Electric Vehicle Infrastructure: Options and Financing for Schools

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Your Presenters

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Key Takeaways

- Leverage Others’ Expertise
- Utilize Other Funding Sources
- Control What You Can Control

Well to Wheel - Why Electric Vehicles?
Real World Comparison
Why Electric is Happening Now

**PASSENGER VEHICLES**

**DODGE DEMON**
- 4,500 lbs
- 840hp (620 Gas)
- 2.3 sec 0-60mph

**TESLA S P100D**
- 4,941 lbs
- 503hp (375kW electric)
- 2.3 sec 0-60mph

*MORE EFFICIENT*

**PUBLIC TRANSIT**

**DIESEL CITY BUS**
- 2.3 Mpg, Hybrid 3.18 Mpg, CNG 1.7 Mpg
- Maximum grade hill climb 6-8%
- 350 miles on 3,795kWh of energy = ~350 miles, 100 gallon diesel tank
- **10.8 kWh per mile**

**PROTERRA E-BUS**
- 20 mpg Equivalent
- Maximum grade hill climb 26%
- 350 miles on a 660kWh battery
- **1.88 kWh per mile**

*MORE EFFICIENT*

**SCHOOL BUS**

**BLUEBIRD VISION DIESEL BUS**
- 7.2 L turbodiesel 300hp
- Avg 7mpg, (17 gallons to go 120 miles), 645.15 kWh
- **5.38 kWh per mile**

**BLUEBIRD VISION ELECTRIC BUS**
- 77 passengers
- 120 miles range, 160kWh battery
- **1.33 kWh per mile**

*MORE EFFICIENT*

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**EV Infrastructure for Schools**

![School Bus Illustration]
Background

- **2013, B-16-2012**: Infrastructure for 1MM ZEVs by 2020 and 1.5MM ZEVs in CA by 2025
- **2015, SB 350**: Clean Energy and Pollution Reduction Act
- **2017, SB 110**: School Bus Replacement Program
- **2018, B-48-2018**, 5MM ZEVs by 2030, 250k EV chargers, 200 hydrogen refueling by 2025
- **2018**: 225 Level 2 chargers and 90 Fast Chargers per month resulting in 18,000 public chargers.

* Zero Emission Vehicles (ZEV): Plug-in Electric Vehicles (PEVs) + Fuel Cell Electric Vehicles (FCEVs)

Funding Sources

**Up to $60,000 from SB 110 for Approved Bus Applications**

<table>
<thead>
<tr>
<th>PG&amp;E Charge Network Program</th>
<th>California HVIP</th>
<th>North Coast Air Quality Management District</th>
<th>San Joaquin Valley Air Pollution Control District</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PG&amp;E pays for infrastructure for 10+ Level 2 Charging Stations</td>
<td>• Hybrid and Zero Emission Truck and Bus Voucher Incentive Program</td>
<td>• Rural School Bus Pilot Project</td>
<td>• Charge Up – Electric Vehicle Charger Incentive Program</td>
</tr>
<tr>
<td>• <a href="https://www.pge.com/en_US/large-business/solar-and-vehicles/clean-vehicle/ev-charge-network/program-participants/about-the-program.page">https://www.pge.com/en_US/large-business/solar-and-vehicles/clean-vehicle/ev-charge-network/program-participants/about-the-program.page</a></td>
<td>• Up to 80% of the incremental cost up to $110,000 per vehicle</td>
<td>• Application Period Closed</td>
<td>• $6,000 per dual port level 2 and $25,000 for DC Fast Charger</td>
</tr>
<tr>
<td></td>
<td>• <a href="https://www.californiahvip.org/">https://www.californiahvip.org/</a></td>
<td>• $400,000 in funding for Zero-Emission School Bus</td>
<td>• <a href="http://valleyair.org/grants/chargeup.htm">http://valleyair.org/grants/chargeup.htm</a></td>
</tr>
</tbody>
</table>
# Charging Level Basics

<table>
<thead>
<tr>
<th></th>
<th>Amperage</th>
<th>Voltage</th>
<th>KWH</th>
<th>Typical Charging Time</th>
<th>Connector</th>
<th>Primary Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Level 1</td>
<td>12–16 amps</td>
<td>120 V</td>
<td>1.3–1.9 kW</td>
<td>12–48 hours</td>
<td>J1772 connector</td>
<td>Backup charge</td>
</tr>
<tr>
<td>AC Level 2</td>
<td>6–80 amps</td>
<td>208 V or 240 V</td>
<td>Up to 19.2 kW</td>
<td>2–4 hours</td>
<td>J1772 connector</td>
<td>Park and charge</td>
</tr>
<tr>
<td>DC Fast Charge</td>
<td>70–125 amps</td>
<td>208 V or 480 V</td>
<td>24–150+ kW</td>
<td>15–45 minutes</td>
<td>SAE Combo, Tesla, CHAdeMO connector</td>
<td>Commercial, public</td>
</tr>
</tbody>
</table>

