



CITY OF
HAYWARD
HEART OF THE BAY

CITY COUNCIL SUSTAINABILITY COMMITTEE MEETING

Hayward City Hall – Conference Room 2A
777 B Street, Hayward, CA 94541-5007

Wednesday, November 28, 2007
4:00 p.m. - 5:30 p.m.

A G E N D A

- I. Call to Order
- II. Roll Call
- III. **Public Comments:** *(Note: For matters not otherwise listed on the agenda. The Committee welcomes public comments under this section, but is prohibited by State Law from discussing items not listed on the agenda. Items brought up under this section will be taken under consideration and referred to staff for follow-up as appropriate. Speakers will be limited to 5 minutes each; organizations represented by more than one speaker are limited to 5 minutes per organization. All public comments are limited to this time period on the Agenda.)*
- IV. **Solar Panels/Photovoltaic Cells Information**
 - a. Presentation by City of Berkeley representative
 - b. Survey of other cities' efforts in solar implementation
 - c. Possible funding sources and strategies
- V. Committee Schedule
- VI. Adoption of Sustainability Committee Mission Statement and Goals
- VII. Next Meeting: January 18 - Overview of Green Building Standards for New Construction and How They're Measured

Adjournment



Assistance will be provided to those requiring accommodations for disabilities in compliance with the Americans with Disabilities Act of 1990. Please request the accommodation at least 48 hours in advance of the meeting by contacting Katy Ramirez at 510/583-4234 or by calling the TDD line for those with speech and hearing disabilities at 510/247-3340.



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DATE: November 28, 2007

TO: Mayor and City Council Sustainability Committee

FROM: Director of Community and Economic Development Department

SUBJECT: **Solar Photovoltaic Panel Programs and Funding Information**

RECOMMENDATION:

Review the information presented in this report and from City of Berkeley representative, and direct staff to prepare a report to the City Council with recommendations for implementation of solar power policies discussed in the meeting.

SUMMARY

This report examines Bay Area cities' efforts in solar energy program implementation. The installation of solar photovoltaic panels is a voluntary program in all cities addressed within this report. Also examined in this report are possible funding sources and strategies for Hayward residential property owners and businesses.

BACKGROUND

On October 24, 2007, the first meeting of the City Council Sustainability Committee was held. Discussion included direction to staff to present recommendations regarding green building standards for new construction. Staff plans to present an overview of measures, including those for residential and non-residential new construction, at the next meeting in January. One component of green building relates to solar photovoltaic panels, which promotes use of a renewable energy source. Given interest expressed by Committee members regarding solar panels, this report will provide an overview of solar programs, a summary of programs in other Bay area cities and will identify funding sources and strategies for implementation of a solar panel program.

DISCUSSION

Staff encourages the use of improvements and design that utilize renewable energy resources, such as solar photovoltaic (PV) panels. However, as has been suggested by professionals in green building organizations and staff of municipalities that have solar programs, staff recommends that prior to implementing a solar panel program, energy efficiency standards be adopted. Solar PV panels are not efficient or cost effective without the implementation of energy conservation and

efficiency measures, which would minimize energy loss by reducing air leakage. The "holes" within a home or structure need to be filled. Examples of holes are frames around doors and windows, roof, roof fans, framing, ducts, electrical and plumbing openings and penetrations, plumbing openings, vents, HVAC closet, fire places and attic hatches. "Sealing holes" or sealing seams and penetrations leading from the living space to the attic or exterior of a structure requires the sealing and testing of ducts, properly insulating the house, including insulating around ducts and pipes, installing high performance windows, weather-stripping the doors, installing a radiant barrier at the roof framing, caulking, and use advanced infiltration methods, including barriers around chimneys and whole house fan covers. Therefore, any solar panel policy adopted should include a requirement for energy efficiency. A homeowner or business would not be eligible for PG&E, State and Federal rebates and tax incentives, and some home equity loans, if energy efficiency measures are not implemented.

StopWaste.Org's *GreenPoint Checklist for New Home Construction* (guidelines booklet attached) requires a home to receive a minimum of 50 points to be GreenPoint-rated. The list is divided into several categories in which points can be obtained. Section J, Building Performance, offers a potential of 30 energy points toward the GreenPoint Rating, with 2 points possible for each one percent energy efficiency achieved above minimum Title 24 standards. This one subcategory has the potential for 42 points on the checklist. (See *New Home Construction Green Building Guidelines*).

Rohnert Park has adopted an energy efficiency ordinance; however, it does not require all construction to be GreenPoint-rated. In addition, Stopwaste.Org is currently working on a draft energy efficiency ordinance that can be used by all cities.

At the last meeting in October, Committee member Al Mendall distributed a proposed set of recommendations related to establishing provisions that would require all new developments in Hayward to include solar panels, or developers would pay in-lieu fees (Exhibit D). While staff supports encouraging the use of photovoltaic systems through community outreach, including distributing information about cost-saving programs, it would not recommend that such systems be required. As discussed above, solar power systems should be considered in the context of all green building measures, which is how the *GreenPoint Checklist* is structured. Other forms of energy savings/green building measures may be more cost effective. However, if the Committee is inclined to support a recommendation to Council to create policy that would require solar power systems or payment of in-lieu fees for all new construction, staff would recommend that non-residential facilities that have larger roof areas be emphasized, which may require a different standard than that for residential construction, that criteria be established for determining which projects would be eligible for receiving in-lieu fee funds, etc.

Summary of What Other Cities are Doing

According to the Northern California Solar Energy Association, at of the end of 2006, Hayward ranked eighth and sixth, respectively, for large Bay Area Cities in terms of watts per capita and total watts installed for solar systems (see Exhibit B). Exhibit C is a table that provides solar system installation information for all northern California cities. Following is a summary of programs in

place or proposed in cities in the Bay area and vicinity. As noted previously, none of the programs *require* installation of solar panels.

Solar Sebastopol

The City of Sebastopol's Solar Sebastopol began in 2002 with a solar feasibility study conducted by students from Sonoma State University's Energy Management Design Program. The Sebastopol City Council endorsed the study's recommendation for a citywide solar program. A self-funded advisory group of mostly solar vendors manages the program under the guidance of the City of Sebastopol.

The Solar Sebastopol program is voluntary and encourages more solar energy on residential, business, and public properties. According to Project Manager Marty Roberts, the first goal of the program was to install 1 megawatt (1,000 kW) of solar power production by the end of 2006. That's equivalent to solar photovoltaic (PV) systems on about 500 average-size homes. This was accomplished within incorporated and unincorporated Sebastopol. The new goal is to install as many solar panels as possible within City limits. The City decreased the fee of a permit to \$75, and because of the size of Sebastopol, the process seems to be streamlined. Program information can easily be found on the City of Sebastopol website home page through a Solar Sebastopol icon link.

As of July, 2007, Sebastopol has added 400 kW of solar power within its limits, or more than one-third of the original 1 megawatt goal. By the end of 2007, it is estimated that Sebastopol will have installed panels generating 105.5 kW on city buildings. Although it does not technically count towards the goal, Sebastopol and the surrounding unincorporated area have installed more than 1.4 megawatts of solar PV systems. This is a voluntary program with incentives of rebates, tax incentives, and elimination of the energy bill.

