Driving to Net Zero

Submitted to: Santa Clara County
Submitted by: ICF

County of Santa Clara Office of Sustainability

Funded through a grant awarded by the California Strategic Growth Council

MARCH 9, 2018

CALIFORNIA STRATEGIC GROWTH COUNCIL

Acknowledgements

The work upon which this publication is based was funded in whole or in part through a grant awarded by the California Strategic Growth Council.

Santa Clara County would like to acknowledge the cities of Cupertino, Morgan Hill, Mountain View, Palo Alto, San Jose, and Sunnyvale for their contributions and support as partners in the Driving to Net Zero Project.

Disclaimer

The statements and conclusions of this report are those of the Santa Clara County and/or ICF and not necessarily those of the California Strategic Growth Council or of the California Department of Conservation, or its employees. The California Strategic Growth Council and the California Department of Conservation make no warranties, express or implied, and assume no liability for the information contained in the succeeding text.

Permitting Practices for Electric Vehicle Charging Infrastructure

March 8, 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 (ZEVs) 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

See the DNZ website for 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***

https://www.sccgov.org/sites/osp/pages/net_zero.aspx

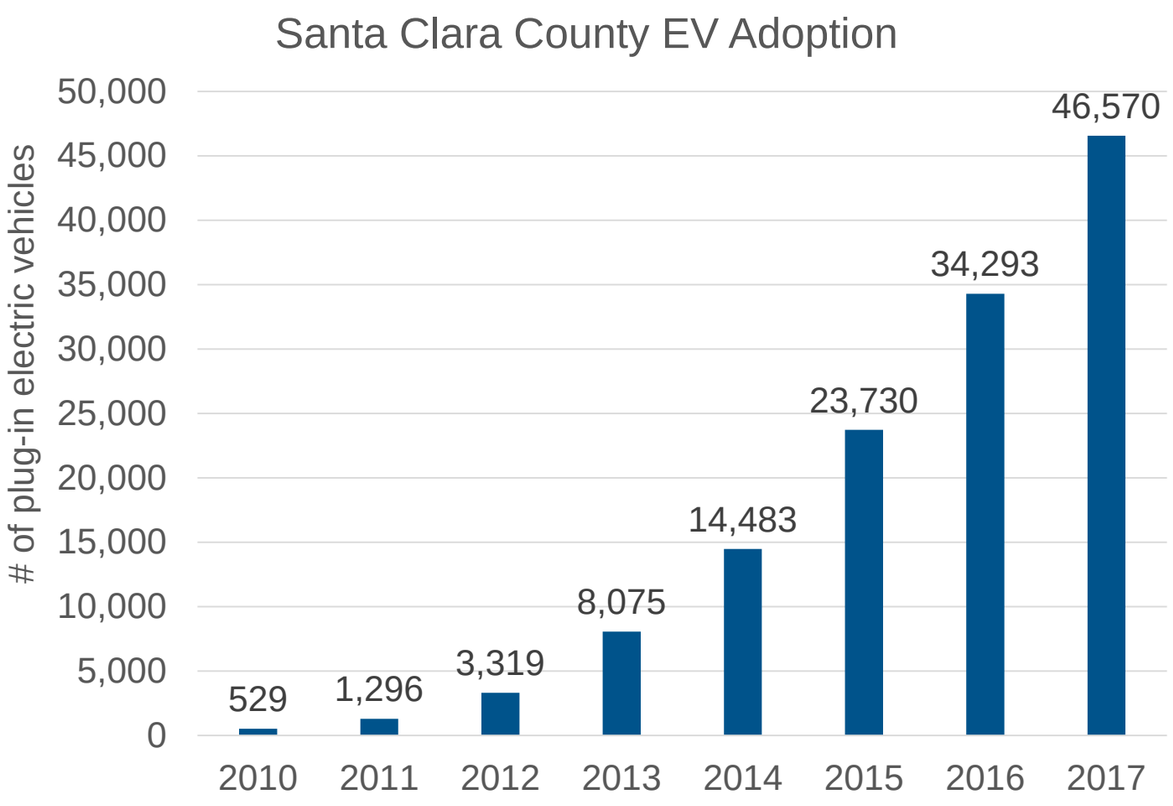
Terminology

Vehicles		
	Fuel	Electric Range (miles)
Plug-in Hybrid Electric (PHEV)	Electricity & Gasoline	9 mi – 53 mi
Battery Electric (BEV)	Electricity	57 mi – 335 mi

