Electric Vehicle Charging Issues in an Urban Environment

- Practical Measures and Concerns

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Issues

- Charging at Work
  - Managing charging locations
- Public Charging
  - Locating Stations by Consumers
- Charging in the Wild
- Parking Station Standards
  - ADA
  - State
Employer Owned and Tenants

- Employer-owned parking
  - Employer decides to install EVSE for employees
    - Is all parking controlled by the employer?
      - If so, decisions about location, type of equipment, employee use, and charging station management can be internalized.
    - Does parking include other building tenants?
      - If other companies at the same location use the same parking facility, then decision making affects tenants.

- Employer as Tenant
  - If employer is dominant tenant, decision to acquire charging can be part of lease agreement.
  - Building owner may largely control the go/no go decision as well as location, type of equipment, cost, and management of charging facility.
Managing for employees
- Type of charging may affect how charging is used
- Level 1 charging for all day users; perhaps enough for all EVs
- Level 2 charging may need more complex management
  - Allocation by “need to charge” decisions rather than first come first serve
  - First come, first serve; limit connect time
  - Alternating days or day of week assignments; limit connect time
  - Online reservation system; limit connect time
  - Moving vehicles based on state of charge or specific charging needs

Minimizing daytime charging
- Provide Level 1 charging only – trickle charge only
- Impose benefit maximum for users (taxable benefit)
- Include other non-vehicle travel incentives – e.g., transit passes
- Restrict use to need-based system – enough charging to get home or for business related travel

Minimal Need – minimal problem
- Short term – address as problem when it becomes a problem
- Provide for short term demand, but plan for longer term in early design considerations
Charging at Work

Tenant Charging Provisions

- Building owner decides to provide charging facilities
  - Visible or invisible locations?
  - Primarily tenant or visitor charging?
  - Financial decisions, lease, and tenant issues?

- Managing tenant use
  - First come, first serve
  - Minimal charging with multiple Level 1
  - Reserved for specific tenant similar to reserved parking slots
  - Billed by facility use; e.g., number of charging events
  - Online reservation system?
  - Time restrictions as demand increases
Locating Stations

Owner Behavior

- Early owners and charging behavior
  - Will know where stations are initially
  - Will identify where they can charge for frequent trips
  - Will plan for uncertainty for non-regular trips
  - Will experiment with longer trips; risk takers and risk averse
  - Lower expectations

- Established owner market (future owners)
  - Will identify station locations initially
  - Will not plan well for uncertainty
  - Will make mistakes
  - Higher expectations
Locating Stations

Owner Comments

- Comment on station locator
  - Only seems to update local car dealerships as having charging stations. Is there a better resource out there, online, that can show where the public charging stations are?

- Response
  - Most of LA is covered by ChargePoint and they have a web interface. Personally I use the PlugShare app but it doesn't have a website interface. BTW if you plug in somewhere it will be added to your nav system.

- Comment
  - CarWings shows 4 charging stations, yet I know of several others in the Tucson area. Where does one find a definitive list of all area charging stations?

- Response
  - The lack of a definitive list is frustrating.
Locating Stations

Example Location Information

- **DOE Alt Fuel Station Locator**
  - 30+ stations for Houston area; 30 stations within 50 miles of my house
  - 4 open eVgo stations
    - Locations listed as “private access”
    - 1 location shown 50 miles south of actual location
  - 10 Nissan dealer locations; all “public”

- **ChargePoint Station Locator**
  - 18 charging stations; some of which seem to be at same location
  - Good user interface with grouping of stations and disaggregation to discrete location at higher resolutions

- **Nissan CARWINGS Station Locator**
  - 4 downtown locations
  - All Nissan dealer charging stations
Locating Stations

Station Information Sites

- Example Station Locators
  - www.afdc.energy.gov/afdc/locator/stations/
  - www.recargo.com
  - www.mychargepoint.net/find-stations.php
  - carstations.com
  - www.blinknetwork.com/locator.html
  - www.plugshare.com
  - www.evchargermaps.com
Many Features

- Ability to add stations
- Ability to add comments
- Ability to edit station info
- Directions
- Smart phone apps
- Social media features
Locating Stations

Information Issues

- Early under reporting
- Slow or inconsistent updating
- Inaccurate locations
  - Use of addresses; may be on another block face; may not be obvious where charging is located on mapping system; two charging posts listed in separate locations but side by side
  - Detail of location
- Complete consumer information
  - Availability to public
  - Pricing
  - Hours of operation
  - Contact information
- Wide variation and quality in station locators

Every system using this data source will give incorrect information.
Locating Stations

Options

- Incentives for accurate and timely information
- Consider private versus public sector roles
- Improved quality control
  - obtain high resolution lat/long locations
  - address may be created at two different times; different permitting addresses, for example.
- Centralized versus crowd sourcing or wiki approach
- Local/regional versus national systems
Charging in the Wild

- Highly visible charging locations in areas with high pedestrian and vehicle traffic
  - Vandalism
  - Pranks
  - Vehicular damage
  - Liability and safety; e.g., cord management
  - Location; accessibility; wiring; lighting
  - Signage; chaos and confusion
  - ADA/accessibility; requirements?
H. Electric Vehicle Charging Stations. If spaces for electric cars are provided, allowed compact parking spaces can be increased by 1% for every 2 electric car charging stations; up to a maximum of 25-percent of the total minimum required. (Mesa AZ; zoning)
Accessibility Standards

- ADA Requirements
  - Parking space design
  - EVSE design
As the U.S. Department of Justice has not issued formal accessibility guidelines addressing electric vehicle charging stations, the Texas Department of Licensing and Regulation issues the following technical clarifications until such time as federal standards become available and are adopted.

If electric charging stations are provided in new or existing parking lots, parking garages or other location containing parking spaces, twenty percent (20%) but not less than one, of each type of charging station in each cluster on a site shall meet the following criteria:

- Controls and operating mechanisms for the accessible charging station shall comply with TAS 4.27 and shall be within the forward reach ranges specified in TAS 4.2.5;
- Directional and informational signage complying with TAS 4.1.2(7) shall designate the location of the accessible charging stations. The symbol of accessibility is recommended but not required.

Source: August 16, 2011 TDLR Memorandum
Charging Examples

Streets and Lots
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