The City of Sebastopol has also converted its city hall building to a grid-tied, roof mounted, photovoltaic solar power system. The new 10.6kW solar system is expected to annually generate 18,520kWh (kilowatt hours), which will meet 97 percent of the building's current electrical needs. In its first month of production in August 2007, the City only needed to buy one kWh of grid power, or 0.07 percent of its pre-solar average monthly requirement. The City is also working on reducing its electrical demand through increased energy efficiency, particularly in its HVAC system.

Solar Richmond

Solar Richmond is a non-profit local program developed to encourage more solar energy on residential, business, and public properties in Richmond. Richmond's goal is to install 5 megawatts of solar energy by 2010 and create 100 new jobs. Mayor Gayle McLaughlin and the Richmond City Council decreased the residential solar building permit fee to \$0 until June 1, 2008.

City of Fremont

In July 2006, the Fremont City Council adopted a resolution to support sustainable building and landscape practices. The Council directed staff to explore incentives to encourage private parties to utilize sustainable building practices. Initiated by a request from the Sierra Club to reduce the solar

PV panel installation building permit fees, the fee has been reduced from approximately \$835 to \$236.70, which would be expected to advance the sustainable buildings policy adopted by the Fremont City Council. Installation of solar PV panel installation is voluntary.

City of San Leandro

The City of San Leandro hosted a homeowner Green Fair on October 10, 2007, designed to present information and green options. Representatives from Build It Green and Stopwaste.org, vendors, and staff were on hand to answer questions. The purpose was for homeowners and builders to learn how to design and build more efficiently to save water and energy. The City also publishes a hand-out that recognizes San Leandro Green Businesses. The solar PV panel installation permit fee is \$430. The installation of solar panels is voluntary.

City of Newark

The City of Newark does not have a solar power policy. The solar PV installation building permit fee is \$267.

City of Oakland

The City of Oakland offers several programs related to energy conservation and use. Oakland has simplified permitting and reduced building permit fees to \$199 for solar power systems that meet a set of criteria requiring the system to be reasonably uncomplicated and non-controversial. The City Council approved \$35,000 for a Request for Proposal (RFP) related to developing a program to encourage solar power projects in Oakland. The inclusion of solar PV panels in projects is voluntary and solar power is not required for any projects at this time. The City of Oakland does negotiate for solar power as part of development projects on a case-by-case basis. Oakland is also funding \$287,000 of initial cost for more solar power atop City buildings in the next couple of years.

Oakland has also developed the Solar Opportunity Assessment project, which is an informal collaboration between San Francisco State University, the City of Oakland, the City and County of San Francisco, Marin County, local advocacy groups, and other volunteers.

Cities of Livermore and Pleasanton

The Cities of Livermore and Pleasanton have entered into a joint agreement for the development of a *Solar Cities Program*, which is envisioned to result in a program similar to the City of Sebastopol's current photo voltaic buying program. Livermore and Pleasanton have entered into a Memorandum of Understanding to share costs for the development of the program, which is expected to be approximately \$40,000 (\$20,000 for each city).

The City of Livermore has an agreement with Spectrum Energy, Inc. for the preparation of the development of the program. Spectrum Energy, Inc. is an energy services company that specializes in designing and installing energy-efficient measures. The program would provide a community-wide, customer-friendly system that would not only assist a resident or business in making the decision to purchase and install a solar system, but provide support through the entire

process, from conception to installation. Spectrum delivered the final *Solar Cities Program* to the City of Livermore at the end of the summer. Livermore staff is currently reviewing the program and will deliver the comments and staff report to Pleasanton staff in the near future. The City Councils will review the project in the Spring of 2008. After City Councils review, City staffs would be directed on how to proceed with implementation of the program.

The cities have reduced permit fees (Pleasanton-\$200 and Livermore-\$280) and have streamlined the permit process. Residences are also encouraged by both cities to attend Pacific Gas and Electric solar workshops.

City of Berkeley

In November of 2006, 81 percent of Berkeley residents voted for Measure G, which targets an 80 percent reduction in Berkeley's greenhouse gas emissions by 2050 and directs the City to develop an emissions reduction action plan in partnership with the community. Solar power is one component of the plan. Currently, Berkeley has a stock of about 400 energy efficient and/or solar sites.

Also, the Berkeley City Council approved a plan to create a *Sustainable Energy Financing District*, where property owners (residential and commercial) can voluntarily install solar systems and make energy efficiency improvements to their buildings and pay for the cost as a 20-year assessment on their property tax bills. The assessment would include the cost of the project and fees to administer the program. The annual assessment would be about the same or less than what the property owner would save on energy bills.

The City would provide funding through bonds or financial institutions and interested people or businesses would borrow the funds for the purpose of making their homes more energy efficient and/or for adding solar panels and solar hot water. The City would have a lien on the home or business to assure repayment, and the property owner would pay off the loan—including interest and an administrative fee—through property taxes over 20 years. New owners of the improved property would assume the added tax burden. The assumption is that the City could borrow funds for this purpose at a lower interest rate than the individual property owner. It is also assumed that property owners want to make these changes to their homes, but are not doing so because other means of financing is too costly. The City has submitted a grant application to the Environmental Protection Agency through which they hope to obtain \$160,000 for some of the initial costs.

Currently, the City has completed its initial legal and financial review and is now beginning to work with solar installation companies on program design. The goal is to formally approve and launch the program in 2008. The City estimates that 100 single-family residential property owners will participate in this program during the demonstration period with an average cost of \$25,000 per home and 25 commercial and multi-family projects with an average cost of \$75,000 per property. This will result in approximately \$4.4 million in efficiency upgrades and solar installations by January 2010. The program would be administered by eight staff members.

City of San Jose

The solar PV panel installation building permit fee is \$236. San Jose does not currently have policies or building guidelines that require private developers to utilize solar power or green building techniques. In the past, the requirement of any solar or green building techniques has been on a case-by-case basis. The San Jose City Council has required individual projects to comply with differing levels of sustainability based on the project's location. The business community has requested standards to assure predictability in the development process.

In response, the City is currently formalizing a *Private Sector Green Building Program*. As part of that program, the City Council has adopted Mayor Reed's *Green Vision for the City of San Jose*. The program has the following 10 goals:

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

In June 2007, the San Jose City Council adopted a Green Building Policy, requiring that all municipal facilities be built to achieve LEED Gold certification. The installation of solar PV panels is one of the methods that could help lead to the LEED Gold certification. In addition, the Environmental Services Division's webpage educates residents and businesses aware of several energy saving measures they can do.

City of Mountain View

Mountain View staff facilitated rapid and low-cost permitting of residential solar applications of the City's approximately 9,287 single-family homes. The total number of residential solar or PV permits issued since January 2007 is already 163. Of those permits, 134 were obtained by Solar City Corporation, a community-based effort. Headquartered in Foster City, SolarCity matches advanced solar power technology with a suite of installation services. The company's comprehensive offering removes the technical, regulatory, and financing barriers to solar power, helping customers make smart alternative energy choices that save money. The Collective Power Program is an innovative solar purchasing program that encourages community residents to join purchases together in order to receive special pricing incentives on solar installations. The Collective Power Program has already become a proven model for increasing residential and commercial solar power, attracting a total of over 934kW worth of solar installations to date. Installations of the panels are on a voluntary basis. The building permit fee for solar PV installation is \$152.

