

# **Financing Your Solar (PV) System: A Guide for Congregations**



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## **Introduction**

Welcome to the world of solar power financing! The purpose of this guide is to clarify the solar/photovoltaic (PV) financing world as it suits the needs of California congregations in the California Interfaith Power and Light (CIPL) network. As non-profits with unique cash-flow concerns, congregations often face unanswered questions when investigating the possibilities of installing a PV system. This packet will share with you some of the common experiences of our congregational partners in their transitions to solar energy usage.

While not a magical solution, this guide begins the process of answering financing questions specific to non-profit religious organizations under the current tax code. It explores both potential financing options and financial models our congregations are already using. It provides recommendations based on researched, documented, and/or first-hand information.

We want to help empower you as you shift to solar energy. As you consider, plan, and implement a solar energy system for your congregation, please call us. We are happy to work with you to address any problems specific to your congregation's needs. We know solar and we know congregations - and what we don't know, we can find out for you! Thank you for your interest in solar and your involvement with CIPL.

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## CIPL Member Testimonials

**Episcopal Camp Stevens in Julian** just signed a contract for its third solar system, a 5kW system for the roof of their new administration/Stewardship of Creation building. Their 5kW system will cost \$42,802.47, but with their \$3.25 per watt non-profit state rebate they will pay a net total of \$25,969.91(keep in mind that they are not entitled to federal tax credits or the depreciation value of their system). The system will produce \$2,253.00 per year in energy savings. They funded their previous systems creatively, by seeking individual donors to sponsor panels.

From Peter Bergstrom, Director: “Our system has 36 panels, so we could seek 36 donors who would each make a gift of \$750 to sponsor a panel. This is how we funded our previous systems - we had some people who sponsored two or four panels, and others who got together to sponsor one panel. We have a plaque by the display to identify the donors and their memorials. We invited donors to join us in helping to reduce carbon emissions while at the same time providing an endowment for Camp Stevens through the annual savings in our operating expenses.”

Carol Hom, of the **Church of Saint Martin in Davis**, wrote in about the experience St. Martin’s had with the installation of their system and looks forward to putting more panels on their roof: “We financed our solar array internally, with a small scale pledge drive (about half a dozen to a dozen folks contributed various amounts) with the balance taken from our church's maintenance reserve. We allocated the savings in electricity bills to first go toward paying back the maintenance reserve. Our installation occurred when a state program was in place to match a fraction of the costs, but I no longer remember what that amount was [this was before the \$3.25 per watt rebate program and probably administered by PG&E]. If our church has a larger capital campaign, we intend to include solar on the roof of new construction, and perhaps add more panels to existing buildings.”

In **Fremont, Christ the King Lutheran Church’s** system cost over \$80,000 before rebates in 2004; they paid the remaining \$45,000 owed by refinancing the church’s mortgage. This benefitted (and continues to benefit) the congregation in two ways: the refinanced loan allows for lower mortgage payments monthly, and the power the system produces lowers the church’s electricity costs. Christ the King’s system has produced about 31,000 kWh in the last two years. The church has been able to meet half its energy needs from the system, saving about \$2,250 per year, and since the system locks in utility costs at current prices, it may end up saving them even more as energy prices rise. The congregation expect to pay off the system within 15 years, which may be only half the functioning life of the system. Meanwhile, the church has increased its cash flow, which now goes to support other community programs that were previously underfunded.

With three separate rows of panels that combine into one energy storage unit, Pastor Nielsen found it easy to monitor the system by comparing the performance of each panel against the others.\* He notes that, unlike direct solar energy usage, the photovoltaic system doesn’t work better in heat over 75 degrees. The more sun on warm days will boost the system’s performance, but the heat will decrease it slightly. He has tracked high performances of 65 kWh per day in summer, lower winter performances of 15 kWh, and no energy harvesting on cloudy days.

*\*A note on inverters:* When sunlight hits the photovoltaic cells, direct current (DC) runs to the inverter, which converts the power to alternating current (AC). The AC power either flows directly into the building if there is demand, into a backup battery (if the system has them), or to the utility. When the power is sent back to the utility grid, the electricity meter turns backward. Solar energy sounds complicated to many folks, but compared to other kinds of power systems, maintenance for solar systems is fairly easy: in most cases, all the upkeep needed is monitoring the meter for inverter breakdown and changing a system's battery every 5-10 years, and even that part of the process is usually unnecessary for homes and congregations. The electricity meter on a solar system measures the array's efficiency (i.e. power produced), and estimates place solar cells running at least 80% efficient for 30-45 years. Pastor Nielsen saw his meter falling below normal levels into the first year and realized the bug early, so his solar contractor came out in one day to replace the failing part (the inverter) for free.

