Buses and Trucks and Cars and Charging Stations

What You Need to Know About Transportation Electrification

Enid Joffe
President
Green Paradigm Consulting
• Overview of transportation electrification and the way it impacts you as local government staff including:
  • State and federal legislative and regulatory drivers
  • Brief electric transportation technology overview
  • Charging 101
  • Impact of electrification from the perspective of local government

• Funding opportunities for local governments
• How do you get started?
The Biden administration has embraced transportation electrification as a response to climate change and a source of “good new jobs.”

The proposed American Jobs Plan includes:
- $1.7 billion for electric transportation and infrastructure

Goals include:
- 500,000 charging stations nationwide by 2030
- Electrification of the federal fleet including the U.S. Postal Service
- Electrification of 20% of school buses nationwide
- 40% of funds spent in disadvantaged communities

Hopefully, the bill authorizing this program will pass Congress.
• CA has had a Zero Emission Vehicle (ZEV) mandate since 1990
  • Includes all battery vehicles, hydrogen fuel cell vehicles and gas/battery hybrids
• Current statewide goals include:
  • 1.5 million ZEVs by 2025
  • 250,000 chargers by 2025 (including 10,000 DC fast chargers)
  • 5 million ZEVs by 2030
  • 1 million chargers by 2030 and most importantly...
• 100% of cars and trucks sold by 2035 must be ZEV
• Autonomous vehicles are already being tested in a number of places including San Francisco, San Mateo and Fontana (trucks)...most of these will be electric
Where do Things Stand Today?

- 1.8 million EVs sold in US—800,000 (over 40%) in CA
- Over 70,000 charging stations in CA but
- Anticipated to fall 25% short of first charging milestone of 250,000 chargers by 2025
- New regulations being adopted in CA such as EVITP and CA Green Building Code.
- Cities play a critical role as champion or roadblock depending on your point of view
- Many current and anticipated funding opportunities for business and government
- Today’s goal is to give you some ideas about how to remove roadblocks and take advantage of the available funding opportunities
Overview of Electric Vehicle Technologies—Passenger Vehicles

- The number of EV passenger vehicle models is growing every year
  - 68 models are available today
  - New models expected this year and next including this Ford e-Mustang
- Both Uber and Lyft have committed to use only zero emission vehicles by 2030
- Strong emphasis on ZEVs and equity in disadvantaged communities
  - Less pollution
  - Lower cost of ownership—*not just for the rich!* Nissan Leaf $205/month and electricity costs a fraction of gasoline

New Report from UC Berkeley: “the transition to electric cars can help “avoid the worst impacts of climate change — and the switch would also save consumers around $1,000 per household each year.”
Overview of Electric Vehicle Technologies—Trucks

- There is a shift toward electric trucks for local and regional deliveries within cities including electric bikes and delivery trucks.
  - Amazon has invested in startup Rivian and committed to 100,000 delivery vans starting with 10,000 in 2022

And manufacturers are starting to introduce electric long-haul freight trucks.
Overview of Electric Vehicle Technologies—Transit Buses and School Buses

- CA has adopted a regulation requiring transit buses to be 100% electric by 2040
- Many local transit agencies are already operating electric buses

- CA is supporting electrification of school buses.
Overview of Electric Vehicle Technologies—Marine and Air Travel

• The Ports in CA have adopted aggressive Clean Air Plans and are demonstrating many emerging electric technologies such as electric gantry cranes, battery powered yard trucks and forklifts, solar installations, battery storage and charging for drayage trucks.

• Ships are also trying out shore power (aka cold ironing) for running docked vessels
Overview of Electric Vehicle Technologies—Air Travel and Rail

• Even air transportation is getting into the act

• And regional commuter rail
Charging 101

• Charging comes in many shapes and forms from a cord that plugs into a 110v outlet to 350v DC fast chargers

• **Level 1** charging uses a standard 120-volt plug. Today, new electric cars come with portable charging equipment to allow you to plug in to any 120-volt outlet. Typically, the average daily commute of 40 miles can be easily replenished overnight with a Level 1 charger.