The City of Mountain View has installed a 90-kilowatt solar power system on the municipal California Avenue parking structure to power the building's lighting and elevators. The City estimates an annual savings of approximately \$18,000 in electrical costs.

The City continues research into possibility of solar retrofits at City facilities. At this time, the City is in the research and analysis phase, considering options that could generate most or all of the energy consumed at the Municipal Operations Center.

City of San Francisco

The voluntary solar program is based on the *San Francisco Solar Map*, which was developed to promote greater public awareness about solar potential in San Francisco and to facilitate greater solar usage among commercial and residential building owners. The City promotes solar power as a property investment and encourages businesses to apply to become a Certified Green Business. Utilizing state and federal tax credits and incentives, and non-profit organization tax benefit incentives, the *Solar Map* and other solar power information can be accessed at the City of San Francisco website. The solar PV panel installation building permit fee is \$85.

Funding Sources

Costs for Installing a home solar PV system is about \$8,000-\$12,000 per kW before rebates, but with state and federal rebates and incentives, the cost can be cut to around \$7,000 per kilowatt. Below is a sample summary of such costs and potential rebates.

\$30,000 (list price, fully installed for a 3kW system)
- \$7,000 (California state rebate)
- \$2,000 (Federal tax credit)
\$21,000 final price

There are numerous funding sources for a residential property owner or business owner. As with the City of Berkeley, a city can be instrumental in offering incentives and programs that aide in the payment and installation of solar PV panels. As part of Governor Arnold Schwarzenegger's \$3.3 billion "Million Solar Roofs Program," California has set a goal to create 3,000 megawatts of new, solar-produced electricity by 2017. State incentives are available to encourage the installation of solar PV panels (Exhibit A).

The Energy Policy Act of 2005 created federal income tax credits for solar energy projects installed in 2006-2007. The federal government provides a federal tax credit equal to 30 percent of the solar system cost. For residential systems, there is a \$2,000 limit per system. For commercial systems, there is no ceiling.

Renewable Energy Certificates (RECs)

Also known as Green Tags, Renewable Energy Credits, or Tradable Renewable Certificates, RECs are the property rights to the environmental benefits from generating electricity from solar and other renewable energy sources. RECs create incentives for carbon-neutral renewable energy by

providing a subsidy to electricity generated from renewable sources. REC providers are credited with one REC for every MWh of electricity they produce. The green energy is then fed into the electrical grid (by mandate), and the accompanying REC can then be sold on the open market by companies called aggregators (<http://www.green-e.org/>.)

New Resource Bank- Solar Home Equity Financing

This is an example of home equity financing. Other financial institutions offer home equity loans for home improvements. However, the New Resource Bank program is unique in that the loan is designed to add value to a home while controlling energy cost. The program focuses on:

- Payment of a monthly bill to get solar power while utility bill goes down
- After rebate and after-tax-deduction, the loan cost can be cheaper than current utility bill
- Finance solar - adds value to a home
- Simple application with no fees; and
- Product options to match your preference

New Resource Bank and SunPower (www.sunpowercorp.com) have partnered to provide easy residential solar financing in California. According to the bank founder, this loan payment is designed to replace your energy bill payment.

Flex Your Power

Flex Your Power website (<http://www.fypower.org/>) contains a search engine that finds a list of rebates and incentives by zip code. All PG&E rebates and programs are accessible from this site, or at www.pge.com.

Group Installation

The cost of solar PV panels will decrease if several neighbors choose to install solar at the same time. Solar PV companies encourage multiple installations within a neighborhood to conserve their labor, which results in savings to the customers. (See previous discussion under City of Mountain View activities.)

FISCAL IMPACT

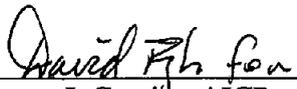
Depending on the extent and approach to implement a solar power program, including an energy efficiency program, funding for studies, consultants, and community education would be required. As described in this report, there are a number of funding sources that could be pursued to help offset costs for residents associated with solar power system installations, as well as to reduce costs in developing and implementing a program. However, additional staff resources would be required to fully implement comprehensive green building and sustainable development programs.

NEXT STEPS

The Sustainability Committee should request that staff prepare a report to the City Council with recommendations for implementation of solar power program, along with an energy efficiency

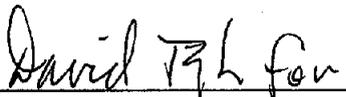
program, and related policies to implement aspects discussed at this meeting. The next Sustainability Committee meeting will be held on January 18th, 2008 and staff will present an overview of green building standards for residential and non-residential new construction and how they are measured.

Prepared by:



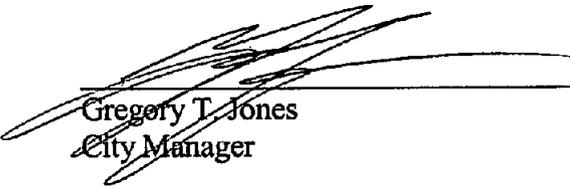
Arlynn J. Camite, AICP
Associate Planner

Recommended by:



Susan J. Daluddung, Ph.D.
Director of Community and Economic Development

Approved by:



Gregory T. Jones
City Manager

Exhibits

- Exhibit A: State Rebate Programs and Federal Business Incentives
- Exhibit B: Bay Area Solar Installations Report (Systems Installed as of 12/06), by Northern California Solar Energy Association
- Exhibit C: Spreadsheet Showing Solar Installed as of 12/31/2006 in Bay Area Cities, by Northern California Solar Energy Association
- Exhibit D: Proposal by Committee Member Al Mendall
New Home Construction - Green Building Guidelines

State Rebate Programs and Federal Business Incentives

State Rebate Program

The California Solar Initiative (http://www.gosolarcalifornia.ca.gov/csi/cash_back.html), managed by the California Public Utilities Commission (<http://www.cpuc.ca.gov/>) and the California Solar Initiative (CSI), will provide incentives over the next decade for existing residential homes and existing and new commercial, industrial, and agricultural properties. The rebate amount depends on the type and size of the solar PV system. For example:

- Commercial & Residential Systems <100 kW: The CSI program will pay incentives to solar PV projects smaller than 100 kW through an up-front incentive known as an expected performance-based buydown (EPBB). EPBB is based on an estimate of the system's future performance. EPBB rebates decline over time based on the number of megawatts that have already reserved rebates. Current rebate amounts can be found at (<http://www.csi-trigger.com/>).
- Commercial & Residential Systems \geq 100 kW: The CSI program will pay performance-based incentives (PBI) for solar PV projects equal to or larger than 100 kW, with monthly payments based on recorded kWh of solar power produced over a 5-year period. These PBI will be a flat per-kWh payment for PV system output. PBI rebates decline over time based on the number of megawatts that have already reserved rebates. Current rebate amounts can be found at (<http://www.csi-trigger.com/>).
- Systems Installed on Non-profit Facilities. The CSI offers an up-front cash incentive of up to \$3.25/watt and a performance-based incentive of up to \$0.50/megawatt-hour (MWh) for solar systems installed on tax-exempt facilities that are ineligible for federal solar tax credits. (http://www.gosolarcalifornia.ca.gov/csi/nonprofit/cash_back_nonprofit.html). Current rebate amounts can be found at <http://www.csi-trigger.com/>.

