



EVERYDAY ENVIRONMENTAL STEWARDSHIP



Financing a Solar Photovoltaic System: Choose the Method that is Best for Your House of Worship

By Jim Nail

Solar panels provide a renewable source of electricity that emits no climate-change-causing emissions. This is reason enough for people of faith to consider installing solar but, of course, there are financial realities that houses of worship (HOW) face. The good news is the cost of solar photovoltaic systems (aka, solar panels that produce electricity) has dropped 40% in the past 5 years, making it quite common that the \$50,000 - \$75,000 cost of a system for a typical house of worship will pay for itself in 7 to 8 years. In addition, several financing options make it even easier. This EES Brief compares these options based on the example HOW and system described to the right.

Baseline: Buying electricity from the utility will cost \$100,000 over the next 20 years

If the example HOW continues buying electricity from its utility, it can expect to spend about \$100,000 over 20 years, assuming a 2.27% annual inflation rate. (2.27% is the average inflation rate for electricity in Massachusetts since 1990.) Since solar panels will last at least 20 years, an HOW considering installing solar panels should compare the economics of solar this business-as-usual case.

There are two financial benefits to consider in determining the financial aspect of solar panels:

- 1. Reduced electricity costs.** Because the panels are producing electricity, the house of worship no longer needs to buy it from a utility such as Eversource, National Grid, WMECO, etc.
- 2. State incentives.** In 2018, Massachusetts is launching a new incentive called SMART: owners of solar panels receive a quarterly payment based on how much electricity the system produces. The example system would receive a total of \$24,000 - \$33,000 over 10 years, depending on what part of the state the HOW is in.

If the example HOW were to buy the panels outright, the solar panels would pay for themselves in about 12 years, even without the state SMART incentive; the SMART incentive brings this down to between 7 and 8 years.

SOLAR EXAMPLE

To illustrate the different financing options, this paper will use the following example system, based on Massachusetts Interfaith Power & Light's experience and approximate system costs as of spring 2018.

House of worship total annual electricity use:
20,000 kilowatt hours (kwh)

Electricity cost 2018:
\$.21/kwh

20-year cost of buying electricity from utility:
\$100,000 (including 2.27% annual inflation)

Solar panel system size:
17 kilowatts DC

Annual estimated solar electricity production:
19,500 kwh

System cost: \$51,000

Many HOWs ask how they can also get the benefit of the 30% federal tax credit. Because this is only available to tax-paying individuals and organizations, it is not available to houses of worship since they don't pay taxes. However, this has spawned what are known as "third party ownership models" where a tax paying company or individual who can use the tax credit funds and owns the system for the period of time required by IRS rules to claim the credit. This paper discusses the advantages and disadvantages of this approach in the "Power Purchase Agreement" section following.

Determining the right way to finance a solar panel system is often the hardest part of the project. No single financing approach will work for all, but there are several options available today:

Purchase: The Greatest Savings, Easiest Process

The easiest, and in the long run, most financially beneficial approach, is to purchase the system. And because of the savings on electricity costs and the SMART incentive, the system will likely pay back this initial cost in 7 – 8 years, then will generate additional savings for at least 12 more years – and likely longer. Houses of worship with an endowment should first evaluate borrowing from these funds to install the system, and use the savings and SMART payments to repay the endowment. Compared to conservative investments like government bonds or certificates of deposit (which likely pay 3% or less currently) an investment in a solar system will likely generate the equivalent of 7% or more.

Advantages: Highest savings, simplest to understand and execute.

Factors to consider: Requires money upfront, either by congregational donations, borrowing from the endowment or a taking out a loan (see below). As owner of the system, the congregation is responsible for maintenance of the system, but this should not be a major obstacle. Solar panels require very little maintenance; the major maintenance item that can be expected is replacing a component called an inverter after about 15 years, which may cost \$3000 - \$5000 depending on the size of the system and the future changes in pricing for this piece of equipment. You may want to pay for an annual inspection, as you do for a heating system or other major piece of equipment.