• In most cases **Level 2 charging** requires charging equipment to be purchased and installed. The typical Level 2 charger can replenish the same 40 mile average daily commute in less than 2 hours.

• **DC fast chargers** can provide 10 to 20 miles of range per minute. DC Fast Charging is for public charging stations only and not for home use.

<table>
<thead>
<tr>
<th>Miles of range added per hour of charging</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7kW slow</td>
</tr>
<tr>
<td>7kW fast</td>
</tr>
<tr>
<td>22kW fast</td>
</tr>
<tr>
<td>43-50kW rapid</td>
</tr>
<tr>
<td>150kW rapid</td>
</tr>
<tr>
<td>Up to 15 miles</td>
</tr>
<tr>
<td>Up to 30 miles</td>
</tr>
<tr>
<td>Up to 90 miles</td>
</tr>
<tr>
<td>Up to 90 miles in 30 mins</td>
</tr>
<tr>
<td>Up to 200 miles in 30 mins</td>
</tr>
</tbody>
</table>
Impact of Charging on Cities

- Permitting! Permitting! Permitting!
- Public, Workplace and Destination charging
- What Cities Can Do to Help Meet Vehicle and Charging Goals
- Americans with Disabilities Act--ADA
- Urban Design
- Environmental Leadership
Impact of Charging on Cities--Permitting

• Permitting remains the EV industry’s most frequently cited obstacle to installing charging infrastructure

• There have been multiple efforts to expedite permitting including:
  • Local streamlined permitting procedures
  • Over the counter permitting
  • On-line permitting
  • No cost permitting
  • Utility and state awards for best practices by local governments

• State level efforts to expedite permitting are under way
  • Governor’s office GoBiz
  • Electrify America bill

• Local governments need to address this issue
  • Now is the time for local governments need to ask for what they need to expedite EV permitting—ie., staffing, money for on-line permitting, etc.
**GO BIZ: Permitting Olympics**

- AB 1236 requires local jurisdictions to streamline permitting

<table>
<thead>
<tr>
<th>Gold:</th>
<th>Silver:</th>
<th>Bronze:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpine County</td>
<td>Alameda County</td>
<td>Lassen County</td>
</tr>
<tr>
<td>San Francisco City and County</td>
<td>Marin County</td>
<td>Sacrameneto County</td>
</tr>
<tr>
<td>Napa County</td>
<td>San Luis Obispo County</td>
<td></td>
</tr>
<tr>
<td>Tuolumne County</td>
<td>Santa Barbara County</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sonoma County</td>
<td></td>
</tr>
</tbody>
</table>

Medals will be awarded county by county, based on all the jurisdictions within the county:
- Counties with 100% of their region streamlined = Gold
- Counties with 75% of their region streamlined = Silver
- Counties with 50% of their region streamlined = Bronze
Impact of Charging on Cities—Public, Workplace and Destination charging

• Charging availability and reliability is the biggest concern of EV drivers and potential EV buyers

• Types of charging:
  • Home—difficult in Multi-family buildings
  • Workplace—many businesses installing charging for employees
  • Destination—shopping centers, entertainment venues
  • Long distance charging for traveling up and down the state and beyond—fast charging such as Tesla Superchargers and the West Coast Electric Highway
Public, Workplace and Destination Charging—What Cities Can Do to Help Meet Charging Goals

- Permitting—explore ways to expedite permitting
- Ordinances—many cities now require conduits or chargers in new construction—CA Green Building Code or higher
- Zoning and conditional use permits—evaluate need for charging in all new construction and renovations
  - Review zoning for location of DC fast charging stations
- Provide incentives for adding charging to project design such as a density bonus
- Use charging as an EIR environmental mitigation measure
- Parking ordinances—designated charging spaces; designated electric ride share spaces
- Sign ordinances
  - Advertising on chargers
  - Wayfinding signage
Public, Workplace and Destination Charging—What Cities Can Do to Help Meet Charging Goals