Nielsen highly recommends their solar panel installation company, Sun Light and Power in Berkeley (see our last page of recommended installers for contact information). The company has been in the solar business since 1976, weathering decades of changing solar technology. They know their trade, and their customer service is admirable. When the Christ the King's system was under-performing, Sun Light and Power sent out workers to fix what they could, and called in the production corporation to replace the inverter unit, all for free. The system has been performing wonderfully since the repairs.

Christ the King has made their solar energy system a visible part of their community, placing in the church's entry a panel with readouts of the system's daily and cumulative energy production. The inverter also lives in the entry, slightly higher overhead but still audible as it does its job of converting energy currents. This serves as an educational tool, encouraging members to consider solar for their own homes and businesses. The panels themselves are visible from the courtyard, placed on the roof of the parish hall building to catch the sun. Pastor Nielsen sees the solar power system as a gift to the congregation's children and grandchildren: not only will they inherit a cleaner world, but they will also be left with cheaper energy costs. For him, the long-term value of a church's solar system is not just in the financial savings but in the benefit to the wider Earth community, and he commends such a commitment to any congregation that can join him.

With a generous donor and ample state tax rebates, solar energy can provide big savings, as exemplified by **Congregation Shir Hadash in Los Gatos**. Five years ago, a member of the congregation donated \$40,000 for the purpose of installing solar panels, and the synagogue made the most of that donation by doubling its power with state tax rebates for half the system cost. They used the funding opportunity to spend roughly \$10,000 on regular roof improvements, including installing a "cool roof" for greater efficiency. The Shir Hadash system contains 140 photovoltaic modules (9.9 kW). The system provides about a quarter of the congregation's energy needs, for a savings of at least \$3-4,000 per year, and even more as energy costs rise. With these savings, Shir Hadash paid off the roof maintenance expenses within three years.

Executive Director Art Scher sees the investment in solar as an easy choice: it has proven significant financial savings, and it is part of the congregation's ongoing discussion about conservation issues. He sees it as an extension of the culture of the synagogue, a part of the community's faithful engagement with the environment and their surrounding community. Los

Gatos neighbors stop by to get tips for their private solar projects, and Scher is always happy to talk with folks interested in moving to solar. Contact CIPL to get in touch with Mr. Scher.

Six years ago, the **San Francisco Zen Center** installed solar, and they haven't regretted their choice yet! The Center's 132 panels (185 watts) provide enough power to supply around half of the congregation's electricity needs each month, for a savings of roughly \$6,000 per year. Surplus electricity generated by the system flows into a utility box, to feed back into the city's energy grid while providing credit for the Center during low-harvest times. Because the panels are fixed, they require no maintenance. Fundraising (\$40,000), a state grant (\$65,000), and operating budget expenses covered the total costs of the system: \$164,000.

Reverend Richard Rubin will be happy to tell you about how **Christ Church of Ontario** installed 108 solar panels (11.1 kW faceplate) in 2002. The church keeps reference materials about the process they underwent to set up their system, to share with anyone, from interested neighbors to publications such as Guidepost magazine, which will featuring the church in its June issue on green living.

The congregation did the installation themselves, savings tens of thousands of dollars on labor costs by utilizing the know-how of their own congregants. Half of their \$76,000 system was paid for by state tax rebates, and the rest was covered by reserves from an investment account, which they are repaying from their energy savings. Saving at least \$5,000 per year on energy costs, the church has almost fully paid back the investment account, while being able to go years at a time without purchasing any electricity from their utility company.

Besides the cost savings, the members of Christ Church Ontario have been very satisfied with their system. Rev. Rubin attests that, besides washing every few months, the system requires no significant maintenance. Further, the solar panels reflect the parish's sense of responsibility about social and environmental concerns. The congregation is happy to know that they are not contributing to greenhouse gases and proud when they raise awareness about the environmental impact of their church operations. To learn more about the Christ Church Ontario solar energy project, feel free to get in contact with us at CIPL (and we can connect you with Rev. Rubin).

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## **How the Solar Energy System Works and How You Save Money**

**Net Metering on an Annual Basis:** Over the course of one year, your utility company will track the amount of electricity your solar power system has sent to the company's energy grid and credit this contribution to offset your costs of purchasing power from them when your system does not generate enough electricity to meet your needs, such as during cloudy days or at night. At the end of the year, the utility will factor together how much electricity it provided to you, and compare it to how much your system fed back to the utility grid. If you produced more than you consumed, your bill will be close to zero. If you used more electricity than you generated, you will only pay the difference.