Loan: Low Interest Rates May Be Available

The purchase of a system may be financed by a loan. The combination of electricity savings and the SMART incentive is likely to provide enough income to cover the monthly payments on a 10-year loan carrying up to a 7% interest rate, meaning this loan would not affect the annual budget. Some denominations offer reduced-rate loans, often in the 4% range; at this rate, your house of worship could save around \$1000 per year – see the Resources section for a list of denominational loans sources.

SMART Incentives Pay Up to Half the Cost of Solar Panels

Massachusetts is launching the SMART (Solar Massachusetts Renewable Target) incentive in 2018. Our example HOW would receive a payment every 3 months for 10 years in addition to the savings on their electric bill. The incentive amount is based on the amount of electricity the panels produced during that period and ranges from about \$.12 to \$.18 per kwh the panels produce, depending on which utility area the HOW is located in. Larger systems (over 25 kw AC) receive a lower incentive (\$.02 - \$.06) for 20 years. All of these incentives will decline modestly as the installed solar capacity reaches defined thresholds in each utility territory, so the sooner an HOW installs the system, the greater the incentive they will receive. Your solar installer will provide details of the SMART incentive you will receive when they design your system.

Advantages: Simpler to understand and execute than methods involving additional parties (such as a power purchase agreement explained below) and long term likely provides greater savings. After the loan payoff, 100% of the savings belong to the house of worship for remainder of the 25+ year life of the system.

Factors to consider: The interest rate limits savings in the initial years and the interest rate will determine how long it will take to pay off the loan.

Power Purchase Agreement (PPA): No Cost Upfront, but Lower Savings and 15 – 20 Contract is Required

This has been the most popular approach for several years. An outside company owns and installs the system, takes advantage of state and federal incentives, and the house of worship only pays for the electricity the system produces. Typically, the cost of the electricity is guaranteed to be 10% (sometimes as much as 15%) below the going utility rate for the 15 – 20 year life of the agreement. The important terms to evaluate are the starting cost per kwh, what if any inflation adjustment is included (and whether this adjustment is a set annual rate (usually 1% - 3%) or is tied to increases in the electricity rate of your utility), and terms for buying the system prior to the end of the contract. Both of MIP&L's solar partners offer PPAs, if a system meets their size requirements.

Advantages: Immediate savings, no money required upfront, the PPA company has responsibility for maintenance of the system. The PPA company has one or more installers that they work with regularly, so the congregation does not need to seek their own installer. Ability to own the system, either at the end of the contract or earlier.

Factors to consider: Requires a 15 – 20-year contract with the PPA company and results in lower savings than owning the system; these contracts are long and require careful review. Requires a relatively large system, at least 30 kw, and often 40 kw or more.

Pre-Paid PPA: A Hybrid Model Offering Good Savings And Early Ownership

Collective Sun, a partner of the national Interfaith Power & Light organization, offers a “pre-paid PPA” that is a hybrid of the purchase and PPA model for relatively large systems, ie, over 50 kw. When the house of worship selects a solar installer, they engage Collective Sun who will bring in an investor who initially funds the installation and takes advantage of the federal tax credits. The house of worship then pre-pays the full cost of the PPA payments which are calculated at 15% below the cost of purchasing the system outright: i.e. If the system costs \$150,000, the pre-paid PPA payment is \$127,500. The house of worship receives no further bills from Collective Sun or its investor, and gets the full savings of the lower electric bills plus the state incentives. The house of worship is free to finance this pre-payment from their endowment, donations/loans from parishioners, or other loan. Collective Sun can help advise on how to raise this money and has models for structuring loans from congregation members that are repaid from electricity savings and state incentive payments.

Advantages: Collective Sun's investors share more of the federal tax incentives with the house of worship than other PPA investors. If the house of worship follows Collective Sun's model for loans from congregation members, the interest rate usually falls in the 3 – 5% range, a lower interest rate than other loan sources but higher rates than other investment options such as certificates of deposit or Treasury bonds that the participating members might consider. MIP&L partner Resonant Energy regularly works with Collective Sun.

