HABITAT FOR HUMANITY

SOLAR TOOLKIT

PROVIDED BY

RESONANT ENERGY

Disclaimer: This toolkit was created for Massachusetts Habitat for Humanity affiliates in 2023. Some of the information regarding grants and incentives is time-sensitive information that may have changed. Please use this toolkit as an educational guide but seek professional consultation regarding solar, taxes, incentives, or other financial information.

Forward

The purpose of this toolkit is to provide education on solar PV to Habitat for Humanity affiliates in Massachusetts. The intention of the toolkit and research is to reduce barriers to the adoption of solar PV for affiliates and their homeowners.

This solar toolkit is provided by Resonant Energy in partnership with the Massachusetts Clean Energy Center and Habitat for Humanity Greater Boston. Special thanks to the MassCEC for funding the project, to Habitat Greater Boston for their help in facilitating this grant, to Habitat for Humanity Pioneer Valley for their early stage support, and to all Massachusetts affiliates for their time sharing experiences and data to build out this toolkit.

Habitat for Humanity®

Habitat for Humanity Greater Boston

MASSACHUSETTS CLEAN ENERGY CENTER®

RESONANT ENERGY

TABLE OF CONTENTS

Resonant Energy's Solar Toolkit for Habitat for Humanity Massachusetts Affiliate use only

Establishing A Baseline - Results from Affiliate Survey

To begin, Resonant Energy interviewed all 14 Massachusetts Affiliates in order to establish current practices and understanding.

- Half of all MA Affiliates have installed solar PV in the past five years.
- Most Affiliates rely on the solar installer to provide guidance to homeowners who have solar.
- Most Affiliates do not fully account for energy costs when calculating ongoing costs for homeowners.

While no one affiliate has the exact same needs, three main factors emerged as barriers for implementing solar:

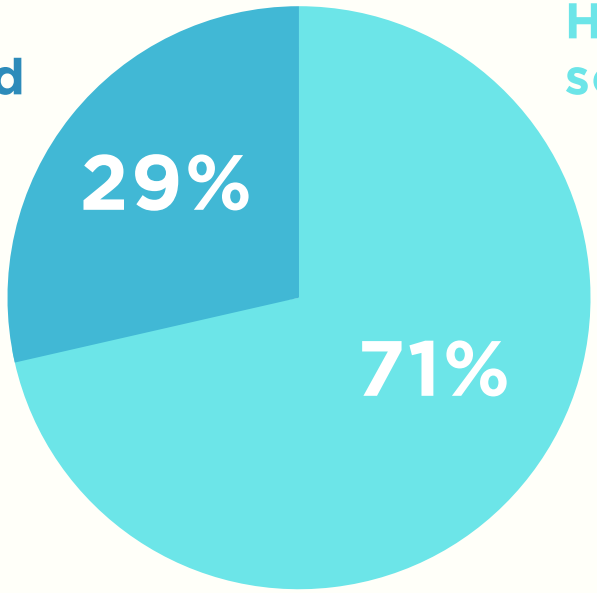
TOP BARRIERS TO INSTALLING SOLAR

1. KNOWLEDGE & UNDERSTANDING
2. COST
3. MAINTENANCE CONCERNS

Habitat for Humanity MA Affiliates

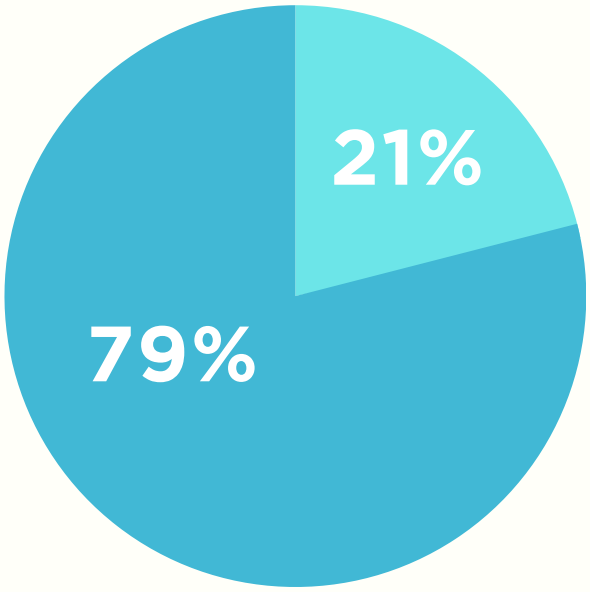
Haven't installed solar

Have installed solar



Feel knowledgeable about solar

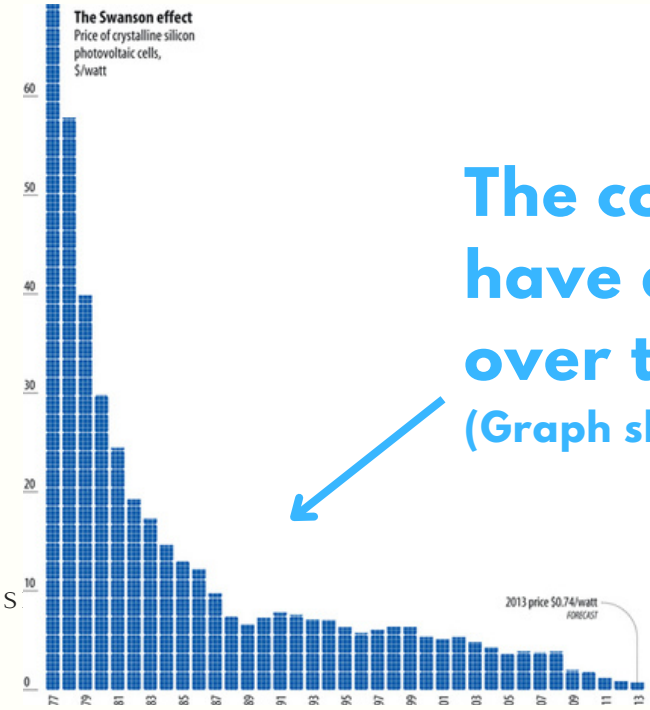
Don't feel very knowledgeable about solar



87% of affiliates do not account for electricity costs as part of long term affordability calculations for Habitat homeowners

SOLAR 101

Solar photovoltaic (PV) technology allows us to capture light from sun, and convert it to electricity to power our homes. Solar PV was **first developed in 1954** at Bell Labs in California. The Carter administration installed Solar PV on the roof of the White House in 1979! These days, solar PV is the **most cost effective way to generate electricity** (cheaper than coal, gas, and oil!).

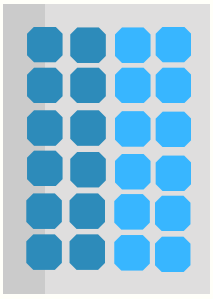


The cost of solar modules have decreased significantly over the decades.
(Graph shows 1977 to 2013)

SOLAR 101

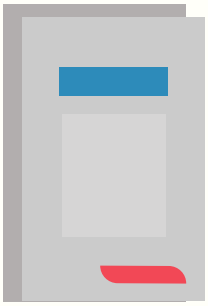
EQUIPMENT

SOLAR PANELS



Solar PV stands for solar photovoltaic (not to be confused with solar water heaters). Solar panels themselves have no moving parts except the electrons that are pushed around by particles of light. Because there are no moving parts, solar panels typically last 25+ years. Multiple panels are wired together to form an **array**, and connected to an inverter and the main electrical panel of the home.

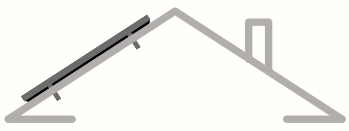
INVERTERS



Every residential solar array is connected to an inverter. The inverter converts the Direct Current (DC) electricity that solar panels generate and turns it into Alternating Current (AC) that is usable by our plugs at home. There are two main types of inverters. A **String Inverter** is a rectangular boxes typically installed in a basement or on the outside of a home. **Microinverters** are installed on the underside of the panels themselves. Both types of inverters offer the ability to remotely monitor panel performance.

