



# SOLAR ELECTRIC PERMIT FEES IN NORTHERN CALIFORNIA

## A COMPARATIVE STUDY

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## 1 Executive Summary

Federal and state incentives, such as the California Solar Initiative, take much credit for making photovoltaic (PV) energy systems (solar panels) more affordable to middle-income homeowners. Technological advances have also lowered PV costs over the past few decades. But few realize permit fees at the local level also make a difference.

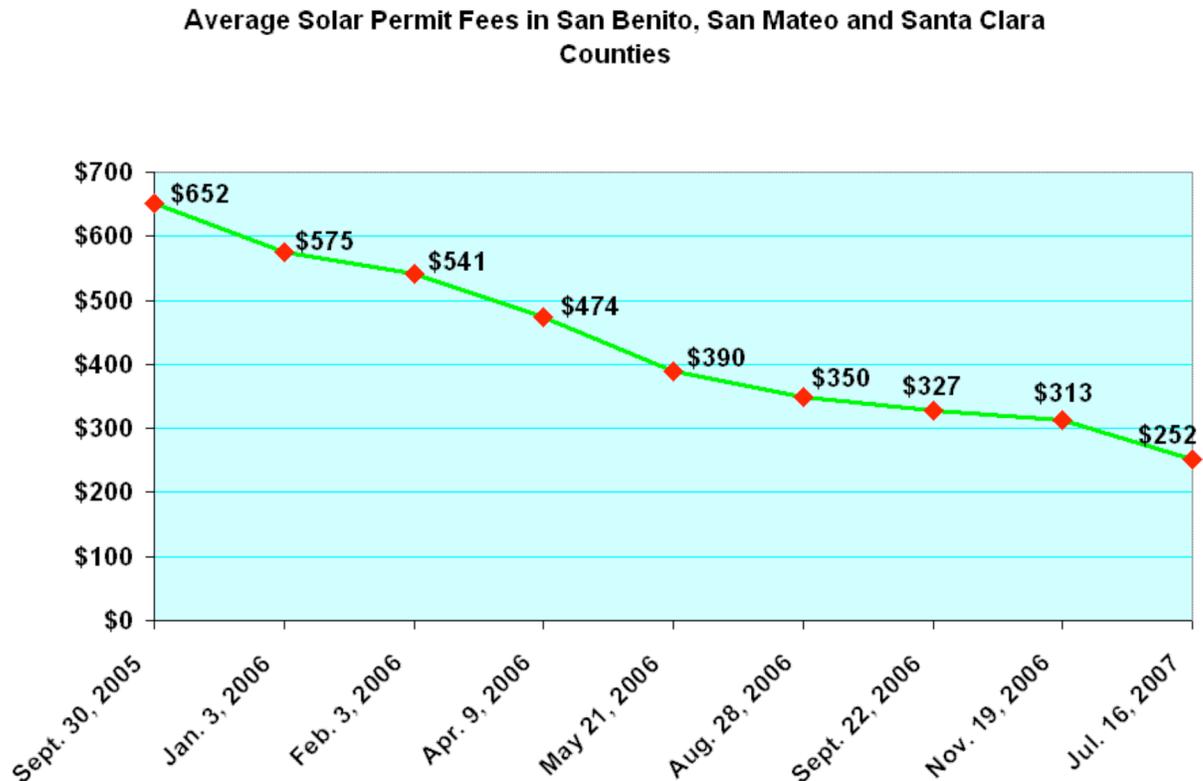
Almost all cities charge PV installers a permit fee. The fee covers services that cities perform to ensure installations meet engineering and safety standards. Solar contractors bill homeowners for this fee as part of the installation cost. Cities whose inspectors are most knowledgeable about PV systems usually cover their permitting expenses with a fee of \$300 or less for standard, average-sized systems.\* Unfortunately, some cities base permit fees on system valuation or are not so familiar with PV, and charge far more.

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\* A "standard, average-sized system" here denotes the PV system described in the **Study Parameters** section of this document.

This study compares the progress of 131 municipalities in Northern California<sup>1</sup> in making PV permit fees affordable. The goal is to persuade local governments with high fees to follow the example that our region's most solar-friendly cities have set.

This study is a follow up to a prior study for the counties of San Benito, San Mateo and Santa Clara. The following chart shows the progress of our campaign to reduce solar permit fees in that region.



## 2 Study Parameters

- **All jurisdictions in these counties were surveyed:**
  - Alameda
  - Contra Costa
  - Marin
  - Napa
  - Sacramento
  - San Francisco
  - San Benito

<sup>1</sup> Currently, this survey does not include *all* municipalities in Northern California, only those listed under the Study Parameters.

- San Mateo
- Santa Clara
- Santa Cruz
- Solano
- Sonoma
- Yolo
- **Customers:** Residential single family homeowners (commercial installations are NOT included)
- **Survey period:** Summer 2007 (Note that the data in this document are continuously updated to reflect changes and corrections to the fees that the jurisdictions originally reported.)
- **PV system design:** Some cities charge higher fees for installations that require more time and resources from the permitting authority. This study assumes the following specifications to equalize the comparisons across jurisdictions:
  - A licensed solar contractor installs the system.
  - The contractor mounts the system flush to the roof using industry-standard mounting techniques.
  - The contractor installs the system on a composite-shingle roof with one layer of roofing and a PV system roof load of 3 pounds per square foot.
  - The system has a valuation, before the California Energy Commission (CEC) rebate<sup>\*</sup>, of \$27,000.
  - The system is 3kW (peak AC rating) in output size and covers 320 square feet.
- **Survey question:** "What is the total cost for a permit to install a 3kW solar electric system on a composite shingle roof of a single story residence in your jurisdiction (assuming the system cost is \$27,000 before the California Energy Commission rebate and \$18,600 after the rebate)?" Note: the system will be professionally installed, 320 square feet in size, and mounted flush to the roof with a weight load of 3 pounds per square foot.

## 3 Findings Summary

### 3.1 Permit Fee Variation

As of December 12, 2008, the permit fees varied from **\$0** to **\$671**, or **0%** to **3.6%** of the total post-rebate cost (\$18,600) of a standard PV installation. Out of 131 jurisdictions, 102 had fees of \$300 or less, 7 had fees of \$500 or more, and **21 charged nothing**. The average fee was **\$214**.

### 3.2 Permit Fee Ceiling

After surveying various city permit processes and costs, we recommend \$300 as a reasonable maximum for solar permit fees. This amount would cover most or all of the services a city

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<sup>\*</sup> The California Energy Commission (CEC) offers cash rebates on grid-connected renewable energy electric-generating systems through its Emerging Renewables Program.

must perform to ensure a PV installation meets engineering and safety standards. (For residential PV systems, experienced building department staff normally take 2–4 hours to process the permit and inspect the system.) The following sections describe the context of our \$300 recommendation.