Factors to consider: Raising the money for the PPA prepayment upfront. If raised from congregation members, this capital campaign may be perceived as competing for funds needed for other capital campaigns or mixing finance and faith. Some congregations may not wish to mix this sort of financial relationship with the spiritual relationship members have.

MIP&L is also aware of two other unique programs and will assist members in evaluating if they are appropriate for their situation.

Solar Access: Rent Your Roof in Exchange for a Share of the Electricity

This is a program offered by MIP&L partner, Resonant Energy. The easiest way to think about it is the house of worship rents its roof to Resonant and in lieu of cash rent, receives some of the electricity in payment -- usually enough to offset 10 - 30% of their electric bill. Resonant sells the rest of the power to an “anchor institution” with a high electric use, such as a school or municipal building. Resonant owns the system and has full responsibility for maintenance, and also owns the state incentives. So this model is probably the easiest/least demanding on the church, and is mainly about savings for the church (saving as much or more than a PPA). While they don’t get the credits to lower their carbon footprint, they are playing an important role in bringing more renewable energy to the grid and could use some of those savings to buy carbon offsets.

Advantages: No money required upfront, no payments of any kind, guaranteed savings on the electric bill of 10 – 30%, no responsibility for maintenance of the system.

Factors to consider: Likely less savings than owning the system, no reduction in carbon footprint. No opportunity to own the system.

Self-financed PPA: Complicated Legal and Tax Issues, but Higher Savings Potential

Under special circumstances, it may be possible for your congregation to create its own PPA financing organization, though the complexities make this a very rare occurrence. There are significant legal, tax, and accounting issues that must be carefully worked through. The group of parishioners who invest in the system must form a limited liability corporation (LLC) and must have passive income (most commonly rental real estate income) to take advantage of the federal tax credit. Annual corporate tax returns must be filed for the LLC, the LLC must make periodic payments to the investors, and annually issue a K-1 statement to each investor for their tax reporting. But these members will likely be willing to pass more of these savings on to their house of worship than a for-profit PPA financing organization. MIP&L partner Resonant Energy can advise on this approach and provide template documents.

Advantages: Potentially higher savings and/or shorter contract term for the house of worship than a PPA provided by a for-profit PPA financing company.

Factors to consider: Complex and requires expensive legal and tax advice. Congregation members who are potential investors must be identified, solicited and involved in the program. Ongoing administrative tasks must be executed for the life of the contract.

Given the urgency of climate change today, it is imperative that faith communities do all they can to address climate change and installing solar panels makes a significant contribution. With this range of financing options available, houses of worship have choices that will enable them to find one that fits their circumstances. Massachusetts Interfaith Power & Light has advised over two dozen members on their solar projects and will help you!

RESOURCES

Below are links and contacts to MIP&L partners and the organizations mentioned above:

Solar installers

621 Energy: <http://www.621energy.com/> Contact Bob Clarke, clarker@621energy.com

Resonant Energy: <http://www.resonant.energy/> Contact Isaac Baker, isaac@resonant.energy

Energy Sage: www.energysage.com/mipl

This is an online site where you set up a free account, list your property, put in some information about your electric utility and monthly/annual kilowatt hours and subscribing installers contact you if they are interested in the project. An easy way to find multiple installers and get multiple quotes.

Sources of loans

United Church of Christ Cornerstone Fund

<https://www.cornerstonefund.org/churches/borrowing/mortgage-loans/energy-improvements/>

Episcopal Diocese of Massachusetts Green Loan

<https://www.diomass.org/resources/grants-loans/creation-care-initiative>

Unitarian Universalist Association Building Loan Program

<https://www.uua.org/finance/grants/buildings/loans>

Episcopal Church Building Fund (will make loans to churches of other denominations)

<https://www.ecbf.org/loans-parishes-ministries/>

Financing partners

Collective Sun

<https://www.collectivesun.com/>