Charging Stations				
	Current Type	Voltage (V)	Range & Charging Time	Primary Use
Level 1	AC	110/120V	2 to 5 miles of range per hour of charging	Residential Workplace Fleet
Level 2	AC	220/240V	10 to 20 miles of range per hour of charging	Residential Workplace Public Fleet
DC Fast	DC	480V	60 to 80 miles of range per 20 minutes of charging	Public

Leading the Way in EVs

- **California has ambitious goals for EV adoption**
  - In 2012: set a goal of having 1.5 million 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

- Background on Permitting
- Permitting Process
- Installation & Inspection
- Utility Notification
- Metrics
- Key Recommendations

Background on Permitting

- Types of EV Charger Installations
  - Residential
    - –Single-family, multi-family
  - Non-Residential
    - –Workplace, retail
- Applicable Codes
  - National Electrical Code (NEC)
  - 2016 California Electrical Code (CEC)
  - 2016 California Green Building Standards Code (CALGreen)

Photos (top to bottom): Ed Hancock / NREL 10063, Jean Ku / NREL 10707, Warren Gretz / NREL 04134

Background on Permitting

Good News

- Each municipality can determine:
  - Application type/format
  - Required documentation
  - Fees
  - Timeframes

Bad News

- Each municipality can determine:
  - Application type/format
  - Required documentation
  - Fees
  - Timeframes

Complicated, labor-intensive permitting process create barriers to increased EV charging station installations

Background on Permitting

Assembly Bill 1236 - Local governments must streamline the permitting process for EV charging infrastructure

- Timeline:
  - Population > 200,000 – by September 30, 2016
  - Population < 200,000 – by September 30, 2017
- Required Ordinance Elements:
  - Permitting checklist
  - Expedited review for eligible projects
  - Materials available online
  - Allow for electronic submission

Materials available from the Governor's Office of Planning and Research at: www.opr.ca.gov/planning/transportation/zev.html

For those who have not passed an ordinance, see www.calbo.org for the "AB 1236 Tool Kit: EV Charging Stations Ordinance and Staff Report Templates"

Background on Permitting

Executive Order B-48-18

- 5 million ZEVs by 2030
- Streamline ZEV infrastructure installations
  - Governor's Office of Business and Economic Development (GO-Biz)
  - EV station development guidebook
  - Expected later this year

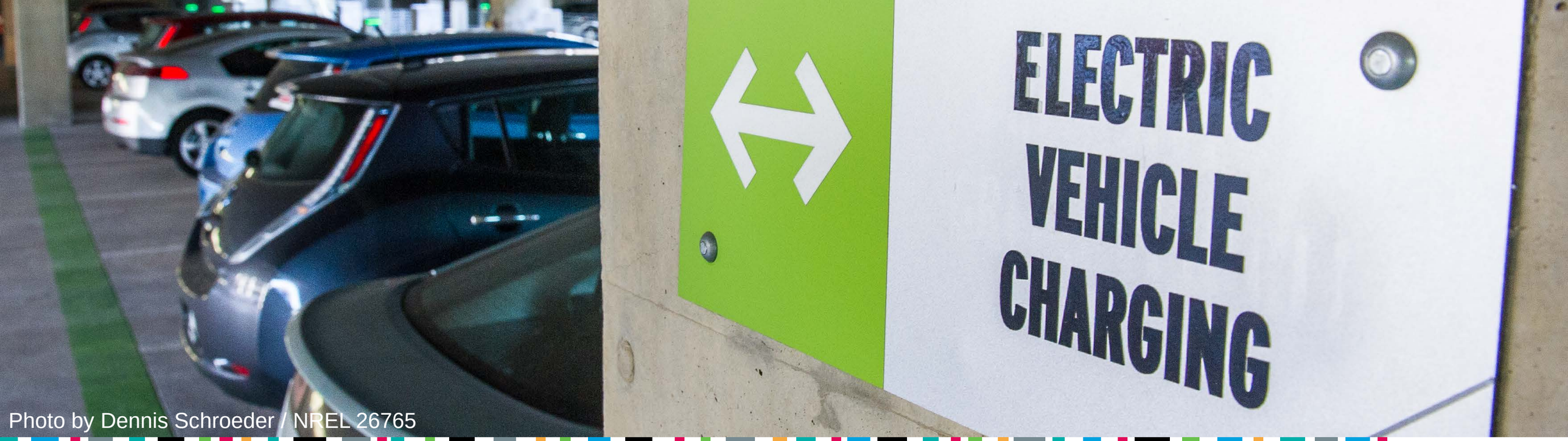


Photo by Dennis Schroeder / NREL 26765

Recommendations for Municipal Governments

Permitting Process

- Specific Application
  - Adapt 240V circuit installation, but specify EV charging
- Permitting Fees
  - Goal: Cover municipal costs (review and inspection), but lower the installation cost burden
  - Recommend $75 to $200 per permit for residential
  - Consider waivers or incentives
- Permit Accessibility
  - Available online AND over-the-counter
- Time to Issue Permit
  - Recommend 48 hours or less