## 4 Why We Need Solar Energy

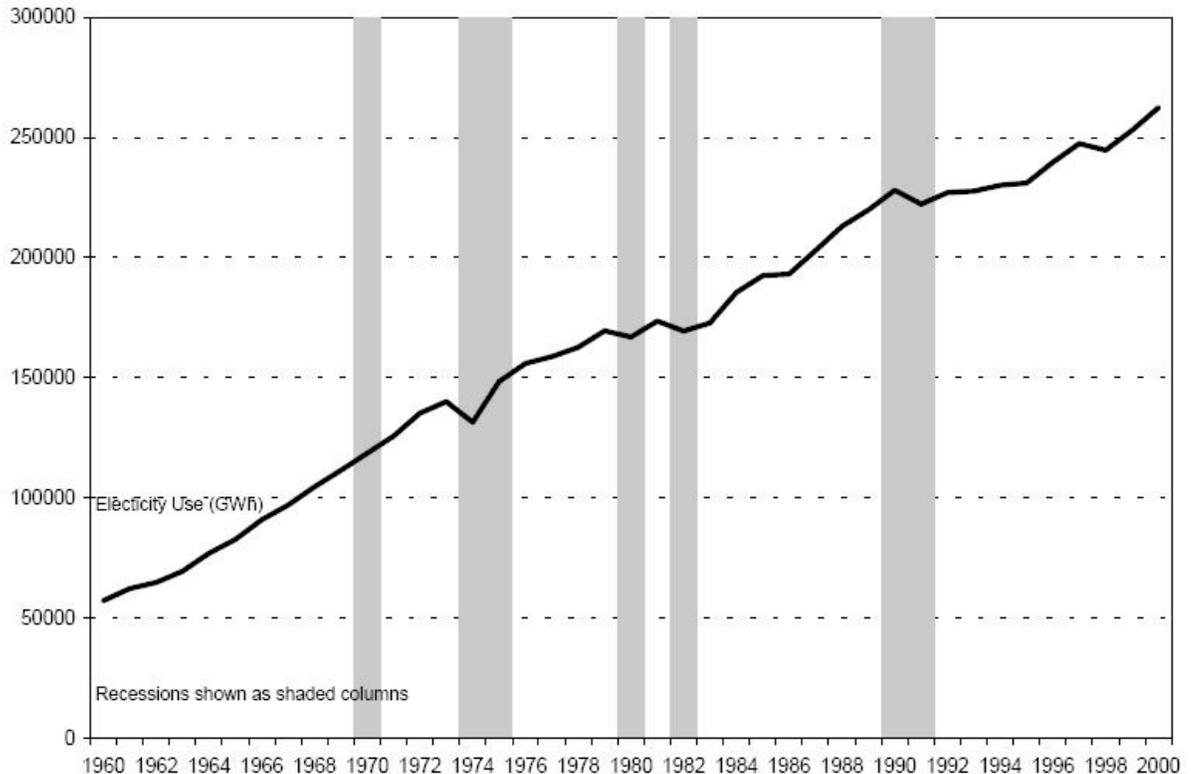
California gets more sunshine hours than any state besides Arizona.<sup>1</sup> Solar irradiance averages over 5.4 peak sun hours per day in much of California. As such, PV systems here have tremendous potential for harnessing this inexhaustible energy source. Conversely, we have much to lose by ignoring solar power, due to our state's soaring demand for energy, rising fossil fuel prices, environmental degradation and dependence on offshore energy imports. The following subsections explain the factors that contribute to these trends.

### 4.1 Economic Growth

The products in which Silicon Valley specializes are energy intense. Internet traffic, computers, and computer-related products have huge electric appetites. As the Bay Area's economy grows, so will its output of such products and their demand for electricity.

The following chart shows the correlation between California's economic growth and electricity consumption over a 40-year period.<sup>2</sup> Obviously, our economy cannot continue evolving unless we increase electricity production commensurably.

**California Electricity Consumption from 1960–2000**

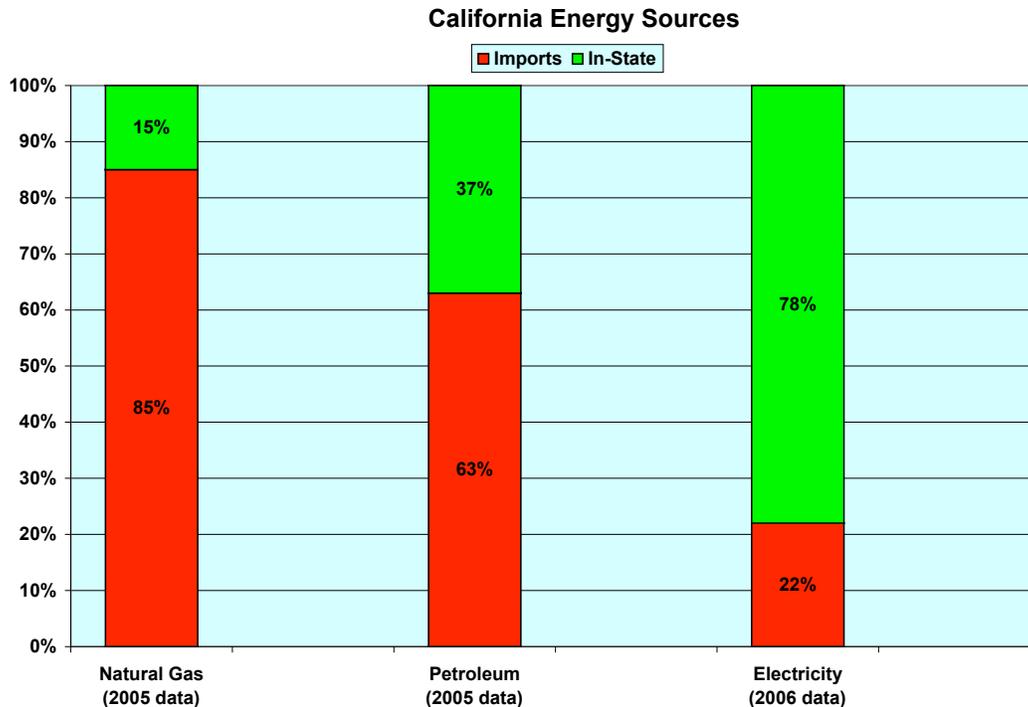


## 4.2 Population Growth

As our population grows, so does energy demand. California's population is expected to grow 51% between 2000 and 2040. The population for our surveyed counties is forecasted to grow 42% between 2000 and 2040.<sup>3</sup>

### 4.3 Reliance on Imports

The following chart illustrates California's dependence on energy imports.<sup>4</sup>

