Driving to Net Zero

<table>
<thead>
<tr>
<th>Submitted to: Santa Clara County</th>
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<tbody>
<tr>
<td>Submitted by: ICF</td>
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<table>
<thead>
<tr>
<th>County of Santa Clara Office of Sustainability</th>
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</thead>
<tbody>
<tr>
<td>Funded through a grant awarded by the California Strategic Growth Council</td>
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MARCH 9, 2018
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EV Charging Infrastructure as a Novel Land Use: Zoning, Parking Practices, Building Codes

March 5, 2018
Driving to Net Zero (DNZ)

- Two year project funded by a grant from the Strategic Growth Council
- Objective: Deliberately and effectively increase the adoption of zero emission vehicles throughout Santa Clara County
- Focuses on the role of county and municipal governments in the deployment of electric vehicle (EV) charging infrastructure
Relevant DNZ Resources

The DNZ website will be posting other relevant resources for stakeholders, including:

- EV Best Practices Compendium
- EV Building and Zoning Code Evaluation and Recommendations
- Local Government EV Siting Toolkit and Reference Guide

Leading the Way in EVs

- California has ambitious goals for EV adoption
  - In 2012: Set a goal of having 1.5 million zero emission vehicles (ZEVs) on the road by 2025
  - In 2018: Increased goal to 5 million ZEVs on the road by 2030
- Santa Clara County is the leading region for early EV adoption
- ICF estimates that there will 250,000 EVs in Santa Clara County by 2025
Agenda

- Key Considerations
- General Plans
- Building Codes
- Zoning
- Parking
- Americans with Disabilities Act (ADA) Accessibility
- Key Recommendations
Encouraging Infrastructure: There is No Right Answer!

Require
- Pre-wiring
- Actual charging equipment

Incentivize
- Incentives
- Policies that encourage
Areas of Focus

General Plans
- Regional coordination
- Local planning efforts

Building Codes
- 2016 Green Building Standards Code (CALGreen)
- Exceeding CALGreen

Zoning
- Counting EVs towards minimums
- Other zoning ordinances

Parking
- Specifications, time limits/restrictions, signage, enforcement, fees
- ADA accessibility
General Plans

Regional Coordination

Local Planning Efforts
Local Planning Efforts

- Get EVs into the mix whenever and wherever you can!
- General plans, climate action plans (CAPs), and similar documents
  - Opportunities for requiring or incentivizing charging?
  - May be broad, voluntary, or vague policies
  - Enable and provide a basis for further action

Key Considerations:

- What documents are getting updated next?
- How much new development will there be?
- Are there high-priority charging locations?
Local Planning Case Studies

- **City of Cupertino** – 2015 CAP
  - Includes goals and actions to incorporate EVs into fleets, provide fueling infrastructure, explore building and zoning code revisions, and work within region to develop tools and technical assistance

- **City of Sunnyvale**– 2014 CAP
  - Sets action items to designate preferred EV parking in all public and private lots, secure funding for EV chargers in these lots, and require sufficient electrical service in residential developments

- **City of Mountain View** – 2015 Climate Protection Roadmap
  - Identifies the need to increase the number of EV parking spaces and implement requirements for EV charging in multifamily developments
Building Codes

CALGreen Mandatory Requirements

CALGreen Voluntary Requirements

Exceeding CALGreen Requirements
### CALGreen Mandatory Level 2 Pre-Wiring Requirements

<table>
<thead>
<tr>
<th>Total Number of Parking Spaces</th>
<th>Number of Required EV Charging Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>0</td>
</tr>
<tr>
<td>10-25</td>
<td>1</td>
</tr>
<tr>
<td>26-50</td>
<td>2</td>
</tr>
<tr>
<td>51-75</td>
<td>4</td>
</tr>
<tr>
<td>76-100</td>
<td>5</td>
</tr>
<tr>
<td>101-150</td>
<td>7</td>
</tr>
<tr>
<td>151-200</td>
<td>10</td>
</tr>
<tr>
<td>201 and over</td>
<td>6% of total</td>
</tr>
</tbody>
</table>

- **Single Family Homes**: Pre-wire where vehicles parked
- **Attached garages**: Pre-wire where vehicles parked
- **17+ units**: Pre-wire at least 3% of parking
- **Pre-wire a portion**

*Effective January 1, 2017*
CALGreen Voluntary Installation or Pre-Wiring Requirements

<table>
<thead>
<tr>
<th>Total Number of Parking Spaces</th>
<th>Number of Required EV Charging Spaces</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mandatory</td>
<td>Tier 1 Voluntary</td>
</tr>
<tr>
<td>0-9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10-25</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>26-50</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>51-75</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>76-100</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>101-150</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>151-200</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>201 and over</td>
<td>6% of total</td>
<td>8% of total</td>
</tr>
</tbody>
</table>
Exceeding CALGreen: Addressing Existing Developments

- Requirements and ordinances less addressed due to cost-prohibitive nature of retrofitting
- Can include major renovations in building code ordinances
- Not many proven examples of addressing through regulations or permitting

**Best practice:**
Provide financial incentives (or outreach and education about such incentives) to building owners to reduce the cost of EV charging equipment and installation.
Exceeding CALGreen: Case Study 1: City and County of San Francisco

City and County of San Francisco
• All new residential, commercial, and municipal buildings:
  • Electrical capacity and raceway infrastructure for future EV chargers in 100% of off-street parking spaces for passenger vehicles and trucks
  • Full circuits for EV chargers to at least 10% of parking spaces
  • Sufficient electrical infrastructure to simultaneously charge vehicles in 20% of parking spaces.