Examples:
Encinitas – energy-efficient permit fee waiver for residential chargers
Anaheim – residential building permit cost waiver

Permitting Process

- Required Documentation/Materials
  - Keep it simple and clear
  - Minimize required information, within reason
  - Recommend avoiding site plan approval, when possible

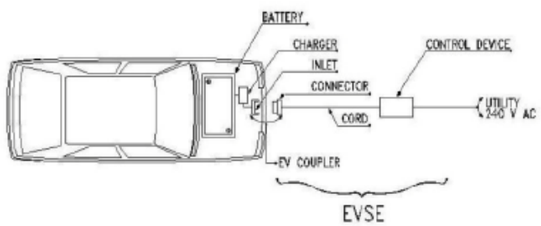
https://www.sccgov.org/sites/dpd/DocsForms/Documents/EV_ChargingStationPermit.pdf

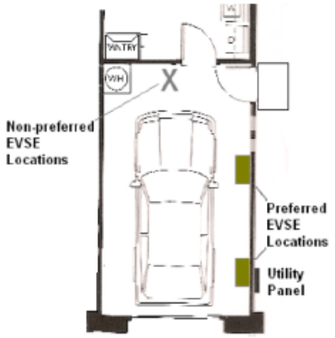
COUNTY OF SANTA CLARA
Electric Vehicle Charging System
Over the counter permit guidelines

An electrical permit is required for an EV charging system to be installed in the garage or carport of a single-family dwelling. Electric Vehicle Supply Equipment (EVSE) consists of the connector, cord, and interface to utility power. The interface between the EVSE and utility power is typically directly hard-wired to the control device, and each automaker has its own EVSE design. A J1772 Standard EV coupler should be utilized for all installations.

The following information is required with the application for an over-the-counter permit:
1. EV charging system information: Level 1 or 2, EVSE system with UL listed number or other approved nationally recognized testing laboratory, in compliance with UL2202, "Standard for Electric Vehicle (EV) Charging System Equipment."
2. Existing electrical service panel size and location at the residence. Include EVSE load and circuit size. A load calculation is required if the existing service is less than 200 Amp. *Note: some manufacturers require a minimum service size of 200A.* Identify if a second electric meter is being installed, and check with PG&E for their requirements.
3. Clarify EVSE location and wiring method. EVSE shall be installed in accordance with manufacturer's guideline and must be suitable for the location (indoor/outdoor).
4. The manufacturer's installation guideline **must** be available at the site for the inspector.
5. All new electrical wiring, including a service panel upgrade if necessary, shall be in conformance with the *current* California Electrical Code.

Typical installation criteria for an EV installation:





Permitting Process Example

Residential

The Building and Safety Department is pleased to provide guidelines for the permit application process for the installation of residential electrical vehicle (EV) charging station. Follow the link, obtain permit and start saving energy now.

Apply for EV Charging Station Permit Online!!

Submittal Requirements:

- EVC System in Single Family Residence Plan Review and Permitting Requirements

Permit Fees Table:

Electrical Vehicle Charging System	$149.63
Planning Community Fee	$7.25

Inspection Information:

- Building Inspection Procedure

http://www.ci.milpitas.ca.gov/milpitas/departments/building-and-safety-department/electrical-vehicle-charging-station/

Commercial

Submittal Requirements:

- Eligibility Checklist for Expedited Permitting Process and Submittal Requirements
- Policy for Multi-Family Electric Vehicle (EV) Charging Station

Permit Fees Table:

Plan Check Fee	$177.33
Inspection fee: First EV Charging Station	$176.30
Each additional EV Charging Station	$58.43
Planning Community Fee	$8.6 (First EV) and $2.85 each addtitional

Plan Check Process:

Electronic Plan Submittal

OR

Express Plan Check (Over the Counter)