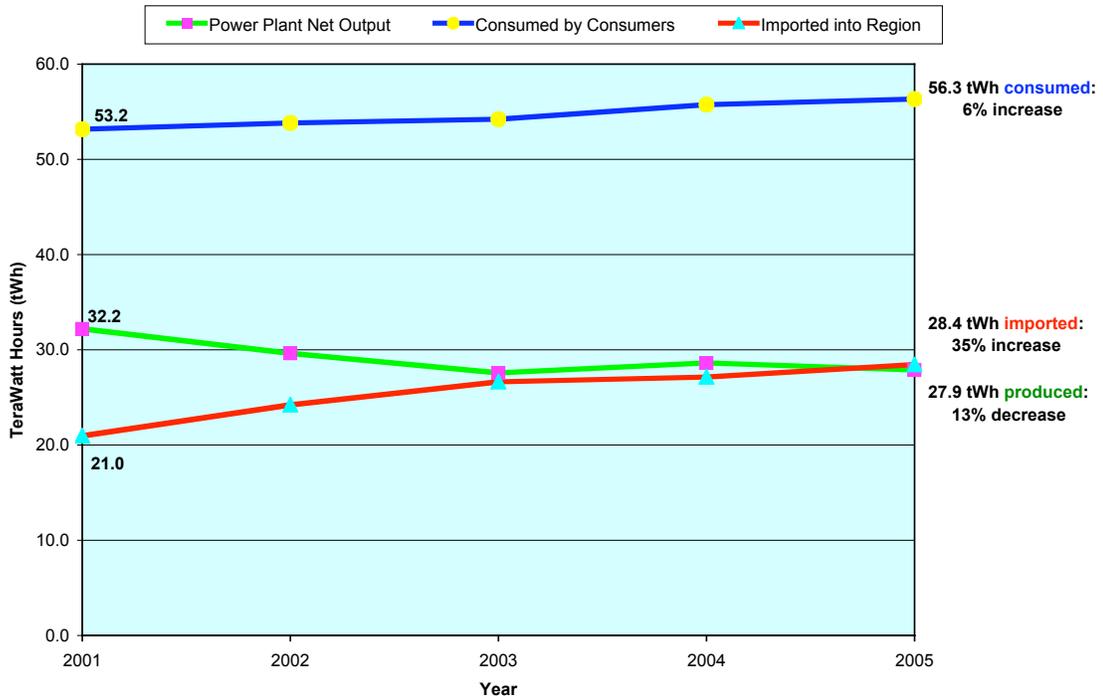


These imports are only as reliable as the states and countries that provide them. Those providers are subject to political, economic, and even climatic conditions that can interrupt our supply unpredictably.

This also applies regionally. A CEC study indicates Silicon Valley produces only about 15 percent of its power, making it California's most energy-deficient area. A Silicon Valley Manufacturing Group study says the area might need more energy than it can import by 2010.<sup>5</sup> The Group estimates that its nearly 200 members lost over \$100 million dollars in just *one day* of rolling blackouts in June 2000.<sup>6</sup> Our transmission system's inability to import enough electric power to the San Francisco Bay Area caused the first rolling blackouts that year.<sup>7</sup>

Locally, electric demand increased 6% from 2001 to 2005. The following chart shows this trend from 2001 (the year of California’s last energy crisis) through 2005.<sup>8</sup>

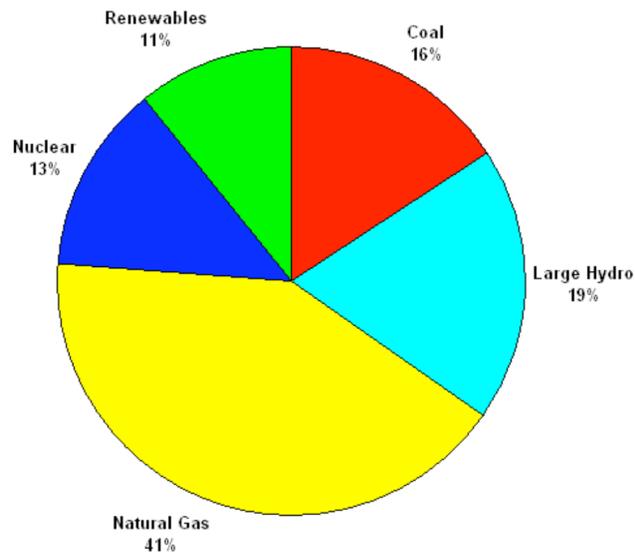
**Electricity Production, Consumption and Imports in the Greater S.F. Bay Area**



## 4.4 Dirty Energy

Of the electric energy that California consumes, only 11% is from renewable sources (solar, geothermal, small hydroelectric, biomass and wind) as of 2006. As the following chart shows, 57% is from fossil fuels (coal and natural gas) as of 2006.<sup>9</sup>

Sources of Electric Energy Consumed in California



(Fortunately, a recently passed state law [SB 107] accelerates California's renewables portfolio standard and requires investor-owned utilities to achieve a 20 percent renewable electricity portfolio by the end of 2010.)

As natural gas supplies dwindle, fossil fuels that create even more greenhouse gas pollution (e.g. coal) could fill the gap. Fossil fuels and nuclear energy have health consequences and risks beyond all economic considerations, both for individuals and our environment. The Intergovernmental Panel on Climate Change, an international body comprising 2,000 of the world's leading climate scientists, has concluded that our global climate is gradually warming. They predict that during our children's lifetimes global warming could raise the planet's average temperature by as much as 11 degrees Fahrenheit. Unchecked, this landscape-altering trend promises a heavy toll on our ecosystems, economies and quality of life.<sup>10</sup> Moreover, energy from non-renewable sources becomes more expensive over time due to finite supply. In contrast, renewable energy technologies tend to become more affordable as supply and economies of scale increase.

## 4.5 The Solar Solution

Solar electricity is a clean, reliable, and renewable solution that can alleviate much of our state's energy problems and its contribution to global warming. Local sunlight and available roof space are plentiful, so only the number of installations can limit PV energy's potential. Moreover, PV virtually eliminates long-distance electric transmission losses (which are around 7%) because the individual home is both the source and destination of the energy. Best of all, once a PV system is installed, it generates energy for free, requires minimal maintenance, and can last 35 years or more. This makes PV a fantastic long-term financial investment for homeowners.

Awareness of solar energy's advantages is growing. A Roper survey<sup>11</sup> of 1,004 adults conducted in May 2006 showed:

- 79 percent of Americans want homebuilders to offer solar power as an option for all new homes.
- 84 percent of Americans ages 25–49 supported solar on new homes; 69 percent of those over 65 years agree.
- After being told that solar homes have a proven higher resale value, 64 percent would be willing to pay more for a home with a solar system.
- 73 percent believe that solar energy technology is more important today than ever.
- 42 percent say that saving money on monthly utility bills is the most compelling argument for installing solar power. Other respondents indicated it was to decrease the nation's dependence on oil (31 percent) or reduce environmental pollution (18 percent).

In response to this popular momentum, some cities are installing PV systems on municipal buildings and reducing or eliminating PV permit fees. Other cities still charge high permit fees that make the PV industry less competitive with polluting energy sources, especially imports. Kate Latham's master thesis of 16 municipalities that have installed PV systems in California<sup>12</sup> describes PV as "a sound economic investment for local communities." California recently passed the Million Solar Roofs Initiative (SB1) that requires home developers to offer PV as an option beginning January 1, 2011. This legislation creates 10 years of incentives with a goal to install the equivalent of 1 million 3kW solar electric systems in California.

The demand for solar energy is growing rapidly (about a 40% a year). This is causing growing pains and temporary shortages of silicon (a key ingredient in solar cells). The result is temporarily increased solar module prices and restricted PV panel deliveries. Over the long term, PV system costs in a competitive environment will decline as increased supply creates price competition for solar products and installation services. The fact that solar electricity is a new technology in a virtually untapped market accelerates this trend: currently, solar power generates only a fraction of one percent of our electricity. Solar power investments and innovations are proliferating to fill this void.

However, no competitive market forces influence permit fees! There is only one local permitting authority for each installation site. Thus, one goal of this study is to help foster a more competitive environment for solar permit fees by publicly ranking local jurisdictions.

## 5 A Typical Case History

Marilyn Thomas of Mill Valley experienced her PV purchase as so many do: as an opportunity and a frustration.