- Develop innovative solutions to multi-family charging such as designated curb-side charging, chargers mounted on streetlights, shared-use for commercial (daytime) and residential (nighttime) charging
- Coordinate with local utility on city/utility approvals
  - Jobs often get hung up over simple issues such as assigned addresses or paperwork between utility and AHJ
  - Investor owned utilities and some municipalities have generous incentive programs such as SCE’s Charge Ready
- Ensure prevailing wage and DIR requirements are met
  - Charging projects on government-owned property are considered public works jobs and subject to prevailing wage requirements and certified payroll reporting. Firms must be DIR registered to bid.
- Consider EVITP—AB 841
  - On projects funded by California Public Utilities Commission, California Energy Commission or California Air Resources Board, at least 25% of electricians (minimum one) must be an EVITP certified journeyman. Hearings occurring now on development of training curriculum
- Address code upgrade requirements
  - Upgrades to current electrical codes is a major obstacle when adding charging to older properties—consider a minimum cost level or a percentage ceiling for waiving complete code upgrades (controversial)
  - Powersharing is increasing in popularity and is allowed in NEC Article 625 as part of load management
Impact of Charging on Cities—Urban Design

- Transportation electrification is part of urban street design.
- Some suggestions:
  - Curbside charging as part of streetscape design
  - Electrification of school buses, transit, waste management and delivery vehicles improves urban quality of life by reducing air pollution and noise pollution
  - Electrification does not eliminate traffic congestion per se but can be used to encourage alternative modes of transportation
  - First mile/last mile—bikes, pedestrian friendly streets, scooters, car sharing—ways to encourage healthier lifestyles and use of transit
  - Revenue enhancement—most cities have a utility user tax—the more charging the more revenue is generated—this has not been studied
8.106.110 Electric vehicle charging.
Section 4.106.4 of the 2019 California Green Building Code and its subsections are amended to read as follows:

4.106.4 Electric vehicle (EV) charging for new construction. New construction shall comply with Section 4.106.4.1, 4.106.4.2, or 4.106.4.3, to facilitate current and future electric vehicle charging. Electric vehicle supply equipment (EVSE) shall be installed in accordance with the California Electrical Code, Article 625.

4.106.4.1 New one- and two-family dwellings and town-houses with all types of parking facilities. If residential parking is available, for each dwelling unit for which a parking space is available, for all types of parking facilities, install a listed raceway to accommodate a dedicated 208/240-volt branch circuit.

4.106.4.2 New multifamily dwellings. If residential parking is available, ten (10) percent of the total number of parking spaces on a building site, provided for all types of parking facilities, shall be electric vehicle charging spaces (EV spaces) equipped with EV chargers. Calculations for the required number of EV spaces equipped with EV chargers shall be rounded up to the nearest whole number.

4.106.4.2.1 Electric vehicle charging space (EV space) locations. Construction documents shall indicate the location of proposed EV spaces. Where common use parking is provided at least one EV space shall be located in the common use parking area and shall be available for use by all residents.
## Accessibility for Charging Stations (ADA)

### Electric Vehicle Charging Stations for Public Use and Common Use

<table>
<thead>
<tr>
<th>Total Number of EVCS at a Facility</th>
<th>Minimum Number (by type) of EVCS Required to Comply with Section 11B-812a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Van Accessible</td>
</tr>
<tr>
<td>1 to 4</td>
<td>1</td>
</tr>
<tr>
<td>5 to 25</td>
<td>1</td>
</tr>
<tr>
<td>26 to 50</td>
<td>1</td>
</tr>
<tr>
<td>51 to 75</td>
<td>1</td>
</tr>
<tr>
<td>76 to 100</td>
<td>1</td>
</tr>
<tr>
<td>101 and over</td>
<td>1, plus 1 for each 300, or fraction thereof, over 100</td>
</tr>
</tbody>
</table>

From: 2019 CALIFORNIA ACCESS COMPLIANCE ADVISORY REFERENCE MANUAL STATE OF CALIFORNIA DEPARTMENT OF GENERAL SERVICES, DIVISION OF THE STATE ARCHITECT
Impact of Charging on Cities—Environmental Leadership