Inspection Information:

- Building Inspection Procedure

Permitting Process

- Load Calculations
  - Needed to confirm adequate electrical capacity
  - Calculators/worksheets available

- Checklist
  - Primarily benefits the applicant
  - Also helpful for reviewers
  - Templates available

Materials available from the Governor's Office of Planning and Research at: www.opr.ca.gov/planning/transportation/zev.html

Permitting Process Example

- Document includes:
  - Application checklist
  - Information from utility (PG&E)
  - Load calculation worksheet
  - Inspection checklist

https://www.ci.campbell.ca.us/DocumentCenter/Home/View/7543

City of Campbell
Community Development Services • Building Safety & Inspection
70 N 1st Street • Campbell, California 95008
Phone (408) 866-2130 Fax (408) 866-8381
www.cityofcampbell.com

Residential and Non-Residential Checklist for Permitting Electric Vehicles and Electric Vehicle Service Equipment (EVSE)

Please complete the following information related to permitting and installation of Electric Vehicle Service Equipment (EVSE) as a supplement to the application for a building permit. Provide (3) scaled and dimensioned sets of plans consisting of: 1) Site Plan, 2) Completed EV Supply Equipment Checklist, 3) Completed Residential and Non-Residential Checklist for Permitting EVs and EVSE, 4) Completed Service Load Calculation worksheet, 5) two (2) copies of the manufacturer's specifications.

This checklist contains the technical aspects of EVSE installations and is intended to help expedite permitting and use for electric vehicle charging.

Upon this checklist and the accompanying permit application being deemed complete, a permit shall be issued to the applicant. However, if it is determined that the installation might have a specific adverse impact on public health or safety, additional verification will be required before a permit can be issued, possibly including a Use Permit filed with the Planning Division.

This checklist substantially follows the *"Plug-In Electric Vehicle Infrastructure Permitting Checklist"* contained in the *Governor's Office of Planning and Research "Zero Emission Vehicles in California: Community Readiness Guidebook"* and is purposed to augment the guidebook's checklist.

Job Address:	Permit No.
☐ Single-Family ☐ Multi-Family (Apartment) ☐ Multi-Family (Condominium) ☐ Commercial (Single Business) ☐ Commercial (Multi-Businesses) ☐ Mixed-Use ☐ Public Right-of-Way	
Location and Number of EVSE to be Installed: ☐ Garage _____ ☐ Parking Level(s) _____ ☐ Parking Lot _____ ☐ Street Curb _____	
Description of Work:	

Applicant Name:	
Applicant Phone & email:	
Contractor Name:	License Number & Type:
Contractor Phone & email:	
Owner Name:	
Owner Phone & email:	