"My first motivation was to save the planet and number two was... my [utility] bill would be less expensive," Thomas said of her reasons for going solar. Seven months after Cooperative Community Energy (CCE) installed her 3.3 kW system, she was more than satisfied with its performance. "I've been paying about \$5 dollars a month [for electricity]."

However, she cited a long wait and high price as the primary hurdles. "Make it easier for people to get solar and... even subsidize it," Thomas advised governments.

Permit fees are one of many cumulative costs for a PV system that make potential customers think twice. Jason Jackson, President of Solaris Solar (a PV installation company), expressed his customers' viewpoint: "I'm already spending all this money on solar, I'm trying to reduce my impact on the planet, I'm trying to help out the city and myself and the environment, and I'm being penalized for it."

Fortunately, Thomas's city has heard and answered such pleas. Starting in 2006, Mill Valley reduced its permit fee for standard PV systems to a flat \$3.29—one of the cheapest PV fees anywhere. And it now issues permits over-the-counter for systems that meet its design guidelines.

"City Council... has an interest in green building and encouraging alternative forms of energy," said Elise Semonian, Associate Planner for the City of Mill Valley. Over-the-counter permitting there means about 15 minutes for the permit application review. The post-installation inspection also takes about 15 minutes. "We hope that it [low fees and quick permitting] is encouraging people to install."

"There's nothing complicated about a solar system," said Tom McCalmont, President of REgrid Power (another PV installer). "Some building departments are unfamiliar with them ... so they're ultra-cautious in their process. Cities like San Jose... do it over the counter; you're in and out."

McCalmont said many cities spend too much time reviewing the plans for PV installations instead of inspecting them properly after installation. "It's very clear from cities like San Jose... that it [processing solar permits] can be done safely, dependably, with an over-the-counter permit... The cities would be better served by sending the inspectors to classes and getting them trained and familiar with solar so that they do the right thing when they come out and look."

Jackson of Solaris Solar said frustration with permit processes is having an impact on the PV industry. "When you are depending on things going quickly and smoothly to make the finances work in a small [solar] company, I think it does hurt a lot of people."

## 6 Why Cities Require Solar Permits

Cities require solar permits to ensure PV installations meet safety and engineering standards. All utilities require a signed-off building permit before officially authorizing a PV system's operation. Entities that issue solar rebate money (e.g. the California Energy Commission and PG&E) require a permit before issuing the rebate. Utilities also require a permit before authorizing connection to the grid.

Installing systems that generate electricity and connecting them to the transmission grid is potentially dangerous. The installations must be safe for homeowners, contractors, grid technicians, and firemen. They must also be safe for the transmission grid itself. Therefore, cities pay staff or outside consultants to inspect PV plans and installations to verify they meet code and safety standards. Poor installations may cause electrocution or fires, and are vulnerable to power surges during blackouts. A safe backflow of power into the grid is important both for the PV owner and for the community that relies on the grid.

Local permitting authorities must verify the homeowner's roof can support a PV system and that the PV system's rack and roof attachments are water tight and meet wind-load requirements. The system must also meet building and electrical code requirements.

## 7 Permit Fees: Comparison by City

### 7.1 Ranking the Cities

The following tables show the permit fee that each surveyed city charges for a PV system that has the specifications described in Section 2 .

*Note 1: These fees do not reflect the business license fee that most municipalities require solar contractors to pay. Business licenses are usually \$30 to \$200 and are good for a year.*

**As of 12/12/2008, the Average Permit Fee in the survey region was \$214.**

The next two tables list the municipalities by fee (highest to lowest) and alphabetically (so you can find your own town). The alphabetical table notes recent and future fee changes.

Ranked by Fee		Listed Alphabetically		
Municipality	Fee	Municipality	Fee	Notes
Vallejo **	\$671	Alameda (City)	\$108	Reduced from \$510
Calistoga	\$585	Alameda County	\$358	Reduced from \$458
Yountville	\$585	Albany	\$183	
East Palo Alto	\$534	American Canyon	\$292	
Hercules	\$533	Antioch	\$243	Reduced from \$745
Windsor	\$509	Atherton	\$250	Reduced from \$970
Cotati	\$500	Belmont	\$0	Reduced from \$1,100
Daly City	\$490	Belvedere	\$155	Increased from \$73
Cloverdale	\$486	Benicia	\$125	
Union City	\$475	Berkeley	\$0	Reduced from \$261
Los Altos	\$474	Brentwood	\$250	
Napa County	\$401	Brisbane	\$250	Reduced from \$816
Watsonville	\$399	Burlingame	\$0	Reduced from \$1,022
Woodland	\$395	Calistoga	\$585	
Los Gatos	\$390	Campbell	\$225	Reduced from \$687
San Ramon	\$387	Capitola	\$130	Increased from \$125
Sonoma County	\$373	Citrus Heights	\$0	Reduced from \$732
Napa (City)	\$364	Clayton	\$230	
Alameda County	\$358	Cloverdale	\$486	

<b>Ranked by Fee</b>		<b>Listed Alphabetically</b>		
<b>Municipality</b>	<b>Fee</b>	<b>Municipality</b>	<b>Fee</b>	<b>Notes</b>
Millbrae*	\$358	Colma	\$80	
San Mateo County**	\$345	Concord	\$288	Reduced from \$600
Sunnyvale	\$339	Contra Costa County	\$195	
Pacifica	\$334	Corte Madera	\$313	Reduced from \$660
West Sacramento	\$330	Cotati	\$500	
Palo Alto	\$327	Cupertino	\$300	Reduced from \$1,002
Corte Madera	\$313	Daly City	\$490	Reduced from \$986
Sonoma (City)	\$309	Danville	\$290	Reduced from \$850
Piedmont	\$307	Davis	\$196	
Oakley	\$303	Dixon	\$149	
Cupertino	\$300	Dublin	\$250	Reduced from \$740
Gilroy	\$300	East Palo Alto	\$534	
Hayward	\$300	El Cerrito	\$0	Reduced from \$840
Larkspur	\$300	Elk Grove	\$0	Reduced from \$336
Pinole	\$300	Emeryville	\$250	Reduced from \$674
South San Francisco	\$300	Fairfax	\$0	Reduced from \$783
San Jose	\$294	Fairfield	\$203	
American Canyon	\$292	Folsom	\$0	Reduced from \$823
Half Moon Bay	\$291	Foster City	\$0	Reduced from \$983
Danville	\$290	Fremont	\$237	Reduced from \$850
Concord	\$288	Galt	\$0	Reduced from \$575
Suisun City	\$282	Gilroy	\$300	Reduced from \$769
Solano County	\$281	Half Moon Bay	\$291	Reduced from \$335
Livermore	\$280	Hayward	\$300	Reduced from \$1,000
Newark	\$267	Healdsburg	\$130	
Milpitas	\$265	Hercules	\$533	Reduced from \$894
Redwood City	\$261	Hillsborough	\$0	Reduced from \$699
Rohnert Park	\$260	Hollister	\$224	
Winters	\$260	Lafayette	\$250	
Santa Clara County	\$253	Larkspur	\$300	Reduced from \$813
Atherton	\$250	Livermore	\$280	
Brentwood	\$250	Los Altos	\$474	Reduced from \$869
Brisbane	\$250	Los Altos Hills	\$0	Reduced from \$340
Dublin	\$250	Los Gatos	\$390	Reduced from \$1,287
Emeryville	\$250	Marin County	\$190	
Lafayette	\$250	Martinez	\$158	Reduced from \$303
Moraga	\$250	Menlo Park	\$0	Reduced from \$411
Orinda	\$250	Mill Valley	\$3	