The New Solar Homes Partnership is managed by the California Energy Commission (<http://www.energy.ca.gov>), the New Solar Homes Partnership (NSHP) will provide \$400 million worth of incentives over the next 10 years to encourage solar in new residential construction. To qualify, buildings must achieve energy efficiency levels substantially greater than the requirements of the current Building Energy Efficiency Standards (Title 24). Incentives are provided through an up-front rebate, at two different incentive levels:

- The Expected Performance-Based Incentive (EPBI) amount is \$2.50/watt. This incentive level applies to custom homes, small developments (less than six homes), and all residential applications where solar will be installed on less than 50 percent of the homes in a development.
- The EPBI incentive level for new homes/dwellings in subdivisions or multi-family housing developments with 6 or more homes/dwelling units home developments,

and where a minimum of 50 percent of the homes/dwellings will have solar systems offer solar as a standard feature, is \$2.60/watt.

NSHP rebates decline over time based on the number of megawatts that have already reserved rebates. (<http://www.gosolarcalifornia.ca.gov/nshp/index.html>)

Low-income and Affordable Housing Projects: Ten percent (\$216 million) of the overall CSI budget has been allocated to low-income projects (<http://www.gosolarcalifornia.ca.gov/csi/low-income.html>) and new affordable housing (<http://www.gosolarcalifornia.ca.gov/nshp/affordable.html>).

Federal Business Incentives

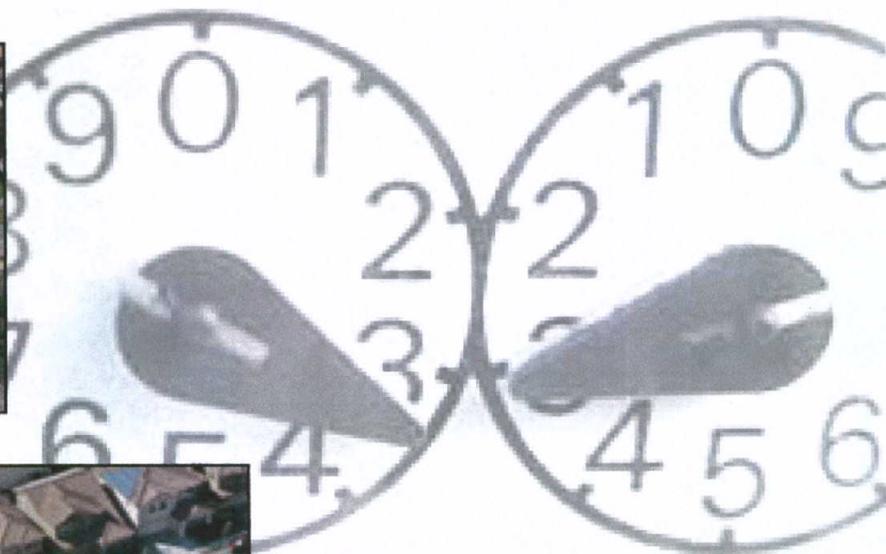
The program is fully explained in the Solar Energy Industries Association's "Guide to Federal Tax Incentives" (http://www.riseo.state.ri.us/riref/programs/fedtax_solarguide.pdf) and IRS Form 3468 (www.irs.gov).



**Northern
California
Solar Energy
Association**
Promoting solar energy solutions since 1975

Bay Area Solar Installations Report

Systems installed as of 12/06



Photos courtesy of ProehlStudios.com
Clockwise: Solar installations in
Berkeley, Watsonville, San Leandro,
and Contra Costa County

Exhibit B

Acknowledgements

*Thank you to our sponsors for
making this report possible!*



Download the entire report and all data files at
<http://www.norcal solar.org/citysolardata>

Summary

Californians have purchased more than \$2.8 billion in solar electric technology (PV), representing 31,380 PV systems and 336 megawatts (MW) of solar power. California has offered financial incentives for grid-tied solar electric systems (PV) since 1998, and in January 2007 the state implemented a new incentive program called the California Solar Initiative (CSI). The CSI is a ten-year \$3.2 billion incentive program with the goal of installing 3,000 MW of solar power on the equivalent of one million rooftops. The CSI was a much heralded program due to its size, length, and cutting-edge policy goal of establishing a sustainable solar industry.

This report by NorCal Solar Energy Association (norcalsolar.org) uses publicly available solar incentive data to describe the number and amount of grid-tied solar photovoltaic (PV) installations as of 12/31/2006 in ten Bay Area counties and 165 communities. The data is provided in an Excel file and is useful to consumers, the solar industry, and decision makers in considering the following:

- Tracking local prices and cost trends
- Measuring installation progress against CSI goals
- Setting specific city level goals for PV installation and tracking current status
- Uncovering trends in equipment, system sizes, number of installers, and new types of installation business models

Highlights from Bay Area data:

- Average aggregate cost of systems under 15 thousand watts (15 kW) is \$9.49 per watt, about the same as May 2006
- Average cost of systems 15-50kW is \$8.69 per watt
- Average cost of systems >50kW is \$8.58 per watt
- Average size and cost of residential sized systems (under 5kW) is 3.6kW (up from 3.5 in 2006)
- Total sales of systems (prior to incentives and tax credits) is \$787 million
- Interesting trends in solar include the increasing use of third party financing for large commercial systems, the increase in average system sizes for residential systems, and an increase in the average cost per watt for smaller systems.

NorCal Solar Energy Association plans to update this data annually. In the report website we have provided the raw data used for these summary tables in a pivot table that allows for easy sorting, comparisons, and selection of individual cities data. We have also provided an Excel sheet with the entire statewide data set for all incentives since 1998 through May 2007. Readers may use this worksheet to sort and search for specific regional data.

Data Analysis and Rationale

NorCal Solar Energy Association focused on ten Bay Area counties because this region leads the growing wave of solar adoption across the state. Apparent reasons for strong solar adoption in the Bay Area include solar-friendly utility rates, net metering, ample sun exposure, supportive local governments, a strong environmental ethic, and the attention brought to PV technology through the Vote Solar initiative in 2000.

NorCal Solar Energy Association limited the records to installed systems as of the end of 2006 so that we could do a comparable annual analysis, and so the data was easily compared between the old and new rebate programs (Emerging Renewables Program and Self-Generation Incentive Program versus the California Solar Initiative). In order to compare communities equitably we defined cities based on population:

- small - 10,000 or less
- medium -50,000 and less
- large – more than 50,000

The raw data for this report includes incentive records from the California Energy Commission (CEC), data from PG&E for the Self-Generation Incentive Program (SGIP), records from Silicon Valley Power (SVP) that serves the City of Santa Clara, and the City of Palo Alto Utilities (CPAU).

To produce the final Top Ten lists, we first established a list of all the zip codes and place names included in all ten Bay Area countiesⁱ. The second step was to sort through and correct city and place spellings in the central data file (merged from two ERP files and one SGIP file). Finally, we copied the essential data (date installed, size system, system cost, utility, county) into a new workbook and generated a pivot tableⁱⁱ. After adding population and county data, we checked our summary data against the original raw data to ensure the error rate was reasonable given the corrections to city spellings and missing city or zip code dataⁱⁱⁱ. It is estimated that the Top Ten lists are accurate within 5% of the raw data sets used.