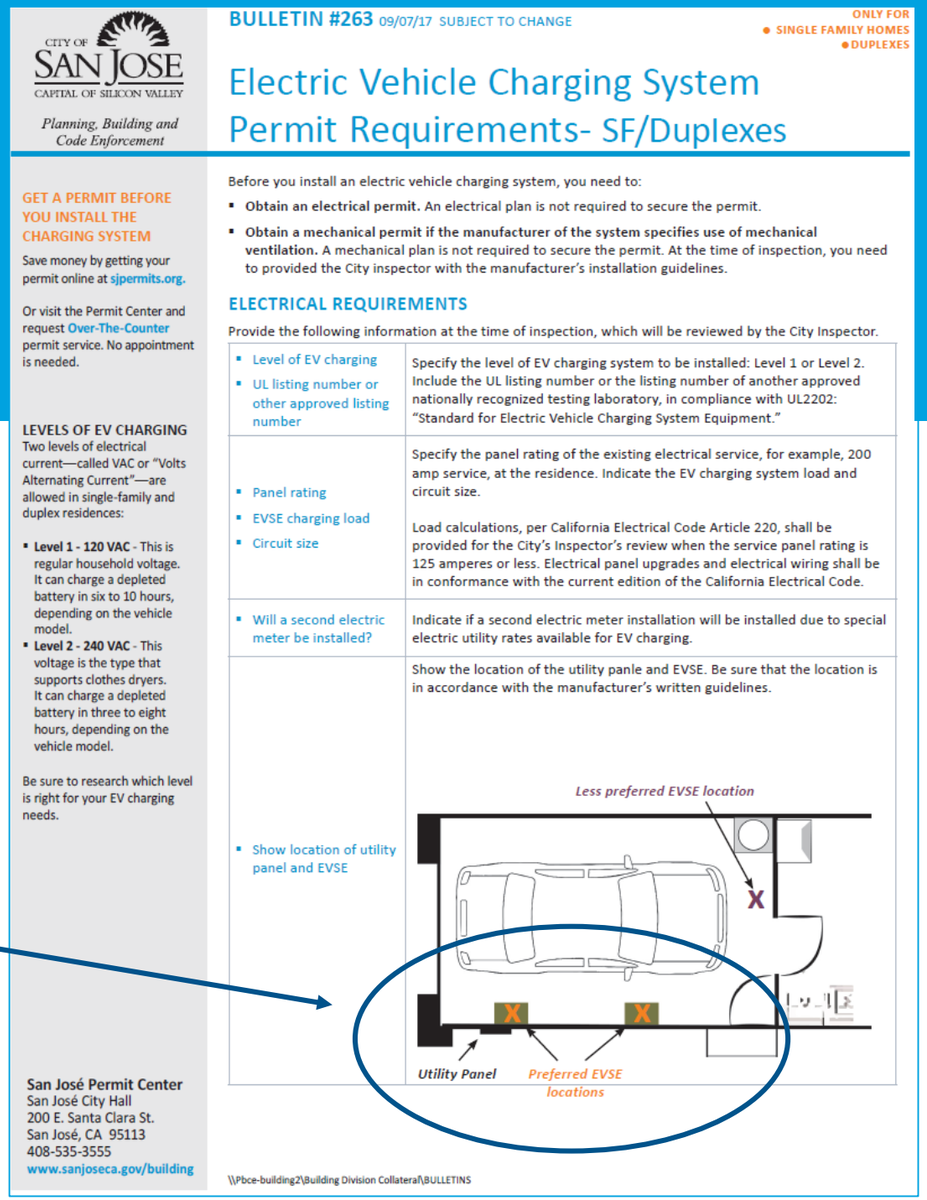
Permitting Process

- Train Staff
  - The basics: EVs and charging infrastructure, municipal processes and requirements
  - More complex installations may require more training
  - Leverage organizations, peer experience for training

- Harmonize Practices
  - In coordination with other jurisdictions

Installation & Inspection

- Installation Guidelines
  - Specify siting and design considerations for different scenarios
  - Point to industry rules of thumb, for example:
    - At least two open spaces on electric service panel
    - Clear wall and floor space
    - Electrical distribution panel nearby
  - Must be installed according to manufacturer specifications



CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY
Planning, Building and Code Enforcement

BULLETIN #263 09/07/17 SUBJECT TO CHANGE

ONLY FOR
- SINGLE FAMILY HOMES
- DUPLEXES

Electric Vehicle Charging System Permit Requirements- SF/Duplexes

GET A PERMIT BEFORE YOU INSTALL THE CHARGING SYSTEM

Save money by getting your permit online at sjpermits.org.

Or visit the Permit Center and request Over-The-Counter permit service. No appointment is needed.

LEVELS OF EV CHARGING

Two levels of electrical current—called VAC or "Volts Alternating Current"—are allowed in single-family and duplex residences:

- **Level 1 - 120 VAC** - This is regular household voltage. It can charge a depleted battery in six to 10 hours, depending on the vehicle model.
- **Level 2 - 240 VAC** - This voltage is the type that supports clothes dryers. It can charge a depleted battery in three to eight hours, depending on the vehicle model.

Be sure to research which level is right for your EV charging needs.

Before you install an electric vehicle charging system, you need to:

- **Obtain an electrical permit.** An electrical plan is not required to secure the permit.
- **Obtain a mechanical permit if the manufacturer of the system specifies use of mechanical ventilation.** A mechanical plan is not required to secure the permit. At the time of inspection, you need to provided the City inspector with the manufacturer's installation guidelines.

ELECTRICAL REQUIREMENTS

Provide the following information at the time of inspection, which will be reviewed by the City Inspector.

Level of EV charging UL listing number or other approved listing number	Specify the level of EV charging system to be installed: Level 1 or Level 2. Include the UL listing number or the listing number of another approved nationally recognized testing laboratory, in compliance with UL2202: "Standard for Electric Vehicle Charging System Equipment."
Panel rating EVSE charging load Circuit size	Specify the panel rating of the existing electrical service, for example, 200 amp service, at the residence. Indicate the EV charging system load and circuit size. Load calculations, per California Electrical Code Article 220, shall be provided for the City's Inspector's review when the service panel rating is 125 amperes or less. Electrical panel upgrades and electrical wiring shall be in conformance with the current edition of the California Electrical Code.
Will a second electric meter be installed?	Indicate if a second electric meter installation will be installed due to special electric utility rates available for EV charging.
Show location of utility panel and EVSE	Show the location of the utility panle and EVSE. Be sure that the location is in accordance with the manufacturer's written guidelines.