• Climate change is major concern to residents and a priority on both the national and state levels

• Electrification and charging infrastructure provide cities with an opportunity to demonstrate environmental leadership

• More and more requirements placed on cities such as inclusion of climate change issues in general plans and land use decisions

• Local and regional governments need to lead by example by:
  • Electrifying fleets
  • Negotiating with vendors such as refuse haulers and paratransit providers to electrify
  • Establishing ordinances and policies like those suggested above
  • Using electrification as a design review consideration
• Fortunately, a lot of financial assistance exists on the state level
  • Funding is projected to grow over the next several years especially if the federal infrastructure bill passes

• Tracking funding opportunities and writing grant applications is a fulltime job; many cities don’t have the band with to keep up with all the grant and incentive programs

• Utilities, state agencies and regional air districts are committed to removing obstacles to electrification
  • Request technical support from these agencies or through your elected representatives
Funding Opportunities for Infrastructure

- SCE Charge Ready 2—expected release late 2021
  - Will add 38,000 chargers in SCE territory
    - Charging at workplace and public parking lots, schools, hospitals and destination centers
    - Focus on multi-family residential and disadvantaged communities
    - Utility installs and maintains charging infrastructure and provides incentives for chargers; participants own and operate charging equipment
    - [https://pages.email.sce.com/cr2/](https://pages.email.sce.com/cr2/) to sign up

- SCE Charge Ready Transport
  - Target of 870 locations serving 8500 industrial EVs
    - Funds infrastructure for medium and heavy-duty fleet vehicles, buses, shuttles
    - [https://crt.sce.com/overview](https://crt.sce.com/overview)

- PG&E has similar programs for Northern CA
Funding Opportunities for Infrastructure

• Carl Moyer Program
  • Funding for replacement or repower of older heavy-duty vehicles—annual program SCAQMD application period currently open until June 1, 2020

• CaleVIP Program—has been allocating funds for Level 2 and DC fast charging by region. Newest RFP is for the second block grant program

• Electrify America—Funded by Settlement with VW over emissions test tampering
  • Five-year, multi-category funding
  • RFP coming soon for infrastructure
Funding Opportunities for Vehicles

• Carl Moyer Program
  • Funding for replacement or repower of older heavy-duty vehicles—annual program SCAQMD application period currently open until June 1, 2020

• HYBRID AND ZERO-EMISSION TRUCK AND BUS VOUCHER INCENTIVE PROJECT (HVIP)
  • HTTPS://CALIFORNIAHVIP.ORG/
  • Point of sale vouchers for heavy duty (14,000 GVWR) buses and trucks Used by many cities for shuttles. Average savings ~ 20%
  • Reopening later in 2021

• CVRP—incentives for purchase of personal light duty vehicles

• Replace Your Ride—up to $9,500 for low income drivers who buy a newer clean vehicle. Must salvage old vehicle.

• Federal funding—Low-No Emission Vehicle Program for buses—Arvin funded
Funding for Community Programs

• Clean Mobility Options Voucher Program—$1 million per project for car sharing. Focused on disadvantaged communities. Evaluating applications for Round 1. Expect a Round 2
https://www.cleanmobilityoptions.org/
How Do You Get Started

• Sign up for SCAQMD, CARB and CEC notifications on funding programs
• Many excellent website resources such as:
  • Veloz
  • Clean Cars
  • AFDC
• E newsletters such as
  • Clean Technica
  • Grants.gov
  • Evobsessed
• Or if staff to figure it all out can hire help:
  • CalStart
  • Gladstein and Associates
  • Green Paradigm
• Or for bigger engineering type projects
  • Burns and McDonnell
  • Black and Veatch
  • ABM
Thank you!

Enid Joffe  
Green Paradigm Consulting  
[Enid.Joffe@greenparadigmconsulting.com](mailto:Enid.Joffe@greenparadigmconsulting.com)  
626 533-2225