There are numerous oddities included in the dataset, such as three systems in San Francisco showing a \$7,000+ dollar per watt cost. We excluded these outliers for the cost per watt summary data, but we did not exclude other records that also seemed out of bounds such as \$43 per watt for a small system in Marin. These oddities either demonstrate that some solar projects have unique and high expenses, or that some records had data entry errors. Excluding all projects with costs above \$20 per watt did not significantly affect the averages so these are included.

Top Ten Cities Data

	Watts Per Capita			Total Watts Installed			Total Projects		
SMALL CITIES (<10K POPULATION)	1	Saint Helena	210	1	Sonoma	1,803,253	1	Sebastopol	326
	2	Nicasio	196	2	Sebastopol	1,421,423	2	Sonoma	93
	3	Sebastopol	188	3	Saint Helena	1,240,631	3	Los Altos Hills	78
	4	Sonoma	182	4	Rutherford	570,643	4	Aptos	71
	5	Belvedere	170	5	Calistoga	489,663	5	Belvedere	65
	6	Portola Valley	166	6	Kentfield	469,422	6	Soquel	57
	7	Valley Ford	156	7	Los Altos Hills	455,586	7	Portola Valley	54
	8	Point Reyes Station	104	8	Soquel	376,808	8	Saint Helena	45
	9	Calistoga	94	9	Portola Valley	362,371	9	Fairfax	43
	10	Occidental	80	10	Fairfax	354,890	10	Cloverdale	34
						11	Calistoga	34	
MEDIUM CITIES (10- 50K POPULATION)	1	Healdsburg	136	1	Newark	1,536,473	1	Watsonville	355
	2	American Canyon	63	2	Healdsburg	1,489,160	2	Los Gatos	149
	3	San Pablo	40	3	San Pablo	1,241,659	3	Los Altos	137
	4	Mill Valley	37	4	Dublin	1,206,615	4	Mill Valley	130
	5	Newark	37	5	Pleasant Hill	1,110,021	5	Saratoga	88
	6	Pleasant Hill	33	6	American Canyon	1,010,483	6	Menlo Park	81
	7	Dublin	29	7	Watsonville	792,106	7	San Anselmo	70
	8	San Anselmo	28	8	Los Gatos	728,013	8	Healdsburg	66
	9	Los Gatos	26	9	Rohnert Park	657,420	9	Lafayette	65
	10	Larkspur	24	10	Los Altos	644,754	10	Morgan Hill	64
LARGE CITIES (>50K POPULATION)	1	Napa	43	1	Oakland	5,989,931	1	San Jose	491
	2	Pleasanton	36	2	San Francisco	4,549,299	2	San Francisco	483
	3	Mountain View	34	3	Santa Rosa	4,255,095	3	Berkeley	364
	4	San Rafael	33	4	San Jose	3,742,818	4	Santa Rosa	348
	5	Santa Rosa	28	5	Napa	3,208,407	5	Oakland	342
	6	Santa Cruz	27	6	Hayward	3,053,496	6	Santa Cruz	296
	7	Vacaville	24	7	Pleasanton	2,408,605	7	San Rafael	172
	8	Hayward	22	8	Mountain View	2,354,096	8	Redwood City	169
	9	Pittsburg	17	9	Vacaville	2,268,744	9	Palo Alto	169
	10	San Leandro	16	10	San Rafael	1,853,662	10	Petaluma	141

Endnotes

i Brainy Zip used for zip codes http://www.brainyzip.com/state/zip_california.html

ii This report is an expansion of a report published in August 2006 that was drafted by Bill LaCommare and Liz Merry. The pivot tables used to generate the statistics and many of the report parameters and strategies were authored by Bill LaCommare.

iii Census data from 2000 http://factfinder.census.gov/servlet/GCTTable?_br=y&-geo_id=04000US06&-_box_head_nbr=GCT-PH1&-ds_name=DEC_2000_SF1_U&-format=ST-7 Note: the protocol for records that had city names with incorrect zip codes was to keep the city name and delete the zip code. Approximately 5% of the records had no zip codes, and another 5% had incorrect or incomplete zip codes.

Disclaimer: all attempts were made to present the actual incentive data within the specified parameters. Please report any missing incentive data to webmaster@norcalsolar.org.

Bay Area Cities - Solar Installed as of 12/31/2006

1,333 watts capacity per house

1 kw capacity per house

Rank	City	Total Projects	Total Watts	Average Size	Total Cost	Average Cost	Cost per Watt	Population	Watts per Capita	# of Homes Powered
1	Alameda	1	81,162	81,162	\$ 743,790	\$ 743,790	\$ 9.16	74,405	1	61
2	Alamo	37	187,726	5,074	\$ 1,832,436	\$ 49,525	\$ 9.76	15,626	12	141
3	Albany	37	83,959	2,269	\$ 825,992	\$ 22,324	\$ 9.84	15,965	5	63
4	Alviso	1	3,501	3,501	\$ 42,768	\$ 42,768	\$ 12.22	2,128	2	3
5	American Canyon	16	1,010,483	63,155	\$ 10,861,298	\$ 678,831	\$ 10.75	15,919	63	758
6	Angwin	5	21,636	4,327	\$ 204,114	\$ 40,823	\$ 9.43	3,148	7	16
7	Antioch	35	154,835	4,424	\$ 1,450,121	\$ 41,432	\$ 9.37	100,586	2	116
8	Aptos	71	290,154	4,087	\$ 2,805,201	\$ 39,510	\$ 9.67	9,396	31	218
9	Atherton	27	176,171	6,525	\$ 1,881,890	\$ 69,700	\$ 10.68	7,194	24	132
10	Belmont	37	132,969	3,594	\$ 1,284,600	\$ 34,719	\$ 9.66	24,665	5	100
11	Belvedere	65	351,454	5,407	\$ 2,994,380	\$ 46,067	\$ 8.52	2,073	170	264
12	Ben Lomond	23	77,387	3,365	\$ 733,421	\$ 31,888	\$ 9.48	2,364	33	58
13	Benecia	26	85,177	3,276	\$ 806,328	\$ 31,013	\$ 9.47	26,597	3	64
14	Berkeley	364	1,566,852	4,305	\$ 14,630,219	\$ 40,193	\$ 9.34	101,555	15	1,175
15	Bodega	10	42,547	4,255	\$ 419,214	\$ 41,921	\$ 9.85	1,423	30	32
16	Bolinas	15	44,537	2,969	\$ 425,303	\$ 28,354	\$ 9.55	1,246	36	33
17	Boulder Creek	24	70,823	2,951	\$ 711,631	\$ 29,651	\$ 10.05	4,081	17	53
18	Boyes Hot Springs	1	2,127	2,127	\$ 16,357	\$ 16,357	\$ 7.69	6,665	0	2
19	Brentwood	48	354,131	7,378	\$ 3,186,704	\$ 66,390	\$ 9.00	47,547	7	266
20	Brisbane	14	65,175	4,655	\$ 567,178	\$ 40,513	\$ 8.70	3,578	18	49
21	Burlingame	48	531,839	11,080	\$ 4,699,961	\$ 97,916	\$ 8.84	27,573	19	399
22	Byron	12	52,224	4,352	\$ 496,751	\$ 41,396	\$ 9.51	916	57	39
23	Calistoga	34	489,663	14,402	\$ 4,469,394	\$ 131,453	\$ 9.13	5,190	94	367
24	Camp Meeker	1	2,858	2,858	\$ 23,791	\$ 23,791	\$ 8.32	425	7	2
25	Campbell	35	125,300	3,580	\$ 1,201,246	\$ 34,321	\$ 9.59	37,520	3	94
26	Canyon	1	5,153	5,153	\$ 49,425	\$ 49,425	\$ 9.59	15,331	0	4
27	Capitola	14	46,855	3,347	\$ 488,904	\$ 34,922	\$ 10.43	9,507	5	35
28	Castro Valley	62	259,377	4,183	\$ 2,400,908	\$ 38,724	\$ 9.26	57,292	5	195
29	Cazadero	9	43,381	4,820	\$ 378,747	\$ 42,083	\$ 8.73	1,569	28	33
30	Clayton	16	64,497	4,031	\$ 563,394	\$ 35,212	\$ 8.74	11,191	6	48
31	Cloverdale	34	115,063	3,384	\$ 1,146,843	\$ 33,731	\$ 9.97	8,129	14	86