*Note:* utility rates have increased steadily at 6.7 percent per year over the past thirty years.<sup>1</sup> Thus, installing solar will theoretically 'lock' in how much energy usage your congregation pays for over the course of one year; with rising energy prices, this may prove to be a worthwhile long-term investment.

**Time of Use (TOU) Savings:** Electricity is either billed to customers on a flat-rate schedule where electricity costs the same all day, or on a TOU schedule, where cost is gauged by the time of day and year, respectively. A solar customer on a TOU schedule, producing power at a peak time period, will theoretically 'sell' power back to the utility during peak periods (for example, during sunny summer months) at a high rate and 'buy' back during off-peak hours (for example, when it is cloudy, or during the evening). The customer gets charged or credited for the value of the electricity when it buys or sells electricity, respectively. According to solar expert Andy Black, "The customer gets more value for the same kilowatt hour (kWh) produced, and therefore needs a smaller system to offset their electricity bill" - another perk for investing in solar!

**How Solar Saves You Money and Saves the Planet from Pollution:** Episcopal Camp Stevens and their contractor, Borrego Solar Systems, offer the details of their savings on their new 5kW system, as an example of just how solar "saves:"

- Their system reduced CO2 emissions by 10,244 lbs. annually, or 307,306 lbs. over the lifetime of the system.
- This is equivalent to the emissions from an average passenger car driven 17,496 miles every year for thirty years.
- This is equivalent to the CO2 that would be removed by planting four acres of trees.
- Their system will reduce nitrogen oxide (NO) by 89 lbs. over the life of the system. Nitrogen oxides are a major contributor to smog and air-pollution-induced respiratory problems.

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<sup>1</sup> Andy Black, "Payback and Other Financial Tests for Solar Electric Systems" in *NorCal Solar's 2006-2007 California's Solar Energy Resource Guide* (Hayward: Northern California Solar Energy Association, 2006), 14.

## Tax Incentives for Installing a System

**Federal Tax Credits:** There are several government incentives to promote the use of solar energy in commercial, industrial, and residential systems. Unfortunately, these incentives do not benefit religious organizations. Congregations enjoy non-profit status and thus **are not eligible for federal tax credits**. Andy Black discusses federal tax credits for other sorts of institutions in his recent article, 'Payback and Other Financial Tests for Solar Electric Systems' in NorCal Solar's *2006-2007 California Solar Energy Resource Guide*:

The Federal Investment Tax Credit for **Residential** [systems] is 30% of net system cost, capped at \$2,000. It is a one-time credit, but may be carried forward (and possibly back) if not completely useable in the system installation tax year. It only applies for systems that are installed in 2006 and 2007. It is likely to be extended past its current 2007 expiration date....The Federal Investment Tax Credit for **Commercial and Business** owned systems is 30% of net system cost with no cap. This applies for systems that are installed in 2006 and 2007. After 2007, if not extended, the tax credit will revert to the previous level of 10%....Home-based businesses typically can qualify for this tax credit as well.<sup>2</sup>

A comprehensive list of federal incentives and state programs) can be found at the website:

[www.dsireusa.org](http://www.dsireusa.org).

*A note on depreciation value:* The Internal Revenue Service (IRS) has a five year accelerated depreciation schedule for commercial solar systems; business-owned systems may also be eligible for this commercial tax benefit. In addition, solar systems are exempt from California property taxes (already-tax-exempt non-profits do not reap this benefit), yet the value of a solar system adds to the appraised value of a property.

**State Tax Rebates:** Fortunately, California has a rebate program **which is applicable to non-profits**. Systems that are smaller than 100kW (i.e. most of our congregations) receive incentive payments up-front, based on their expected performance. The rating and rebate of systems takes into account equipment evaluations and installation factors, such as geographic location, tilt, and shading. California's 'GO SOLAR' website explains more:

[http://www.gosolarcalifornia.ca.gov/csi/non-profit/saving\\_nonprofit.html](http://www.gosolarcalifornia.ca.gov/csi/non-profit/saving_nonprofit.html)

All electric customers of Pacific Gas and Electric (PG&E), Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E) are eligible to apply for these state rebates. If a municipal natural gas customer takes electric service from PG&E, SCE, or SDG&E, that customer is eligible for solar incentives as well. Many publicly owned utilities already offer solar incentives (see [www.dsireusa.org](http://www.dsireusa.org) to find whether your utility offers these incentives). All other municipal electric utilities in California must develop such programs no later than January 2008.