Less preferred EVSE location

X

X X

Utility Panel *Preferred EVSE locations*

San José Permit Center
San José City Hall
200 E. Santa Clara St.
San José, CA 95113
408-535-3555
www.sanjoseca.gov/building

\\Pbce-building2\Building Division Collateral\BULLETINS

https://www.sanjoseca.gov/DocumentCenter/View/1825

Installation & Inspection

- Required Inspections
  - Limit to one for single-family residential
  - Allow qualified electricians to self-inspect
    - Continue random inspections to ensure quality

Example: Sunnyvale
"One inspection is required after the new wiring and charger unit is installed. The manufacturer's installation guidelines shall be available for the building inspector at the job site during the inspection."

Utility Notification

EV charging can negatively impact the grid if not properly tracked and managed

- Clustering in certain areas
- Want to avoid transformer overload/failure

Local government and the utility will benefit from collaboration

Local governments can help!

- Incorporate checkbox into application to give permission to share data with the utility
- Provide utility contact information so applicant can follow up
  - Special rate programs may be available

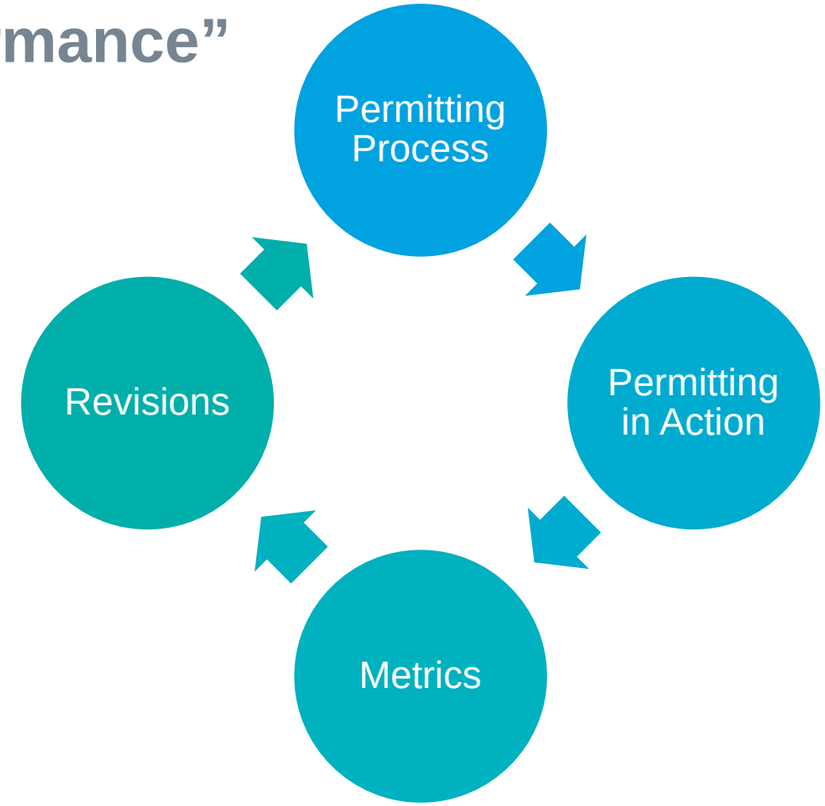
Metrics

Establish a means to track permitting "performance"

- Time required to issue permits
- Average cost of permits

Revisit, revise, improve

- Incorporate metrics into a feedback loop



Summary: Key Recommendations

- **Streamlined, yet safe**
  - Applies to permitting and inspection
- **Accessible**
  - Application and information available online and over-the-counter
  - Reasonable fees
- **Transparent, specific, and predictable**
  - Staff are trained
  - Contractors and staff know exactly what is required
  - Reduce time for residents, developers, and staff
  - Materials specifically address EV charging

Summary: Key Recommendations

- **Harmonized**
  - To the extent possible, in line with other jurisdictions in the area
  - Incorporating state requirements and leveraging available resources

- **Forward-looking**
  - Incorporate utility notification
  - Periodic review and update

Questions?