Ranked by Fee		Listed Alphabetically		
Municipality	Fee	Municipality	Fee	Notes
Pittsburg	\$250	Millbrae*	\$358	Reduced from \$1,180
Scotts Valley	\$250	Milpitas	\$265	Reduced from \$680
Petaluma	\$243	Monte Sereno	\$0	Reduced from \$569
Antioch	\$243	Moraga	\$250	
Santa Cruz County	\$242	Morgan Hill	\$222	Reduced from \$1,188
Fremont	\$237	Mountain View	\$152	Reduced from \$156
San Mateo (City)	\$232	Napa (City)	\$364	Reduced from \$768
Clayton	\$230	Napa County	\$401	Reduced from \$433
Campbell	\$225	Newark	\$267	
Rio Vista	\$225	Novato	\$207	Reduced from \$763
Sausalito	\$225	Oakland	\$199	
Hollister	\$224	Oakley	\$303	Reduced from \$650
Paicines	\$224	Orinda	\$250	
San Benito County	\$224	Pacifica	\$334	Increased from \$332
San Juan Bautista	\$224	Paicines	\$224	
Tres Pinos	\$224	Palo Alto	\$327	Increased from \$110
Morgan Hill	\$222	Petaluma	\$243	Reduced from \$513
Novato	\$207	Piedmont	\$307	Reduced from \$541
Fairfield	\$203	Pinole	\$300	Reduced from \$550
Pleasanton	\$200	Pittsburg	\$250	
Oakland	\$199	Pleasant Hill	\$55	
Davis	\$196	Pleasanton	\$200	
Contra Costa County	\$195	Portola Valley	\$50	
Marin County	\$190	Rancho Cordova	\$0	Reduced from \$493
Albany	\$183	Redwood City	\$261	Reduced from \$385
San Carlos	\$176	Richmond	\$0	Reduced from \$735
Martinez	\$158	Rio Vista	\$225	Reduced from \$783
Belvedere	\$155	Rohnert Park	\$260	
Mountain View	\$152	Ross	\$0	Reduced from \$125
Santa Rosa	\$150	Sacramento (City)	\$0	Reduced from \$774
Dixon	\$149	**		
Santa Cruz	\$136	Sacramento County	\$0	Reduced from \$195
Capitola	\$130	San Anselmo	\$80	
Healdsburg	\$130	San Benito County	\$224	
Benicia	\$125	San Bruno	\$117	Reduced from \$1,200
San Rafael	\$124	San Carlos	\$176	Reduced from \$922
		San Francisco	\$85	

Ranked by Fee		Listed Alphabetically		
Municipality	Fee	Municipality	Fee	Notes
San Leandro	\$122	San Jose	\$294	Increased from \$220
San Bruno	\$117	San Juan Bautista	\$224	
Alameda (City)	\$108	San Leandro	\$122	Reduced from \$430
San Pablo	\$93	San Mateo (City)	\$232	Reduced from \$1,224
Saratoga	\$92	San Mateo County**	\$345	Reduced from \$690
San Francisco	\$85	San Pablo	\$93	
Colma	\$80	San Rafael	\$124	Reduced from \$386
San Anselmo	\$80	San Ramon	\$387	
Sebastopol	\$75	Santa Clara (City)***	\$0	Decreased from \$384
Walnut Creek	\$65	Santa Clara County	\$253	Decreased from \$450
Vacaville	\$56	Santa Cruz	\$136	Increased from \$125
Pleasant Hill	\$55	Santa Cruz County	\$242	
Portola Valley	\$50	Santa Rosa	\$150	
Tiburon	\$35	Saratoga	\$92	Reduced from \$95
Woodside	\$30	Sausalito	\$225	Reduced from \$552
Yolo County	\$6	Scotts Valley	\$250	
Mill Valley	\$3	Sebastopol	\$75	Reduced from \$376
Belmont	\$0	Solano County	\$281	Reduced from \$1,113
Berkeley	\$0	Sonoma (City)	\$309	
Burlingame	\$0	Sonoma County	\$373	Reduced from \$500
Citrus Heights	\$0	South San Francisco	\$300	Reduced from \$825
El Cerrito	\$0	St. Helena	\$0	Reduced from \$700
Elk Grove	\$0	Suisun City	\$282	
Fairfax	\$0	Sunnyvale	\$339	Reduced from \$399
Folsom	\$0	Tiburon	\$35	
Foster City	\$0	Tres Pinos	\$224	
Galt	\$0	Union City	\$475	Reduced from \$1,074
Hillsborough	\$0	Vacaville	\$56	Reduced from \$404
Los Altos Hills	\$0	Vallejo **	\$671	
Menlo Park	\$0	Walnut Creek	\$65	
Monte Sereno	\$0	Watsonville	\$399	Increased from \$304
Rancho Cordova	\$0	West Sacramento	\$330	
Richmond	\$0	Windsor	\$509	
Ross	\$0	Winters	\$260	Reduced from \$1,298
Sacramento (City)	\$0	Woodland	\$395	
Sacramento County	\$0	Woodside	\$30	Reduced from \$728

Ranked by Fee		Listed Alphabetically		
Municipality	Fee	Municipality	Fee	Notes
Santa Clara (City)***	\$0	Yolo County	\$6	
St. Helena	\$0	Yountville	\$585	
<b>Average</b>	<b>\$214</b>	<b>Average</b>	<b>\$214</b>	

## 7.2 "Solar Friendly" Cities

The following traits are typical of cities with permit fees under \$300:

- **Progressive attitude in city council** with regards to promoting renewable energy. For example, Mill Valley reduced its permit fee for the express purpose of encouraging alternative forms of energy. As of February 2005, Palo Alto's renewable-energy program (Palo Alto Green) had 3,199 households committed to using energy from wind and solar sources.<sup>13</sup> Palo Alto has over 131 PV installations.<sup>14</sup>
- **Streamlined permitting process** for PV installations. Municipalities like Novato, San Jose, Saratoga and Walnut Creek issue solar permits over-the-counter without delays.
- **Staff trained to inspect PV systems.** Cities like San Jose send inspectors to solar workshops to familiarize them with solar technology. These workshops typically take just half a day to one full day. During inspections, San Jose inspectors also use a standardized checklist tailored for PV systems. Consequently, the inspections usually take under one hour (including travel time). This saves time and money for the city, solar contractors, and ultimately solar customers.

## 8 Permit Fee Assessment Differences

A city's fee assessment method, its required safety/engineering reviews, and the training of its inspectors have a critical impact on solar permit fees and processing times.

### 8.1 Fee Assessment Method

Cities typically compute solar permit fees using a flat-fee method, a valuation-based method, or a combination of these methods. The flat-fee method applies the same fee regardless of system cost. The valuation method usually bases fees on the pre-rebate cost of a PV system: the more solar panels one purchases, the higher the fee. A consequence of the valuation method is that the more a homeowner contributes to a city's renewable energy supply, the more that homeowner must sacrifice financially.