Up to 4 times more expensive to retrofit for electric vehicle supply equipment (EVSE) than pre-wire!
Exceeding CALGreen: Case Study 2: City of Palo Alto

- **Single family** ➔ Conduit, EVSE-ready outlets, or EVSE at all
- **Multifamily** ➔
  - Resident parking: At least one EVSE-ready outlet or EVSE for each unit
  - Guest parking: Conduit, EVSE-ready outlets, or EVSE for at least 25% of guest parking (5% must be EVSE installed)
- **Hotels** ➔ Conduit, EVSE-ready outlets, or EVSE for at least 30% of parking (10% must be EVSE installed)
- **Other Non-Residential** ➔ Conduit, EVSE-ready outlets, or EVSE for at least 25% of guest parking (5% must be EVSE installed)
### New multi-family building with 3+ units and non-residential building requirements:

<table>
<thead>
<tr>
<th></th>
<th>1 parking space</th>
<th>2-10 parking spaces</th>
<th>11-15 parking spaces</th>
<th>16-20 parking spaces</th>
<th>More than 20 parking spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Circuit</strong></td>
<td>1 parking space</td>
<td>2 parking space</td>
<td>2 parking space</td>
<td>2 parking space</td>
<td>10% of parking spaces</td>
</tr>
<tr>
<td><strong>Inaccessible</strong></td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>1 parking space</td>
<td>2 parking spaces</td>
<td>MDU: remaining 90% of spaces</td>
</tr>
<tr>
<td><strong>Conduit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other Non-Res: Additional 10%</td>
</tr>
<tr>
<td><strong>Installed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
<td>Sufficient to supply 1 parking space</td>
<td>Sufficient to supply 2 parking spaces</td>
<td>Sufficient to supply 3 parking spaces</td>
<td>Sufficient to supply 4 parking spaces</td>
<td>Sufficient to supply 20% of spaces</td>
</tr>
<tr>
<td><strong>Panel Capacity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Zoning Ordinances

Development Guidelines & Standards

Developer Incentives

Best practice: Use standard definitions.

Include charging requirements or incentives
Counting EV Parking Towards Minimum Requirements

Overall parking requirements + EV parking = Overall parking requirements

EV parking
Implementing EVSE Zoning Ordinances and Incentives

Why zoning ordinances, rather than just changing building codes?

- Zoning ordinances allow for more nuanced requirements (and incentives) in high-need areas
  - Increase charging opportunities in high-priority locations
    - Residential and non-residential districts with different densities, uses, and activity
  - Allow for more flexibility on how to implement charging
    - Actual charger installations in specific areas
    - Incentives, such as density bonuses
Zoning Case Studies

- **City of Emeryville** – Planning Regulations
  - Requires at least 3% of parking in parking facilities with 17+ spaces serving multifamily and lodging uses to be charging
  - All other uses, charging stations are eligible for development bonuses
- **City of Lancaster** – Municipal Code
  - Charging stations are allowed within an single- or multi-family garage or carport, and permitted as an accessory use
- **City of San Carlos** – Municipal Code
  - Density bonuses for parking with charging stations
## Municipal Building and Zoning Code Activity

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Clara County</td>
<td>✓</td>
<td>Better (rebuilds as well as new construction)</td>
<td>Better (all new dwellings + 1% installed EVSE if &gt; 100 spaces)</td>
<td>Better (1% installed EVSE if &gt; 100 spaces)</td>
<td>×</td>
</tr>
<tr>
<td>Cupertino</td>
<td>✓</td>
<td>Better (Tier 2)</td>
<td>Better (exceeds Tier 2)</td>
<td>Better (largely exceeds Tier 2)</td>
<td>×</td>
</tr>
<tr>
<td>Morgan Hill</td>
<td>✓</td>
<td>Minimum</td>
<td>Minimum</td>
<td>Minimum</td>
<td>×</td>
</tr>
<tr>
<td>Mountain View</td>
<td>✓</td>
<td>Minimum</td>
<td>Better (10% installed EVSE)</td>
<td>Better (installed EVSE)</td>
<td>×</td>
</tr>
<tr>
<td>Palo Alto</td>
<td>✓</td>
<td>Better</td>
<td>Better (5% installed EVSE)</td>
<td>Better (5% installed EVSE)</td>
<td>✓</td>
</tr>
<tr>
<td>San Jose</td>
<td>✓</td>
<td>Minimum</td>
<td>Minimum</td>
<td>Minimum</td>
<td>✓</td>
</tr>
<tr>
<td>Sunnyvale</td>
<td>✓</td>
<td>Minimum</td>
<td>Better (all new dwellings + 12.5%)</td>
<td>Minimum</td>
<td>✓ (industrial + office bldgs)</td>
</tr>
</tbody>
</table>
Parking

