY STAR Partner since 1997
- Duke participates in the ENERGY STAR Homes, Buildings, and Products program
  - Residential/commercial product rebates available in retail stores, on the online marketplace, and in midstream markets
Utility Role

- Inform
- Encourage
- Demonstrate
- Foundational Infrastructure
Infrastructure Programs

Rebates
• Residential charging stations
• Fleet charging stations

School Buses
• School bus charging infrastructure and battery

Transit Buses
• Transit bus charging infrastructure

Public Charging
• Multi-family charging
• Public Level 2 charging
• Public fast charging network
Park & Plug: Providing FREE EV Charging Stations in Florida

Hurry, charger stations are limited.
Implementation

- Marketing
- Qualification
- Site Survey
- Vendor Quote
- Site Host Agreement
- Installation
- Commissioning
- Monitoring

Florida Electric Vehicle Charging Infrastructure Program Application

Before you begin the application, please keep the following in mind as you may not be able to return to the point where you left off once you close the browser. You will be able to download a PDF of your completed application upon submission. Review the Site Host Agreement. This will provide you with the terms and conditions for participation in the program prior to applying. You will be asked to sign and submit at a later point. Allow 20 minutes to complete the application as you may not be able to return to the same point once your browser is closed. Have your Duke Energy account number on hand. Have the addresses of each site you are proposing for charging stations on hand.

Applicant Information:
Required*

- Company Name*
- Account Number*
- Primary Contact First Name*
- Primary Contact Last Name*
- Primary Phone*
- Primary E-mail*
- Secondary Contact*
- Secondary Phone*
- Secondary Email*
Equipment Requirements

- Revenue-grade metrology
- Wi-Fi, Cellular, or other communications to central server
- Open Charge Point Protocol (OCP-P) Version 1.6 or later
- Certified OpenADR 2.0b
- Remote monitoring
- Load management capability
Load Profiles

- Active from 6am – 9pm
- Peak between 9am – 3pm
  - In-Route
  - Destination
  - Workplace

Florida Public Charging Data

<table>
<thead>
<tr>
<th>Time</th>
<th>6:00am</th>
<th>9:00am</th>
<th>3:00pm</th>
<th>9:00pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>0.75k</td>
<td>0.65k</td>
<td>1.2k</td>
<td>0.5k</td>
</tr>
<tr>
<td>Value</td>
<td>0.80k</td>
<td>0.70k</td>
<td>1.5k</td>
<td>0.60k</td>
</tr>
<tr>
<td>Value</td>
<td>1.40k</td>
<td>1.60k</td>
<td>3.9k</td>
<td>1.8k</td>
</tr>
<tr>
<td>Value</td>
<td>5.85k</td>
<td>3.95k</td>
<td>3.55k</td>
<td>2.55k</td>
</tr>
<tr>
<td>Value</td>
<td>2.25k</td>
<td>2.45k</td>
<td>2.65k</td>
<td>1.07k</td>
</tr>
</tbody>
</table>
## Deployment Status (Florida)

### Charging Port Level Tracking

<table>
<thead>
<tr>
<th>Site Host Type</th>
<th>Requested Ports</th>
<th>Preliminary Approved Ports</th>
<th>Approved Ports</th>
<th>Final Installed Ports</th>
<th>Waitlisted Ports</th>
<th>Withdrawn or Rejected Ports</th>
<th>Commission Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Fast Chargers</td>
<td>51</td>
<td>25</td>
<td>19</td>
<td>11</td>
<td></td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>MUD (Multi-Unit Dwelling)</td>
<td>304</td>
<td>238</td>
<td>195</td>
<td>65</td>
<td>16</td>
<td>18</td>
<td>210</td>
</tr>
<tr>
<td>Public Level Two</td>
<td>141</td>
<td>176</td>
<td>134</td>
<td>81</td>
<td>14</td>
<td>22</td>
<td>130</td>
</tr>
<tr>
<td>Workplace</td>
<td>163</td>
<td>154</td>
<td>141</td>
<td>66</td>
<td>5</td>
<td>11</td>
<td>140</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>659</strong></td>
<td><strong>593</strong></td>
<td><strong>489</strong></td>
<td><strong>223</strong></td>
<td><strong>35</strong></td>
<td><strong>55</strong></td>
<td><strong>530</strong></td>
</tr>
</tbody>
</table>
Grid Benefits

- Managed Loads
- Demand Response
- Distributed Storage
- Vehicle-to-Grid
ENERGY STAR EV Charging

ENERGY STAR certified EV chargers save 40% vs a standard model when in standby mode (typically 85% of the time)

Some ENERGY STAR certified EV charger models have Wi-Fi technology
  - Remote monitoring
  - Controlled charging
Electric Vehicles

Shaping the future and providing smarter, cleaner transportation.

Take Charge. Drive Electric
www.duke-energy.com