Compared to other home improvement projects, material costs for PV systems are high relative to installation costs. However, those material costs have little bearing on the resources a city must devote to review PV systems of different sizes.

Joseph Doody, former Chief Electrical Inspector for the City of San Jose, said of residential PV systems: "The components are pretty basic there. And no matter how many of the PV arrays they put on a roof, the inspection is pretty much the same." Chester Nakahara, an inspector for the City of Piedmont, agreed that large residential systems typically do not take longer to review or inspect than small ones.

California law compels cities to exempt PV systems when assessing a home's value for property taxes for homeowners who retrofit solar power on their current home.<sup>15</sup> This makes PV more affordable as a home improvement project. Perhaps cities can apply the same rationale in computing solar permit fees. Traditionally, many building departments base permit fees for any project on its valuation. However, for the aforementioned reasons, this approach isn't fair and, as of January 1, 2005, might be illegal when applied to PV systems.

The state government has already passed legislation with the intent to limit permit fees for solar. California Government Code section 66005(a), states: “[development permit] *fees or exactions shall not exceed the estimated reasonable cost of providing the service...*” On December 22, 2005 the California State Supreme Court upheld this statute by ruling that building permit fees must be based on the “*estimated reasonable costs of providing the services for which the fees are charged*” (Barratt v. C. of Rancho Cucamonga, Ct.App. 4/2 E032578). (For legal citations on the recently enacted Solar Rights Act state legislation in California, see the information at the end of this report: “California solar access laws as of 2005”.<sup>16</sup>)

We recommend that all cities adopt the flat-fee method for assessing solar permit fees. This would reduce the average permit fee for all PV systems but would still cover the cities' review and inspection costs. It would also encourage homeowners to install larger systems that contribute more to their communities' clean, sustainable energy supply.

## 8.2 Safety and Engineering Reviews

Each city has its own set of engineering and safety reviews for solar permits. The expensive services tend to be pre-installation reviews of the PV system plan and installation site. Arguably, some such services are unnecessary. For example, the flush-mounted PV systems that most homeowners install have a low-enough weight/area ratio that they cannot overload standard roofs. "They're designed so that most roofs will hold them," said Dan Martin, a Building Department official at Mill Valley. Thus, extensive reviews of such PV systems for load-bearing criteria might be unnecessary. Cities with the most experience in processing solar permits tend to put less emphasis on such reviews and more emphasis on the post-installation inspection.

San Jose foregoes planning reviews for single family and duplex residences. It also foregoes building permits for flush-mounted rooftop installations that do not exceed standard load bearing and wind shear limits. These criteria are significant because they apply to most PV systems that homeowners install. In other words, San Jose has streamlined its permit process for middle-income buyers. San Jose has also simplified its process for solar contractors by providing samples of the information and diagrams it requires for solar permit applications.

Perhaps the biggest improvement municipalities can make to the review process is to standardize it. Gary Gerber, President of the solar contracting firm Sunlight and Power, said, "A good process would involve some sort of guidelines... preferably something that is done on a state-wide basis." It would also help if all municipalities used the same National Electric Code (NEC), instead of using versions published in different years.

The guidelines that Brooks Engineering developed might be a good starting point for standardizing PV permit requirements:

[http://www.irecusa.org/fileadmin/user\\_upload/NationalOutreachPubs/InspectorGuidelines-Version2.1.pdf](http://www.irecusa.org/fileadmin/user_upload/NationalOutreachPubs/InspectorGuidelines-Version2.1.pdf)

Some commonly used review criteria are now illegal. The California Solar Rights Act was updated in 2005 to prohibit permitting authorities from restricting PV systems based on aesthetic considerations (i.e. the “look” of the system). California Government Code, Section 65850.5(a) states: “*It is the intent of the Legislature that local agencies not adopt ordinances that create unreasonable barriers to the installation of solar energy systems, including, but not limited to, design review for aesthetic purposes...*” For details on this issue, see the end of this study for the letter of intent about solar permit fees authored by Assembly Member Lois Wolk that was emailed to all California Cities on June 7, 2006.

It follows that cities now have less need for exhaustive plan checks as this applies to visual impacts. A less *exhaustive* plan check should be less *expensive*. Therefore, we recommend that cities requiring plan checks revise their permit fees downward to account for the law.

In sum, a streamlined permit process is also a cheaper process for cities and for solar customers. We recommend that all cities consider how to streamline their solar permit processes to reduce costs. For cities with less experience in processing solar permits, this might entail sending relevant staff to a half- or one-day solar workshop. These workshops would clarify what is and isn't necessary to evaluate PV systems.

### 8.3 Inspector Training

Inspectors who review PV systems on-site after installation usually charge cities by the hour for their services. Cities pass on those charges to the solar installer, and ultimately to the customer. Therefore, a fast inspector is a cheap inspector. To be fast *and* thorough, an inspector must be knowledgeable about PV systems. An inspector's expertise is a critical factor controlling both the permit cost and safety of a solar installation. The expertise of the solar installer is probably a more important factor in determining the cost, speed, and quality of a PV system installation, however this is beyond the scope of this study.

Solaris Solar president Jason Jackson said, “Most of the permit offices are seeing enough [PV applications] that their education level as to what they're asking for has increased.” Nevertheless, he added, “Every day we run into inspectors who have no idea what they're looking at.” By contrast, Jackson praised Berkeley's inspectors as particularly sharp. “They know exactly what they're looking at.”

Various organizations sponsor workshops for solar inspectors, including solar contractors/manufacturers, building departments, and the International Association of Electrical Inspectors (IAEI) (see Section 11.3 for more information).

### 8.4 Permit Process Delays

Customers expect prompt installation when they purchase PV systems. Many people buy them in spring and summer in hopes of activating the systems in time for the year's peak sunshine hours. PV systems activated during these seasons generate proportionately more electricity during peak electric demand times. When the electric meter spins backwards on summer afternoons, money is credited to the PV owner's bill at over three times the rate of

night-time usage in PG&E service territory.\* Thus, customers have a financial incentive to capture peak summer sunlight. Removing bureaucratic hurdles would encourage timely PV installations that coincide with peak summer electric demand periods, and thereby increase customers' satisfaction with the installation process.

Many cities understand this financial impact of permit process delays. Mill Valley, Novato, and San Jose all issue solar permits over-the-counter without delays. Unfortunately, some cities require such lengthy review times that a customer who buys PV in the summer can miss that season entirely before the system is permitted, installed, and activated.

Worse, a really complicated permitting process can make some solar projects impossible. Solaris Solar president Jason Jackson said of one installation that the City of San Ramon "didn't want to see this happen at all and just put so many ridiculous restrictions in the way in hopes that we would just give up."

Often high permit fees and slow permitting processes go hand-in-hand. Sunlight and Power president Gary Gerber said, "We've had a few disgruntled customers for whom the permit process was a problem. Mostly it's the people who end up paying a very high permit fee."

## 8.5 Permit Fee Ceiling

After studying and comparing solar permit processes in different cities, we have determined that ordinary rooftop PV installations need the following reviews to ensure they meet safety and engineering standards:

- **Solar application processing**—Permit department staff who have received basic instruction in solar technology can usually review a standard, residential PV system application in minutes to ensure the plan complies with standard requirements. Cities like Saratoga have over-the-counter permit options for such PV systems.
- **Post-installation system inspection**—A trained inspector in Mill Valley can usually inspect a standard, residential PV system in 30 minutes or less.