- Goals:
  - Unobstructed access to charging for drivers (through design and regulation)
  - Local government can recoup the costs of publicly-available charging that it owns

- Areas of interest:
  - Definitions
  - Restrictions
  - Enforcement
  - Time limits
  - Fees
  - Signage
  - Incentives
Parking Specifications

Goal:
Ensure stations are easy to find, easy to use, and meet the needs of the user

Considerations:
Accessibility, safety, equipment protection, signage

- Minimum dimensions
- Configurations (perpendicular, parallel, or angled; location of wheel stops, guard posts, and signage)
- Technical standards
- Signage and signs directing drivers
- Area lighting
- Clearances (around chargers and for pedestrians)
- Location relative to other spaces, adjacent land uses, and electrical infrastructure
- Considerations for overlay zones
Time Limits and Restrictions

- Restrict use of parking space by internal combustion engine
- Set time limits on EVs
  - **Example:** Santa Clara County Code says non-EVs may not park at charging stations, and EVs not utilizing the charger or parking for longer than designated by signage are subject to a citation.

**Best Practice:**
Restrict use of charging stations to vehicles that are *currently* charging.
Signage

- **Goals:**
  - Help drivers identify and navigate to charging stations
  - Clearly state time limits and restrictions
  - Increase visibility of station

- **Guidance:**
  - California Vehicle Code requirements
  - California Manual on Uniform Traffic Control Devices
Enforcement

Restriction and Time Limit Enforcement

- Towing
- Fines

• Washington State
  • $124 penalty for cars parked in charging station that are not connected

• City of Boulder, Colorado
  • $50 penalty for non-EVs parked in charging stations
Fees

- Fees for municipal-owned stations help recover costs

- Various ways to structure fees:
  - Access Fee
  - Station or Time Based Fee
  - Energy Fee

- Addition consideration: graduated pricing schedules to encourage vehicle turn over

City of Palo Alto

- $0.23 per kilowatt-hour for charging at city facilities, in addition to a per-hour connection charge
- Discretionary “electric vehicle charger connection overstay” fee up to $5 per hours after the vehicle has finished charging
### ADA Accessibility

- **Multifamily**: CALGreen
  - One in every 25 chargers (at least one) must be accessible
- **Non-residential**: California Building Code
  - Roughly one in every 15 new chargers in public locations must be accessible
  - Design standards
    - Ambulatory
    - Standard accessible
    - Van accessible

<table>
<thead>
<tr>
<th>Total chargers</th>
<th>Minimum required van accessible chargers</th>
<th>Minimum required standard accessible chargers</th>
<th>Minimum required ambulatory chargers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5-25</td>
<td>1*</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>26-50</td>
<td>1*</td>
<td>1*</td>
<td>1</td>
</tr>
<tr>
<td>51-75</td>
<td>1*</td>
<td>2*</td>
<td>2</td>
</tr>
<tr>
<td>76-100</td>
<td>1*</td>
<td>3*</td>
<td>3</td>
</tr>
<tr>
<td>101+</td>
<td>1, plus 1 for each 300 over 100*</td>
<td>3, plus 1 for each 60 over 100*</td>
<td>3, plus 1 for each 50 over 100*</td>
</tr>
</tbody>
</table>

* Indicates a case where at least one charger is required to be identified with an international symbol of accessibility and restricted to vehicles with an ADA accessible parking placard.
Possible Configurations: Van Accessible ADA
Possible Configurations
Standard Accessible ADA
Possible Configurations
Ambulatory Accessible ADA
Possible Configurations
On-street

- Crosswalk
- Streetlight
- No Parking near Corner
- Signage Guidance
- EVCS - Electric Vehicle Charging Station
- Pedestal Mounted Charging Equipment

S - Standard Parking Space
R7-108
Key Recommendations

✓ Focus on both regional coordination and local planning, and ensure these efforts align
✓ Get electric vehicles “into the mix” of various planning documents
✓ Assess building codes to encourage minimum charging installation or pre-writing requirements
✓ Make sure zoning codes count EV parking towards minimum parking requirements
✓ Assess zoning codes to include charging requirements and incentives, focusing on high priority locations
✓ Assess accompanying parking codes to ensure they allow for unobstructed access to chargers for drivers
✓ Address ADA accessibility requirements
Questions?