

Regional Renewable Energy Permitting Symposium

City of San José

2008 PBCE Photovoltaic Case Study



About San José



FOUNDED: November 29, 1777

INCORPORATED: MARCH 27, 1850

INCORPORATED AREA: 178.2 SQUARE MILES

COUNTY: SANTA CLARA

LOCATION: San José is located roughly 50 miles south of San Francisco and 390 miles north of Los Angeles.

POPULATION: 989,500*

San José is the third largest city in California, following Los Angeles and San Diego. It is the 10th largest city in the U.S. (Note: Current population figure comes from the California Department of Finance. Population estimate as of January, 2008.)

ELEVATION

The highest elevation is 4,372 at Copernicus Peak, near Lick Observatory at Mt Hamilton in the Diablo Range; the lowest elevation is sea level.

San José's Green Vision

On October 30, 2007, the San José City Council adopted the Green Vision, a **fifteen-year** plan to transform San José into a world center of Clean Technology innovation, promote cutting-edge sustainable practices, and demonstrate that the goals of economic growth, environmental stewardship and fiscal responsibility are inextricably linked. We hope you will join us as we strive to make the Green Vision a reality and ensure that San José remains a sustainable community for generations to come.

Green Vision Goals:

Within 15 years, the City of San José in tandem with its residents and businesses will:

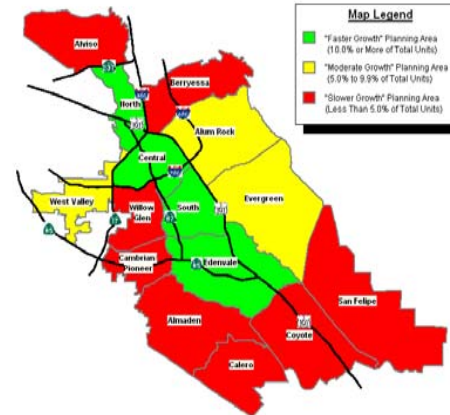
- Create 25,000 Clean Tech jobs as the World Center of Clean Tech Innovation
- Reduce per capita energy use by 50 percent
- Receive 100 percent of our electrical power from clean renewable sources
- Build or retrofit 50 million square feet of green buildings
- Divert 100 percent of the waste from our landfill and convert waste to energy
- Recycle or beneficially reuse 100 percent of our waste water (100 million gallons per day)
- Adopt a General Plan with measurable standards for sustainable development
- Ensure that 100 percent of public fleet vehicles run on alternative fuels
- Plant 100,000 new trees and replace 100 percent of our streetlights with smart, zero emission lighting
- Create 100 miles of interconnected trails

Successfully realizing this vision will require a focused direction for action and a means of regularly measuring progress. By pushing the limits of what is possible, we will all achieve our vision and inspire change globally.

San José has an average of more than 300 sunny days per year

- Housing stock estimated at 307,613 as of January 1, 2008.

Figure 1.
New Housing Units by Planning Area, Since Census 2000



POPULATION AND HOUSING GROWTH ANALYSIS
May 25, 2007

Permitting



- From 2001-2007 there were approximately 500 solar permits issued.
- In 2007 the number of solar permit applications in San José doubled to almost 200 from only 100 in 2006.
- In 2008 the number of permits to date are 230. The majority are for residential installations.
- For most single-family homeowners, a photovoltaic permit can be issued over the counter, usually within one hour.
- Current permit and processing fees for single family photovoltaic systems are \$293.00.

Plan Checking

- Building permits are not required for roof installations that do not exceed any of the following criteria.
 1. Total panel weight (including frame) is greater than 5 lbs. per square foot.
 2. Maximum concentrated load at each point of support exceeds 40 lbs.
 3. Maximum height above roof surface exceeds 18 inches.
- Residential single family review is performed by the field staff when the project does not exceed the above criteria.
- Office Plan Review for photovoltaic systems is required for all multi-family, commercial and industrial installations. The Division recognizes the need to expedite project review services, and has developed several separate review and approval tracks depending upon the scope, complexity, and urgency of construction.
 1. Regular submittals are processed from 5-10 days.
 2. Intermediate submittals are reviewed within 3-5 day.
 3. ITI Special program reviews are offered which allows the customer to often have the project reviewed and approved the same day.

Planning Considerations

Photovoltaic installations must meet planning height and setback restrictions.

Design Guidelines

Planning Site Adjustment Permits are not required for commercial or industrial buildings and residential buildings. Installation of Solar/Photovoltaic panels should strive to incorporate the following design guidelines:

- Solar devices should not block views or be placed where they are visible from the public right-of-way.
- If attached to the building, solar devices should lay flush with the roof line. This will not cause a significant decrease in the device's solar gain capabilities.
- If not attached to the building, collectors should be located in side or rear yards. Exposed hardware, frames and piping should have a matte finish, and be consistent with the color scheme of the primary structure.
- Collectors not attached to the building should be screened by whatever landscaping may be necessary to reduce their visibility. However, screening may diminish the effectiveness of the collectors to receive sunlight.

Field Inspections Reviewed Under the 2007 CEC

- The customer can schedule a next day inspection up to 2:00 p.m. the day prior.
- The customer may request an a.m. or p.m. inspection which the inspector will try to honor.
- The inspector will contact the customer between 7-8:00 a.m. the morning of the inspection and provide a two hour inspection window.
- The field inspector will review the installation information and provide a field inspection. For single family installation the inspection typically takes under one hour.



Field Inspections are reviewed for compliance of the 2007 CEC. The San José checklist covers many of the most common items failed by the inspector.



Solar Photovoltaic System 2007 CEC Residential Inspection Checklist

This is not a comprehensive list of requirements, only a general guide for installation

Reference Information

- San Jose Building Division Requirements for Photovoltaic Systems.
<http://www.sanjoseca.gov/building/PDFHandouts/1-10Solar.pdf>
- 2007 California Electrical Code, 2007 California Building Code, Chapter 15.