After reviewing what the cities with the most experience in processing solar permits spend on these services, we recommend \$300 as a reasonable ceiling for permit fees.

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\* PG&E's Net Energy Metering Program lets owners of PV systems connect to PG&E's grid and earn credit for extra power generated during the day.

## 9 Recommendations

We recommend that all cities reduce their solar permit fees to \$300 or less for residential PV systems that are flush-mounted to rooftops. The cities with the most PV experience and streamlined processes take 2–4 hours to permit and inspect such systems. We recommend the following measures for cities that currently charge over \$300:

- **Use the flat-fee method instead of the valuation-based method to assess permit fees.** It takes about the same amount of time to permit a small or large residential PV system. Thus, the flat-fee method enables the city to recover its costs and be fair to the solar customer too.
- **Streamline the permit process to reduce costs and delays.** For flush-mounted residential systems of 15kW or less, we recommend a permit issuance process that is over-the-counter, particularly for PV systems that meet the following criteria:
  - 1) The weight of the solar panels and mounting hardware is under four pounds per square foot.
  - 2) The weight of the solar array at each attachment point is under 40 pounds
  - 3) The solar panels are no more than 18 inches off the surface of the roof
  - 4) The residence was built after the 1940s with adequate rafters or trusses.

Or

The residence was built to meet modern building codes designed to hold the extra weight of a few pounds per square foot (similar to the weight of an extra layer of composite asphalt roofing).

- **Revise permit fees downward to account for the California Solar Rights Act**, which requires minimal permit fees for solar energy systems and makes prohibitions based on aesthetic concerns illegal. This applies to cities that currently require plan checks with aesthetic criteria. See the end of this study for the letter of intent from Assembly Member Lois Wolk that was sent to all California cities and counties on June 7, 2006.

We recommend the following measures for all cities regardless of their current permit fees and processes.

- **Standardize permit requirements.** We recommend that municipalities create a standard permit process with clear requirements such as:
  - Plan submittals that include the manufacturers' specification cut-sheets for major system components (i.e. solar modules, inverters and racking).
  - No more than two drawings:
    - (1) A schematic of the electrical system showing its size and the conduit types and sizes
    - (2) A roof drawing showing the location of the solar modules relative to the entire roof surface, and specifying the attachment points, rafter size and spacing. It should also mention the quantities and model numbers of the solar modules and inverter(s).

Flush-mounted PV systems should not require professional engineering stamps unless:

- The site is in an excessive wind zone: wind zone category D, with basic wind speeds of 80 miles per hour or greater, as defined by the California Building Code.

Or

- The site has unique structural issues that must be addressed.
- **Reduce the window for inspection appointments.** Solar contractors lose expensive man-hours waiting for inspectors to arrive. Most cities schedule inspection windows of half a day. We recommend that the appointment window be no more than two hours. When feasible, cities should offer specific appointment times, such as the first inspection of the day or the first inspection after lunch. Another option is for the city to call the solar contractor with an estimated appointment time as the appointment window time gets close. We also recommend that cities grant an appointment within 24 hours after the solar installer gives notice that the installation is ready for inspection.

*Note:* Half- to one-day solar workshops for relevant staff can make a critical difference in process expenses. Various organizations sponsor these workshops, including solar contractors/manufacturers, building departments, and the International Association of Electrical Inspectors (IAEI) (see Section 11.3 for more information).

- **Show permit fees and requirements on the city website** to facilitate the application process for solar contractors and for customers who install their own systems.
- **Consider fast-tracking applications for solar contractors who have reliable track records** for PV installations.

Implementing these changes for a trial period could help resolve any uncertainties about the long-term impact. For example, as part of a three-year pilot program, Sacramento County and the city of Elk Grove recently voted to "waive permit fees, use standardized application packets, review building applications in one day, and conduct post-installation inspections within 24 hours."<sup>17</sup>

## 10 Conclusion

Currently, Northern California has a massive and growing need for clean, renewable, locally produced energy. Solar electricity is an obvious and fast-growing solution. Federal and state governments recognize this and have passed legislation to encourage the trend. Cities can contribute too, and several have. After we published our first study on PV permit fees (for Silicon Valley), over a dozen of the 42 surveyed towns found ways to reduce their fees. Over an 11-month period, the average fee in the survey area fell 50 percent from \$652 to \$327!

PV permit fees and processing delays can make a critical difference to some buyers. Much of the costs and delays involved in processing permits reflect misunderstandings about PV systems rather than the realities of installing and inspecting them. Cities can reduce costs and delays for themselves, solar contractors and PV customers by streamlining processes, using a flat-fee permit valuation method, training permit department staff, and standardizing permit requirements.

A permit fee of \$300 is a reasonable amount to cover the reviews and inspections a city performs to ensure a standard, flush-mounted, residential PV system meets safety and engineering standards. Reducing fees to this level or lower would persuade more buyers to invest in solar electric technologies. We ask that all cities consider the recommendations in this study to

encourage an energy trend that contributes so much to the health and energy security of our communities and the global environment.

## 11 References

### 11.1 Contacts

Feel free to contact the creators of this study for more information:

- Kurt Newick: study team leader, Email: [KurtNewick@yahoo.com](mailto:KurtNewick@yahoo.com), Phone: 408-370-9636
- Carl Mills: study author, Email: [carlmills@yahoo.com](mailto:carlmills@yahoo.com), Phone: 510-475-1864
- Kent Halliburton: surveyed cities, Email: [khalliburton@recsolar.com](mailto:khalliburton@recsolar.com), Phone: (510) 846-6855
- Tom Roberts: conducted personal interviews used in the study, Email: [tom.c.roberts@gmail.com](mailto:tom.c.roberts@gmail.com), Phone: 415-203-2781
- Arlen Comfort: surveyed cities, Email: [acomfort@rocketmail.com](mailto:acomfort@rocketmail.com), Phone: 650-323-7188
- Tom Dickerman: surveyed cities, Email: [dickermn@earthlink.net](mailto:dickermn@earthlink.net), Phone: 650-992-3963
- Richard Hughes: surveyed cities, Email: [rlhughes@kmabyoyo.com](mailto:rlhughes@kmabyoyo.com), Phone: 510-396-1207
- Margaret Pennington: permit fee campaign volunteer, Email: [penningt@sonic.net](mailto:penningt@sonic.net), Home phone: 707-829-2294, Cell phone: 707-479-6682
- Jay Halcomb: permit fee campaign volunteer, Email: [halcomb@sonic.net](mailto:halcomb@sonic.net), Phone: 707-869-3302

### 11.2 Download or View the Study Online

You can view this study as a webpage at:

[http://lomaprieta.sierraclub.org/global\\_warming/pv\\_permit\\_study.htm](http://lomaprieta.sierraclub.org/global_warming/pv_permit_study.htm)

You can download this study as a PDF from:

[http://lomaprieta.sierraclub.org/global\\_warming/pv\\_permit\\_study.pdf](http://lomaprieta.sierraclub.org/global_warming/pv_permit_study.pdf)

You can find more information about the campaign to reduce permit fees in the Greater San Francisco Bay Area at:

[http://lomaprieta.sierraclub.org/global\\_warming/fee\\_study.htm](http://lomaprieta.sierraclub.org/global_warming/fee_study.htm)