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<sup>2</sup> Black, 16.



The state rebate for non-profits starting on January 1, 2007 was \$3.25 per watt, with an additional \$.050 per kWh payment based on performance for systems over 100kW. Our congregations average systems of the 5-10kWs, thus these 'performance based incentives' (PBI) likely do not/will not apply to our members—only upfront state rebates will apply.

The California rebate level has now decreased to \$2.65 per watt for PG&E customers, \$2.95 for SCE customers, and remains at \$3.25 for customers of SDG&E. It is unclear whether the California Solar Initiative (CSI) Rebate program will renew its funding in the upcoming year(s). To find updated information on current rebates offered through the CSI Rebate program, see <http://www.sqip-ca.com/>. If you are having difficulty reading the rebate chart on this site, try [http://www.pge.com/about\\_us/environment/solar/CSI\\_Incentives.html](http://www.pge.com/about_us/environment/solar/CSI_Incentives.html), or call us at 510-444-4078 x 319.

## **Financing Your Solar Energy System: Concrete and Theoretical Models for Non-Profits**

- **Concrete Models**

### **Solar Endowment**

One model proposed by Peter Bergstrom at Camp Stevens, and echoed by a publication cited below,<sup>3</sup> sees investing in a solar system as a creative way to approach a congregational endowment. With state tax rebates and the net savings in electricity costs per year, solar systems may return on an initial investment at a rate higher than that of an already-established endowment fund. If a congregation already has a fund, it can withdraw the principal to pay for the installation of the solar system and use the net savings in electricity costs to pay back the fund over 20-25 years, depending on the size of the system. If the net savings on energy bills yield a higher rate of return than the interest earned on the permanent endowment, the solar system could pay back the principle investment *and* interest lost as a result of liquidating the fund.

### **Split-Interest Gift**

A wealthy member of a congregation may be interested in pursuing a Charitable Lead Trust to help a congregation install solar. Under this model, the donor gives an asset (i.e. a given amount of appreciated stock valued at the amount the congregation requires to complete the solar deal after state rebate) and the congregation sells the stock to purchase the solar system. The congregation tallies its electricity savings in a given amount of years and when it reaches the initial cash value of the stock ‘gifted,’ returns the ‘gift’ to the donor (i.e. the initial cash value of the stock). This option benefits both parties: the donor avoids a capital gains tax on the sale of the appreciated securities and receives a tax deduction for the value of the interest/dividends he or she could have made on the investment; the congregation now has a solar array, has paid off its ‘gift,’ and owns the system outright.

### **Sponsor a Panel**

This model draws from the Camp Stevens example, where a donor or group of donors makes a gift that pays for the system. Plaques or memorials to family members involved in the congregation may encourage participation in such fundraising campaigns.

### **Refinance a Mortgage**

This model draws from the example of Christ the King Lutheran Church, where a congregation refinances the mortgage on their building and uses the freed-up capital to invest in a solar system. The longer payoff on the mortgage increases cash-flow for the

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<sup>3</sup> Rabbi Daniel Greybar and Joseph Lichy, ‘PV Financing for Non Profits: A Solar Endowment’ found at [www.solar2006.org/presentations/tech\\_sessions/t03-m009.pdf](http://www.solar2006.org/presentations/tech_sessions/t03-m009.pdf).

congregation to use for other programs, and the energy savings may, in fact, pay for the repayment on the refinanced mortgage.

- **Theoretical Models: Third-Party Financing**

- Power Purchase Agreements (PPAs)**

Power purchase agreements are not likely to benefit our member congregations, because a Limited Liability Company (LLC) administering the upfront capitol for these projects usually requires a system larger than 200kW. Still, the possibilities of this model should be noted. Under a power purchase agreement, a third-party private investor provides the upfront capitol to fund the installation of the solar array. It serves as the owner-operator of the system, covering insurance and fees for operations and maintenance. The LLC investor receives the federal tax credit as a for-profit entity, and it writes off the panels' maintenance and insurance costs as the owner/operator and holder of the lease. In addition to these financial benefits, the LLC will file for a '5-Year Accelerated Depreciation Schedule' and thus enjoy the highly lucrative depreciation value of the system as well. Meanwhile, the non-profit pays the LLC only for the power their system uses in excess of their power produced.