Exhibit C

Rank	City	Total Projects	Total Watts	Average Size	Total Cost	Average Cost	Cost per Watt	Population	Watts per Capita	# of Homes Powered
32	Colma	3	7,503	2,501	\$ 78,454	\$ 26,151	\$ 10.46	1,401	5	6
33	Concord	56	312,393	5,578	\$ 2,814,836	\$ 50,265	\$ 9.01	122,204	3	234
34	Corte Madera	23	233,417	10,149	\$ 1,873,500	\$ 81,457	\$ 8.03	9,313	25	175
35	Cotati	11	69,351	6,305	\$ 601,868	\$ 54,715	\$ 8.68	7,170	10	52
36	Crockett	1	2,500	2,500	\$ 25,000	\$ 25,000	\$ 10.00	3,194	1	2
37	Cupertino	78	553,428	7,095	\$ 4,837,763	\$ 62,023	\$ 8.74	52,948	10	415
38	Daly City	3	54,005	18,002	\$ 498,676	\$ 166,225	\$ 9.23	101,005	1	41
39	Danville	41	329,660	8,040	\$ 3,125,235	\$ 76,225	\$ 9.48	41,540	8	247
40	Davenport	3	10,800	3,600	\$ 109,678	\$ 36,559	\$ 10.16	850	13	8
41	Diablo	3	29,308	9,769	\$ 299,504	\$ 99,835	\$ 10.22	988	30	22
42	Dillon Beach	1	2,442	2,442	\$ 18,207	\$ 18,207	\$ 7.46	319	8	2
43	Dixon	18	68,861	3,826	\$ 655,154	\$ 36,397	\$ 9.51	17,652	4	52
44	Dublin	22	1,206,615	54,846	\$ 9,798,052	\$ 445,366	\$ 8.12	41,840	29	905
45	East Palo Alto	35	74,127	2,118	\$ 629,381	\$ 17,982	\$ 8.49	32,784	2	56
46	El Cerrito	43	465,186	10,818	\$ 4,640,008	\$ 107,907	\$ 9.97	22,600	21	349
47	El Granada	5	14,914	2,983	\$ 140,097	\$ 28,019	\$ 9.39	5,724	3	11
48	El Sobrante	29	89,570	3,089	\$ 797,599	\$ 27,503	\$ 8.90	12,260	7	67
49	Emeryville	4	58,703	14,676	\$ 530,440	\$ 132,610	\$ 9.04	8,751	7	44
50	Fairfax	43	354,890	8,253	\$ 3,133,665	\$ 72,876	\$ 8.83	7,120	50	266
51	Fairfield	38	1,378,416	36,274	\$ 12,188,977	\$ 320,763	\$ 8.84	104,897	13	1,034
52	Felton	19	68,733	3,618	\$ 623,395	\$ 32,810	\$ 9.07	8,720	8	52
53	Forestville	20	78,442	3,922	\$ 718,022	\$ 35,901	\$ 9.15	2,370	33	59
54	Foster City	13	50,474	3,883	\$ 530,422	\$ 40,802	\$ 10.51	28,937	2	38
55	Freedom	15	21,479	1,432	\$ 199,564	\$ 13,304	\$ 9.29	6,000	4	16
56	Fremont	89	1,317,011	14,798	\$ 10,694,444	\$ 120,162	\$ 8.12	203,413	6	988
57	Geyserville	13	66,958	5,151	\$ 590,896	\$ 45,454	\$ 8.82	2,332	29	50
58	Gilroy	44	575,778	575,778	\$ 13,086	\$ 4,350,744	\$ 7.56	48,313	12	432
59	Glen Ellen	26	130,059	5,002	\$ 1,197,574	\$ 46,061	\$ 9.21	4,089	32	98
60	Graton	8	19,259	2,407	\$ 179,863	\$ 22,483	\$ 9.34	1,815	11	14
61	Greenbrae	39	167,140	4,286	\$ 1,567,988	\$ 40,205	\$ 9.38	11,999	14	125
62	Guerneville	16	78,615	4,913	\$ 658,799	\$ 41,175	\$ 8.38	2,441	32	59
63	Half Moon Bay	21	117,758	5,608	\$ 1,137,206	\$ 54,153	\$ 9.66	12,308	10	88
64	Hayward	45	3,053,496	67,855	\$ 25,520,343	\$ 567,119	\$ 8.36	140,606	22	2,291
65	Healdsburg	66	1,489,160	22,563	\$ 13,786,132	\$ 208,881	\$ 9.26	10,961	136	1,117