### Charging Options

- **AC 1**
- **AC 2**
- **DC Fast Charge**
Common Challenges

- No Formal Design
- ADA Compliance Issues
- Improper Permitting
- Unfriendly Layout
- Cutting Corners to Cut Costs
- Cost Overruns & Missed Deadlines
- Lack of Training on EV Requirements
- Increased Electrical Load / Utility Costs

Installation Timeline

Onsite Consultation
1. Prequalification Site Walk, Assessment
2. Access to electrical rooms, panels, etc.
3. On-site summary of station placement, configuration options
4. Assess EV Charging locations for available electrical infrastructure

Cost, Scope & Proposal delivered to Site Host

Site Host Proposal / Approval to Proceed
Order equipment; construction and permitting scheduled:

Permitting and Install Process
Provisioning & Activation
Administrator and New User Training post installation (multiple sessions with administrators)
Update Users that site is live and fully ready (Plugshare, Blogging, Twitter, Media)

Number of Weeks

- 0: 2 Weeks
- 1-2: 2 Weeks – 8 Weeks
- 3-4: 4 - 8 Weeks
- 5: Upon Completion
- 6-12: Ongoing Scheduling
Control What You **CAN** Control

- Added energy costs hit general fund
- Demand charges/TOU
- Have an energy reduction plan

California Energy Commission Loading Order:

<table>
<thead>
<tr>
<th>Priority</th>
<th>Priority for use of Public Good Charges</th>
</tr>
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<tbody>
<tr>
<td>High</td>
<td>Energy Efficiency</td>
</tr>
<tr>
<td></td>
<td>Demand Response</td>
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<tr>
<td></td>
<td>Renewable Resources</td>
</tr>
<tr>
<td>Low</td>
<td>Distributed Generation</td>
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Energy Reduction Plan

Funding Sources:
- Bond
- General Fund
- Grants
- Financing

Energy Related:
- HVAC
- EMS
- Lighting
- Water

Building Value in California...

- Electical: We service & maintain 40,000+ parking & lights
- Energy: We service & maintain 6,000+ lighting fixtures
- Water: We reduced our client energy use by 23%
- HVAC & Mechanical: We service & maintain 14,375+ heating and cooling systems
- Janitorial: We clean and service 484+ million square feet of buildings per day
- Landscape & Turf: We maintain 1,000,000 acres of grounds
- Parking & Transportation: We manage 300,000+ parking spaces everyday and 500+ parking locations

ABM.com/CA
ABM EV Experience

- Grown to currently over 1,800 active projects
- 10,000+ EV Chargers to service and maintain
  - January 1.8 Gigawatt Hours of Energy
  - $186,160.00 billed to users for the usage
- Working on large scale energy projects to feed transportation (320kW - 5MW)
ABM’s Qualifications

State of California Preapproved ESCO
DSA & OPSC Expertise

California Energy Commission
Developed Multiple Prop 39 projects
Prop 39 CEC Reporting
ECCA Loan Grant Expertise

Utility Rebate & Alliances State-Wide
Developed the States First Net Zero
School District
Newcastle School District

DOE and NAESCO Approved ESCO
GSA Los Angeles R.9
USS Iowa

Partner with CA Conservation Corps

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In-House Capabilities

California Licenses Locally Held
*Picture from CLSB website*

- C20 - WARM AIR HEATING, VENTILATING AND AIR-CONDITIONING
- 0 - GENERAL BUILDING CONTRACTOR
- C-4 - BOILER, HOT WATER HEATING AND STEAM FITTING
- C-61 / D62 - AIR AND WATER BALANCING
- C16 - PLUMBING
- C18 - REFRIGERATION
- C-7 - LOW VOLTAGE SYSTEMS
- C19 - ELECTRICAL
- C43 - SHEET METAL
- C-61 / D65 - WEATHERIZATION AND ENERGY CONSERVATION
Thank You

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ABM
Building Value

MISSION CRITICAL
We service and maintain 35+ million sq. ft. of data center space.

ECOLOGICAL
We’ve reduced water usage by 23%.

FACILITIES ENGINEERING
Our 3,800+ engineers keep buildings running.

HVAC & MECHANICAL
We service and maintain 70,000+ heating and cooling systems.

ELECTRICAL
We’ve installed 10,000+ EV charging ports across the U.S.

LANDSCAPE & TURF
We maintain 55,000+ acres of landscaping and golf courses.

ABM
NYSE

300+
U.S. & International Locations

PARKING & TRANSPORTATION
We collect $2+ billion in parking revenue for our clients.

ABM Building Value

Thank You
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ABM
Building Value