*Note:* Congregations beware! At the end of the five-year tax shelter, the LLC approaches the non-profit (in this case, congregation) with an offer for the congregation to buy the system outright for a significantly reduced cost. With all the money the LLC has made off this tax loop, a congregation should think carefully about whether it benefits them to own the system outright.

- Lease Outright Option**

This model may work better for our member congregations. One particular LLC group in Mill Valley employs it and will work with non-profits looking to install between 20-200kW systems. This model shares many of the same qualities of the PPA model (i.e. the LLC provides the upfront capitol required for the installation), but instead of the LLC serving as the owner-operator, the non-profit plays a more direct role in the maintenance and insurance of the system. Because the LLC cannot write off its maintenance and insurance costs, the congregation will not (as under the PPA) pay for the power their system produces in excess of their overhead power costs. Instead, the LLC will negotiate a low lease payment with the congregation (a fixed amount paid regardless of what the system produces) and still enjoy the federal tax credit and accelerated depreciation value of the system. At the end of the tax shelter period, the LLC will again approach the congregation with an option to buy out the lease or extend it. It may be in the best interest of the congregation to buy out the system at this point, because paying a fixed sum on this lease (which actually serves as more of a loan) for a long period of time may reduce the energy savings the congregation would otherwise enjoy, as the system becomes less efficient after 15-25 years.

## **Prepayment Option**

This model is not likely to work for our member congregations. This model can only prove viable when a party can afford the high cost of solar installations, which makes small projects prohibitively expensive (as our congregations well know!). This high cost can be blamed in part on the price of production for solar panels. Employing a cost-benefit analysis in our evaluation likewise makes clear that the more power the system produces (i.e. the larger the kilowattage of the system), the less the cost per unit (in this case, per solar panel) matters.

Under this model, congregations pre-pay for their power over several decades. A hypothetical example illustrates this option: A congregation has a yearly power bill of \$5,000 and wishes to pay for this net present value over ten years, so it will put \$50,000 in a fund. If ten other congregations come together and decide to do the same thing, the fund will now be up to \$500,000. This fund will be used to purchase solar panels in bulk, and the sheer amount of savings from doing a massive, aggregated installation will theoretically defray the initial costs significantly. A third-party for-profit entity will enter the equation to administer the fund and serve as the ‘owner’ of the systems and provide the upfront cost, and because of the ‘owner’s’ for-profit status, the systems will be eligible for federal tax credits and an accelerated depreciation scheme. The for-profit company will be paid back by the power the systems actually produce (as under a PPA), but may be repaid at a faster rate because of the initial low cost of installation and the large amount of power the aggregated systems produce, thus allowing the non-profit conglomeration to pay the for-profit third party AND itself back for initial investments and to capitalize on energy savings for the life of the system.

## **Third-Party Investors and Solar Installation Companies**

### **Third Party Investors**

\*Solar Power Partners, Mill Valley

*Willing to work with non-profits who have power needs of between 20-200kW.*

<http://www.solarpowerpartners.com/>

\*MMA Renewable Ventures, San Francisco

*Willing to work with non-profits on PPAs over 200kW, leases over 100kW and prepays between 300-500kW.*

<http://www.mmarenewableventures.com/>

### **Recommended Installers for Non-Profits**

\*Power Light, Berkeley (Greg Rosen), 510-540-0550 x 233

*Worked with Congregation Shir Hadash in Los Gatos on their system, VERY knowledgeable, familiar and supportive of CIPL's work—a great resource.*

<http://www.powerlight.com>

\*Sun Light and Power, Berkeley (Eric Nyman), 510-845-2997

*Currently working with Saint Ignatius Catholic High School in San Francisco on a possible solar installation; worked with Christ the King Lutheran Church in Fremont.*

<http://www.sunlightandpower.com/>

\*Akeena Solar, Los Gatos, Fresno and Clovis, 888-253-3628

*Has done work with synagogues.*

<http://www.akeena.net/cm/Home.html>

\*Marin Solar, Marin (Roy Phillips), 415-456-2800 x2

*Very competitively priced installation company.*

<http://www.marinsolar.com/>

\*Borrego Solar: San Diego, 619-562-7183; and Berkeley, 510-843-1113

*Worked with Camp Stevens.*

<http://www.borregosolar.com/>

\*Sun First Solar, San Rafael (Aran Moore), 415.458.5870

*Working with San Francisco Theological Seminary in Marin, and a local school.*

<http://www.sunfirstsolar.com/>

### **Low-Cost Loan Options**

\*New Resource Bank (see Green Business and Clean Tech. Department)

<http://www.newresourcebank.com/>