Design Guidelines

- Electrical office plan check is required for multi-family, commercial and industrial installations.
- Building permit is required if the total panel weight is greater than 5 lbs. per square foot, or the maximum concentrated load at each point of support exceeds 40 lbs., or the maximum height above the roof exceeds 18 inches.
- Re-roof permit is required if the photovoltaic system is installed in conjunction with roofing material replacement.
- Planning adjustments are not required for commercial, industrial or residential buildings.

Plan Check Office and Field Required Information

- Minimum 8.5"x11" layout of system configuration. Site drawing with locations of PV and UTILITY interconnection point. Location of modules, array, equipment configuration. Balance of System (BOS) shall be indicated. Conduit sizes and routing, location of disconnecting means, and overcurrent devices required.
- Number of series modules, or number of parallel strings clearly indicated and summarized.
- Calculate Voc with correction factor of 1.13.
- Calculate conductor current at 150% of Isc value. Indicate derating for wire fill and apply operating temperature correction factors.
- Systems shall be calculated as continuous duty.
- Indicate attachment points for array mounting. Provide roof penetration detail ensuring roof integrity will be maintained. All penetrations weather tight.

Inspection

- Permit Card Available. Call 535-3555 for inspection.
- For Residential Systems all design layout and installation calculations will be plan checked by the field inspector.
- Manufacturer installation instructions shall be made available to the City of San Jose's Electrical Inspector at time of inspection. (i.e. inverter, modules, rated combiner boxes, and DC disconnect)
- Access to the roof must be provided. Inspectors DO NOT carry ladders. Provisions shall be made to verify the information located on the modules.

Utility Service/AC Power Source

- Supply side connection shall be made using an approved method and shall not void the manufacturer listing of equipment or lugs.
- Supply side taps shall not void UL listing. Provide manufacturer approval if bus is drilled or tapped.
- Supply side connection shall have all service disconnecting means grouped together. Disconnecting means shall have a minimum 60amp rating.
- Load side connection ampere ratings of over current devices shall not exceed the rating of the bus bar or conductor. For a dwelling the sum shall not exceed 120 percent.
- Back-fed breakers shall be sized at 125% of the continuous output current rating of the inverter. The breaker is not required to be clamped to the bus if the front cover secures it in place.
- The disconnecting means for all current carrying conductors shall be able to be reached quickly at a readily accessible location. The use of portable ladders, removing or climbing over obstacles is not acceptable.
- AC panel, inverter and disconnects, shall maintain unobstructed restricted clearances 30" wide, 36" deep from the ground to a height of at least 6'6".
- Materials used outdoors shall be sunlight-UV resistant, NEMA approved and rated for outdoor locations.
- All components shall be protected from physical damage where necessary.
- Signage shall be provided per attached City of San Jose handout.

Inverter

- The required listed disconnect for the DC source at the inverter shall be remote from the inverter unless the installation instructions clearly show the internal components can be removed for servicing without removing the enclosure.
- No disconnecting of the grounded conductor.
- Inverters shall be listed utility interactive (UL1741) and have a label identifying maximum continuous Output Power, and Input DC voltage range.
- Conductors and overcurrent protection sized at 125% of Output Power rating.
- The grounded conductor and termination point shall be clearly identified at the inverter.
- DC wiring from the modules to the utility interactive inverter may be run inside the building in a metallic raceway. MC cable is not a metallic raceway.



Building Division field inspectors and supervisors are equipped with cellular phones. This provides direct communication among staff and customers. Our field inspectors can contact supervisors or access voice mail messages where other telephone facilities are not available.

Training

- Monthly Internal training is provided to all of our inspectors.
- Outside resources like IAEI, UL and the Southwest Technology Development Group are utilized to obtain information and compare interpretations presented to different groups.
- Industry installers have volunteered to bring in new products. This keeps our field staff aware of changing technology that we may see installed in San José.
- Participation in outside organizations, like the ICC Tri-Chapter, allows us to contribute input into standardizing processes throughout the Silicon Valley to maintain consistency across jurisdictional boundaries.

Lessons Learned

- Permit application information is simplified into one document, and most single family permits can conveniently be handled over the counter.
- We have realized that for a single family project requiring office plan check was ineffective. The actual field installation was often different than the initial design; therefore, it is best that the installation be reviewed by the field inspector.
- For larger commercial industrial and commercial installations providing different plan check services allows the customer to decide which time frame is best for them.
- Continuous training of the field staff is required to maintain consistency. New products and issues are continually being considered.
- The more information we can provide to the installers, the easier it is to allow them to address the City's concerns on the first inspection. Providing a photovoltaic checklist on our website allows the installers to ask questions and request clarification before the system is installed.
- Making the supervisors available to the photovoltaic community quickly can clear up inconsistencies of inspectors and installers at the time of inspection.
- Through partnerships with residents, private sector leaders, and civic organizations, the photovoltaic community can make the department aware of their concerns and provide us with learning opportunities.

Recent Improvements in the Building Division

- Reorganized the Building Division to be responsive to customer's needs.
- Created a Building Division one-stop permit center.
- Created several plan check service programs for certain residential, commercial and industrial projects, substantially increasing same-day, over-the-counter project approval.
- Reduced inspection request lead-time from 3 to 4 days to a maximum of 24 hours for 95% of inspection requests.
- Eliminated requirement for office plan checks of most all single family photovoltaic systems.
- Expanded the one-stop permit center concept by consolidating the Fire Department plan check staff and Planning staff in the Building Division.
- Instituted noon-hour (12-1) phone and permit center services.
- Instituted Automated Telephone Call Management System.