Rank	City	Total Projects	Total Watts	Average Size	Total Cost	Average Cost	Cost per Watt	Population	Watts per Capita	# of Homes Powered
66	Hercules	7	19,669	2,810	\$ 218,170	\$ 31,167	\$ 11.09	24,776	1	15
67	Inverness	12	44,792	3,733	\$ 419,069	\$ 34,922	\$ 9.36	1,421	32	34
68	Jenner	8	24,227	3,028	\$ 244,817	\$ 30,602	\$ 10.11	424	57	18
69	Kentfield	4	469,422	117,355	\$ 3,793,722	\$ 948,431	\$ 8.08	6,351	74	352
70	Kenwood	13	80,863	6,220	\$ 708,486	\$ 54,499	\$ 8.76	1,648	49	61
71	Knightesen	3	17,549	5,850	\$ 161,748	\$ 53,916	\$ 9.22	861	20	13
72	La Honda	5	8,935	1,787	\$ 82,711	\$ 16,542	\$ 9.26	1,610	6	7
73	Lafayette	65	347,509	5,346	\$ 3,304,183	\$ 50,834	\$ 9.51	24,877	14	261
74	Lagunitas-Forest Kr	8	28,385	3,548	\$ 273,568	\$ 34,196	\$ 9.64	1,835	15	21
75	Larkspur	24	290,650	12,110	\$ 2,485,986	\$ 103,583	\$ 8.55	12,014	24	218
76	Livermore	119	1,123,440	9,441	\$ 9,355,783	\$ 78,620	\$ 8.33	79,438	14	843
77	Los Altos	137	644,754	4,706	\$ 6,101,095	\$ 44,534	\$ 9.46	27,483	23	484
78	Los Altos Hills	78	455,586	5,841	\$ 4,391,905	\$ 56,306	\$ 9.64	8,308	55	342
79	Los Gatos	149	728,013	4,886	\$ 6,890,145	\$ 46,243	\$ 9.46	28,366	26	546
80	Marshall	1	5,975	5,975	\$ 55,571	\$ 55,571	\$ 9.30	394	15	4
81	Martinez	49	484,561	9,889	\$ 3,748,486	\$ 76,500	\$ 7.74	35,593	14	364
82	Menlo Park	81	542,214	6,694	\$ 5,319,561	\$ 65,674	\$ 9.81	29,981	18	407
83	Mill Valley	130	493,720	3,798	\$ 4,604,740	\$ 35,421	\$ 9.33	13,323	37	370
84	Millbrae	12	46,519	3,877	\$ 446,986	\$ 37,249	\$ 9.61	20,718	2	35
85	Milpitas	18	88,078	4,893	\$ 810,446	\$ 45,025	\$ 7.00	64,292	1	66
86	Montara	7	18,243	2,606	\$ 186,201	\$ 26,600	\$ 10.21	2,950	6	14
87	Monte Rio	2	7,213	3,607	\$ 66,892	\$ 33,446	\$ 9.27	1,104	7	5
88	Monte Sereno	10	52,270	5,227	\$ 502,425	\$ 50,242	\$ 9.61	3,533	15	39
89	Moraga	29	116,524	4,018	\$ 1,110,784	\$ 38,303	\$ 9.53	16,946	7	87
90	Morgan Hill	64	413,412	6,460	\$ 3,743,298	\$ 58,489	\$ 9.05	35,982	11	310
91	Moss Beach	8	35,924	4,491	\$ 374,013	\$ 46,752	\$ 10.41	1,953	18	27
92	Mountain View	81	2,354,096	29,063	\$ 17,866,095	\$ 220,569	\$ 7.59	70,090	34	1,766
93	Napa	133	3,208,407	24,123	\$ 26,770,916	\$ 201,285	\$ 8.34	74,966	43	2,407
94	Newark	13	43,613	3,355	\$ 423,812	\$ 32,601	\$ 9.72	41,891	1	33
95	Nicasio	16	115,209	7,201	\$ 1,016,658	\$ 63,541	\$ 8.82	589	196	86
96	Novato	105	567,511	5,405	\$ 5,093,286	\$ 48,507	\$ 8.97	51,518	11	426
97	Oakland	342	5,989,931	17,514	\$ 51,958,225	\$ 151,925	\$ 8.67	399,484	15	4,494
98	Oakley	9	34,254	3,806	\$ 342,832	\$ 38,092	\$ 10.01	28,822	1	26
99	Oakville	1	6,344	6,344	\$ 56,498	\$ 56,498	\$ 8.91	100	63	5

Rank	City	Total Projects	Total Watts	Average Size	Total Cost	Average Cost	Cost per Watt	Population	Watts per Capita	# of Homes Powered
100	Occidental	18	101,251	5,625	\$ 900,220	\$ 50,012	\$ 8.89	1,272	80	76
101	Olema	2	4,820	2,410	\$ 38,696	\$ 19,348	\$ 8.03	245	20	4
102	Orinda	44	149,657	3,401	\$ 1,474,236	\$ 33,505	\$ 9.85	18,348	8	112
103	Pacifica	60	531,963	8,866	\$ 4,904,432	\$ 81,741	\$ 9.22	37,327	14	399
104	Palo Alto	169	617,181	3,652	\$ 5,268,432	\$ 34,890	\$ 9.55	57,809	11	463
105	Penngrove	22	88,325	4,015	\$ 798,551	\$ 36,298	\$ 9.04	3,764	23	66
106	Pescadero	2	4,036	2,018	\$ 34,702	\$ 17,351	\$ 8.60	2,042	2	3
107	Petaluma	141	838,960	5,950	\$ 7,712,758	\$ 54,700	\$ 9.19	54,660	15	629
108	Piedmont	24	86,410	3,600	\$ 853,109	\$ 35,546	\$ 9.87	10,540	8	65
109	Pinole	12	49,538	4,128	\$ 458,668	\$ 38,222	\$ 9.26	18,875	3	37
110	Pittsburg	12	1,050,319	87,527	\$ 13,420,431	\$ 1,118,369	\$ 12.78	63,017	17	788
111	Pleasant Hill	32	1,110,021	34,688	\$ 9,401,734	\$ 293,804	\$ 8.47	33,191	33	833
112	Pleasanton	88	2,408,605	27,371	\$ 20,929,751	\$ 237,838	\$ 8.69	66,397	36	1,807
113	Point Reyes Station	17	85,436	5,026	\$ 783,771	\$ 46,104	\$ 9.17	818	104	64
114	Pope Valley	4	12,548	3,137	\$ 121,359	\$ 30,340	\$ 9.67	488	26	9
115	Port Costa	3	11,600	3,867	\$ 109,498	\$ 36,499	\$ 9.44	232	50	9
116	Portola Valley	54	362,371	6,711	\$ 3,437,194	\$ 63,652	\$ 9.49	2,188	166	272
117	Redwood City	169	754,495	4,464	\$ 7,096,239	\$ 41,990	\$ 9.41	73,691	10	566
118	Redwood Estates	1	1,287	1,287	\$ 9,564	\$ 9,564	\$ 7.43	100	13	1
119	Richmond	61	620,495	10,172	\$ 5,632,921	\$ 92,343	\$ 9.08	102,120	6	465
120	Rio Vista	1	7,193	7,193	\$ 64,313	\$ 64,313	\$ 8.94	4,571	2	5
121	Rodeo	2	7,574	3,787	\$ 66,269	\$ 33,134	\$ 8.75	8,717	1	6
122	Rohnert Park	30	1,797,420	59,914	\$ 5,259,389	\$ 181,358	\$ 3.03	41,083	44	1,348
123	Ross	6	25,380	4,230	\$ 221,958	\$ 36,993	\$ 8.75	2,300	11	19
124	Rutherford	7	570,643	81,520	\$ 4,866,456	\$ 695,208	\$ 8.53	525	1,087	428
125	Saint Helena	45	1,240,631	27,570	\$ 9,590,667	\$ 213,126	\$ 7.73	5,904	210	931
126	San Anselmo	70	341,611	4,880	\$ 3,062,525	\$ 43,750	\$ 8.96	12,043	28	256
127	San Bruno	10	23,040	2,304	\$ 213,967	\$ 21,397	\$ 9.29	39,986	1	17
128	San Carlos	62	287,917	4,644	\$ 2,737,904	\$ 44,160	\$ 9.51	27,002	11	216
129	San Francisco	483	4,549,299	9,419	\$ 36,994,222	\$ 76,593	\$ 8.13	776,733	6	3,413
130	San Geronimo	6	21,165	3,528	\$ 174,559	\$ 29,093	\$ 8.25	436	49	16
131	San Gregorio	2	9,248	4,624	\$ 96,331	\$ 48,166	\$ 10.42	287	32	7
132	San Jose	491	3,742,818	7,623	\$ 32,784,231	\$ 66,770	\$ 8.76	974,000	4	2,808
133	San Leandro	23	1,211,176	52,660	\$ 8,693,717	\$ 377,988	\$ 7.18	78,030	16	909