### 11.3 How We Conducted the Survey

We describe our methodology for this study and tips on how to perform a similar one at:

[PV\\_Permit\\_Campaign\\_Methodology.htm](#)

### 11.4 More Information About...

- **Workshops for reviewing and inspecting PV systems**
  - International Association of Electrical Inspectors (IAEI), Northern California Chapter  
<http://www.iaei.org/>  
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 Livermore, CA 94551  
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- Southwest Technology Development Institute (STDI), New Mexico State University  
<http://www.NMSU.Edu/~tdi>  
 John C. Wiles, Program Manager  
 3705 Research Drive  
 Box 30001/MSC 3 SOLAR  
 Las Cruces, NM 88003-8001  
 Phone 505-646-6105  
 Fax 505-646-3841
- **Guidelines for reviewing and inspecting PV systems:**  
[http://www.irecusa.org/fileadmin/user\\_upload/NationalOutreachPubs/InspectorGuidelines-Version2.1.pdf](http://www.irecusa.org/fileadmin/user_upload/NationalOutreachPubs/InspectorGuidelines-Version2.1.pdf)
- **How the National Electric Code (NEC) applies to reviewing and inspecting PV systems**
  - "PV Power Systems and the National Electrical Code: Suggested Practices"  
<http://www.nmsu.edu/%7Etdi/Photovoltaics/Codes-Stds/PVnecSugPract.html>
  - "Permitting or Inspecting a PV System?"  
<http://www.nmsu.edu/~tdi/pdf-resources/IAEI-5to6-05.pdf>
  - "Photovoltaic Power Systems: What Inspectors Should Know"  
<http://www.nmsu.edu/~tdi/pdf-resources/IAEI-3to4-04.pdf>
- **A checklist for PV installations**, based on the general requirements found in the 2005 National Electric Code (NEC), Article 690:  
[http://www.solarsebastopol.com/PDFs/INSPECTOR\\_CHECKLIST\\_5-05\\_\\_1.pdf](http://www.solarsebastopol.com/PDFs/INSPECTOR_CHECKLIST_5-05__1.pdf)
- **Sacramento Municipal Utility District's News Release for Solar Permit Process:**  
[http://www.smud.org/news/releases/07archive/02\\_14Solarpartnerships.pdf](http://www.smud.org/news/releases/07archive/02_14Solarpartnerships.pdf)
- **PV system design and installation**  
[http://www.energy.ca.gov/reports/2001-09-04\\_500-01-020.PDF](http://www.energy.ca.gov/reports/2001-09-04_500-01-020.PDF) (California Energy Commission: A Guide to PV System Design and Installation)
- **Solar technology, organizations, resource links, news, etc.**  
<http://www.norcal solar.org> (website of the Northern California Solar Energy Association)
- **California solar access laws as of 2005**  
<http://www.gosolarnow.com/images/pdf%20files/CASolarAccessLaws.pdf>
- **California's Solar Initiative Program for 2007:**  
<http://www.gosolarcalifornia.com/>
- **Electric power data for California**  
<http://www.energy.ca.gov> (California Energy Commission; contact: Andrea Gough (email: [agough@energy.state.ca.us](mailto:agough@energy.state.ca.us); phone: 916-654-4928)

- **Assembly member Lois Wolk's letter of intent regarding solar permit fees and design reviews**, sent to all California cities on June 7, 2006, can be downloaded at: [http://www.noricalsolar.org/downloads/city\\_resources/WolkPVFeeLetter.pdf](http://www.noricalsolar.org/downloads/city_resources/WolkPVFeeLetter.pdf)

## 11.5 Revision History

- Initial publication: 9/17/2006
- Updated permit fee data: 9/24/2006
- Updated permit fee data: 11/19/2006
- Updated permit fee data: 07/16/2007
- Updated permit fee data: 03/31/2008
- Updated permit fee data: 12/12/2008

## 11.6 Endnotes

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<sup>1</sup> USA Today ([http://www.usatoday.com/weather/news/2004-06-21-fla-sunshine\\_x.htm](http://www.usatoday.com/weather/news/2004-06-21-fla-sunshine_x.htm)) referring to National Weather Service data

<sup>2</sup> CEC 2002 - 2012 Electricity Outlook Report ([http://www.energy.ca.gov/reports/2002-02-14\\_700-01-004F.PDF](http://www.energy.ca.gov/reports/2002-02-14_700-01-004F.PDF))

<sup>3</sup> California Department of Finance ([http://www.dof.ca.gov/html/DEMOGRAP/ReportsPapers/Projections/P1/documents/P-1\\_Tables.xls](http://www.dof.ca.gov/html/DEMOGRAP/ReportsPapers/Projections/P1/documents/P-1_Tables.xls))

<sup>4</sup> California Energy Commission (CEC), 2005 and 2006 data (<http://www.energy.ca.gov/html/energysources.html>)

<sup>5</sup> Silicon Valley Manufacturing Group (<http://www.bizjournals.com/sanjose/stories/2004/06/14/story6.html?page=1>)

<sup>6</sup> White House National Energy Policy website (<http://www.whitehouse.gov/energy/Chapter2.pdf>)

<sup>7</sup> Silicon Valley Power ([http://www.cmua.org/5\\_05news\\_svp.pdf](http://www.cmua.org/5_05news_svp.pdf))

<sup>8</sup> California Energy Commission (CEC) CEC-1304 and CEC-1306 database (<http://www.energy.ca.gov/>)

<sup>9</sup> California Energy Commission (CEC), 2005 data ([http://energy.ca.gov/electricity/gross\\_system\\_power.html](http://energy.ca.gov/electricity/gross_system_power.html))

<sup>10</sup> For more information on global warming, visit the website of the Intergovernmental Panel on Climate Change at <http://www.ipcc.ch>. Alternatively, read an overview of the science behind Vice President Al Gore's documentary, "An Inconvenient Truth," at <http://www.climatecrisis.net/thescience/>.

<sup>11</sup> Realty Times ([http://realtytimes.com/rtcpages/20060622\\_solaremergency.htm](http://realtytimes.com/rtcpages/20060622_solaremergency.htm))

<sup>12</sup> Master Thesis on Solar Electric Systems Installed in 16 California Municipalities, by Kate Latham, 2004 ([http://lomapieta.sierraclub.org/global\\_warming/PVMuniThesis2.pdf](http://lomapieta.sierraclub.org/global_warming/PVMuniThesis2.pdf))

<sup>13</sup> City of Palo Alto Website, "State of the City," February 28, 2005 (<http://www.cityofpaloalto.org/clerk/stateofcity/stateofcity2005.pdf>)

<sup>14</sup> See a data analysis of the number of PV installations in California cities at: (<http://www.noricalsolar.org/local-activism/bay-area-solar-installs-2007-6.html>)

<sup>15</sup> California Revenue and Taxation code, section 73

<sup>16</sup> California solar access laws as of 2005 (<http://www.gosolarnow.com/images/pdf%20files/CASolarAccessLaws.pdf>)

<sup>17</sup> Sacramento Municipal Utility District solar permit partnership program with local governments in 2007:

[http://www.smud.org/news/releases/07archive/02\\_14Solarpartnerships.pdf](http://www.smud.org/news/releases/07archive/02_14Solarpartnerships.pdf)