Rank	City	Total Projects	Total Watts	Average Size	Total Cost	Average Cost	Cost per Watt	Population	Watts per Capita	# of Homes Powered
134	San Lorenzo	8	19,023	2,378	\$ 170,778	\$ 21,347	\$ 8.98	21,898	1	14
135	San Martin	14	102,851	7,346	\$ 797,562	\$ 56,969	\$ 7.75	4,230	24	77
136	San Mateo	81	505,499	6,241	\$ 4,559,681	\$ 56,292	\$ 9.02	91,601	6	379
137	San Pablo	15	1,241,659	82,777	\$ 14,865,156	\$ 991,010	\$ 11.97	31,044	40	931
138	San Rafael	172	1,853,662	10,777	\$ 16,799,691	\$ 97,673	\$ 9.06	56,008	33	1,391
139	San Ramon	30	405,507	13,517	\$ 3,513,440	\$ 117,115	\$ 8.66	49,589	8	304
140	Santa Clara	30	147,847	4,928	\$ 54,999,355	\$ 1,896,529	\$ 10.03	108,518	1	111
141	Santa Cruz	296	1,482,461	5,008	\$ 13,392,423	\$ 45,245	\$ 9.03	54,778	27	1,112
142	Santa Rosa	348	4,255,095	12,227	\$ 38,155,930	\$ 109,643	\$ 8.97	154,212	28	3,192
143	Saratoga	88	451,142	5,127	\$ 4,416,615	\$ 50,189	\$ 9.79	30,045	15	338
144	Sausalito	32	99,562	3,111	\$ 984,004	\$ 30,750	\$ 9.88	7,207	14	75
145	Scotts Valley	34	147,970	4,352	\$ 1,364,242	\$ 40,125	\$ 9.22	11,150	13	111
146	Sea Ranch	11	29,626	2,693	\$ 271,420	\$ 24,675	\$ 9.16	751	39	22
147	Sebastopol	326	1,421,423	4,360	\$ 12,940,764	\$ 39,696	\$ 9.10	7,557	188	1,066
148	Sonoma	93	1,803,253	19,390	\$ 20,525,517	\$ 220,704	\$ 11.38	9,897	182	1,353
149	Soquel	57	376,808	6,611	\$ 3,367,480	\$ 59,079	\$ 8.94	5,081	74	283
150	South San Francisco	21	262,127	12,482	\$ 2,582,648	\$ 122,983	\$ 9.85	61,354	4	197
151	Stanford	10	52,195	5,220	\$ 475,309	\$ 47,531	\$ 9.11	13,315	4	39
152	Stinson Beach	12	40,647	3,387	\$ 345,294	\$ 28,774	\$ 8.49	751	54	30
153	Suisun City	2	22,695	11,348	\$ 200,154	\$ 100,077	\$ 8.82	26,917	1	17
154	Sunnyvale	128	479,271	3,744	\$ 4,620,283	\$ 36,096	\$ 9.64	130,519	4	360
155	Sunol	4	42,455	10,614	\$ 392,102	\$ 98,026	\$ 9.24	1,332	32	32
156	Tomales	4	9,779	2,445	\$ 117,582	\$ 29,396	\$ 12.02	210	47	7
157	Union City	11	601,296	54,663	\$ 4,337,018	\$ 394,274	\$ 7.21	69,477	9	451
158	Vacaville	91	2,268,744	24,931	\$ 18,748,353	\$ 206,026	\$ 8.26	92,691	24	1,702
159	Vallejo	48	712,099	14,835	\$ 6,596,604	\$ 137,429	\$ 9.26	116,844	6	534
160	Valley Ford	1	9,354	9,354	\$ 88,399	\$ 88,399	\$ 9.45	60	156	7
161	Walnut Creek	86	883,034	10,268	\$ 7,215,541	\$ 83,902	\$ 8.17	63,701	14	662
162	Watsonville	355	792,106	2,231	\$ 7,185,359	\$ 20,240	\$ 9.07	48,709	16	594
163	Windsor	45	523,371	11,630	\$ 4,842,956	\$ 107,621	\$ 9.25	25,294	21	393
164	Woodacre	12	39,549	3,296	\$ 389,346	\$ 32,445	\$ 9.84	1,434	28	30
165	Yountville	4	218,258	54,565	\$ 1,335,048	\$ 333,762	\$ 6.12	3,311	66	164
Grand Total		8,403	82,374,941	9,803	\$ 787,081,994	\$ 93,868	\$ 9.19	6,651,535	12	61,532

Photovoltaic Solar Power Requirement

Under this proposal, all new developments in Hayward (business, residential, commercial and public) will be required to install photovoltaic solar electric power generating systems.

Calculating the Solar Requirement

The amount of solar power production that must be installed is 1 watt of capacity per square foot. Thus a 2,000 square foot house would require 2,000 watts (2 kilowatts) of solar power capacity. A typical California home requires around 4 kw of solar capacity in order to be energy neutral, so this requirement equates to ~50% of a home's total power use.

Where Would It Be Installed?

The solar requirement is calculated on a per-development, not per building basis. And the solar can be installed anywhere in the development. This gives the developer some flexibility to install the solar generating capacity in the most cost-effective manner. In cases where on-site installation is infeasible, a waiver may be granted allowing the panels to be installed elsewhere in Hayward (e.g. atop a nearby school).

Solar Power In Lieu Fee

A developer who chooses not to install their allotment of solar capacity, can opt instead to pay a solar power in lieu fee to the City of Hayward. The fee will be equal to the installation cost (around \$5 to \$10 per watt). All solar power in lieu fees collected will be deposited in a fund controlled by the City. Money from that fund can only be spent on energy efficiency projects in Hayward at the discretion of the City Council.

An Example

A developer that proposes to build one hundred 2,000 square foot homes in Hayward would have their solar requirement calculated thusly...

$$\begin{aligned} \text{Total square footage} &= 100 \text{ homes} \times 2,000 \text{ sq ft/home} = 200,000 \text{ sq ft} \\ \text{Solar requirement} &= 200,000 \text{ sq ft} \times 1 \text{ w/sq ft} = 200,000 \text{ w} = 200 \text{ kw} \end{aligned}$$

Meeting the 200kw requirement can be accomplished in a variety of ways.

1. By installing a 5kw solar array on 40% of the homes.
2. By installing a 4kw solar array on 50% of the homes.
3. By installing a 2kw solar array on 100% of the homes.
4. By paying a \$2,000,000 solar power in lieu fee to the City.
5. By installing a 200kw solar array elsewhere in Hayward (subject to a waiver).
6. Or by a combination of methods...
 - By installing a 4kw solar array on 25 homes = 100kw
 - By installing a 40kw array at a Hayward public school = 40kw
 - By paying a \$600,000 in lieu fee to Hayward = 60kw