RACKING

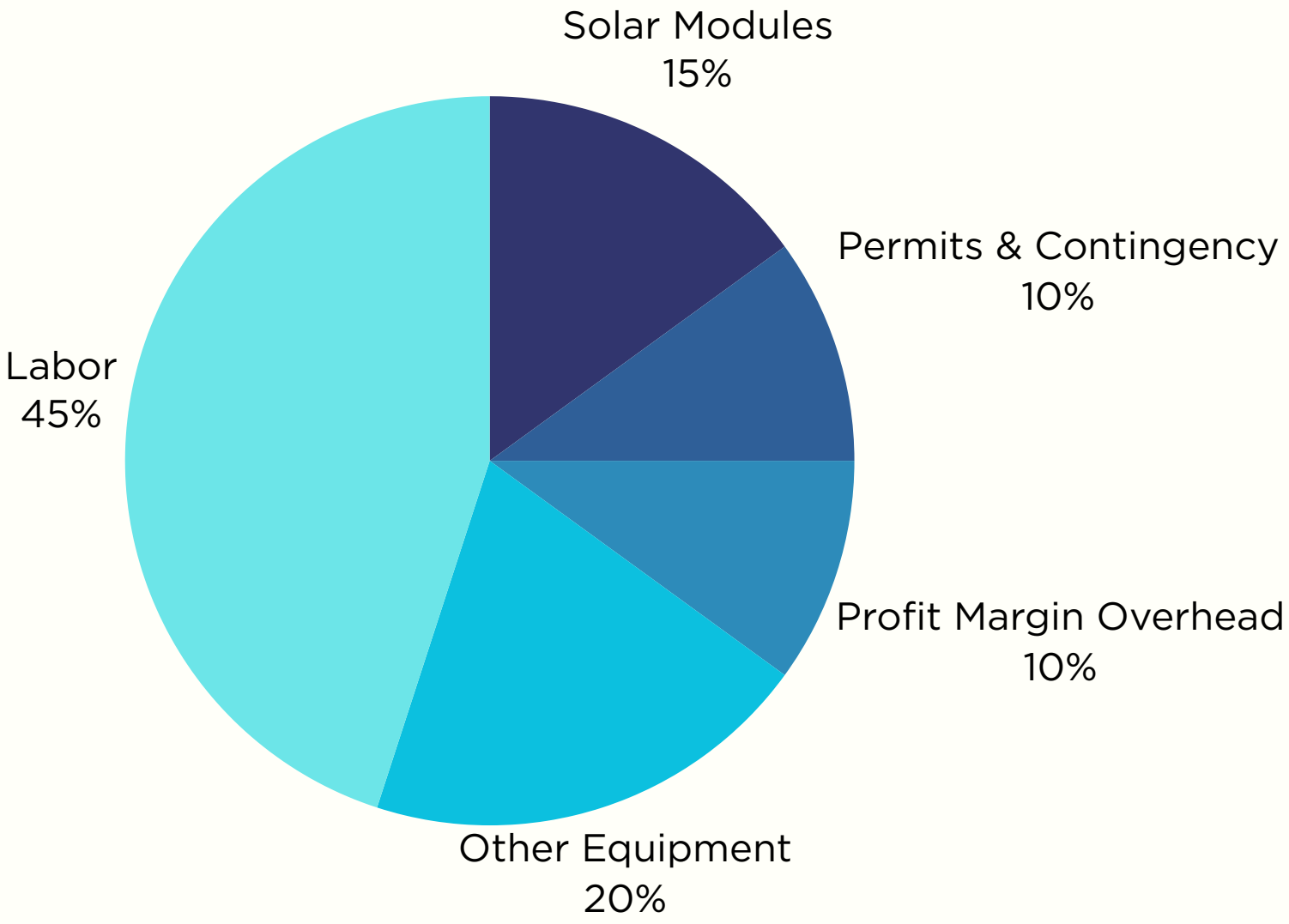
On a flat roofs, panels can be secured to the roof using either attached or ballasted racking. **Ballast racking** is less expensive to install, and requires fewer/no roof attachments. Ballast systems are made up of cement blocks that weigh down the solar array. Typically they require average 5-10 psf of dead load capacity on the roof, while fully attached systems require 3-5 psf.



On a pitched roof, solar is installed with attachments that penetrate the roof to secure the panels. The attachments are flashed and remain waterproof for the life of the system. Both asphalt shingle and metal roofs are compatible with **mechanically attached racking**. A pitched roof requires 2-4 psf of dead load capacity for solar.

COST BREAKDOWN

In 2023, the cost to install a solar PV array can typically be broken down into the following categories:



SOLAR 101

BENEFITS FOR HOMEOWNERS

- Significantly reduces monthly expenses (especially in all-electric homes).
- Increases value of home without raising property tax basis (link).
- Reduces the carbon footprint of a home.
- Can increase the life of the roof by protecting it from UV damage.

BENEFITS FOR AFFILIATES

- Could increase the likelihood of receiving grant funding, land acquisition, and other support to have solar-powered home that is up to green or PHIUS standards.

If Affiliate Owns the System (for at least 5 years)

- Reimbursement of at least 30% of the cost of the system for 501(C)(3)s (see federal incentive section)
- Payments for Renewable Energy Credit (REC) generation via broker or MA SMART incentive program.

COMMON MISUNDERSTANDINGS

Solar is too expensive

- The upfront cost of solar has often been a barrier to homeowners. However, solar loans or third-party-financed options (like leases or PPAs) can make reduced energy costs and clean energy more accessible.

Solar panels can't be recycled

- Solar panels themselves are comprised of recyclable material. An increasing number of organizations offer solar panel recycling services.

Manufacturing solar panels is harmful to the environment

- Solar panels typically offset their manufacturing carbon footprint by year 3 (of a 25+ year lifespan of a system), before being recycled.
- Solar panels are non-toxic & made of metal, glass, silicon, and copper.

Solar PV is a fire risk

- Not when installed properly. Massachusetts enforces strict code requirements for solar PV. All systems must include both rapid shutdown for power outages and manual shutoffs for fire departments and first responders.

You can get a free roof with solar

- The IRS does not allow for roof replacements to be written off or included in the solar tax credit.*

*Most companies advertising this are either A) illegally taking a tax credit on the cost of the roof or B) not actually making the roof free, but rather slightly reducing the cost.

DESIGNING & PLANNING

There are numerous ways to optimize a building for solar. Obstructions on the roof, orientation of the roof, shading, and many other factors can impact a solar arrays efficiency as well as cost of installation. This section will give insight on how to plan and design for solar.

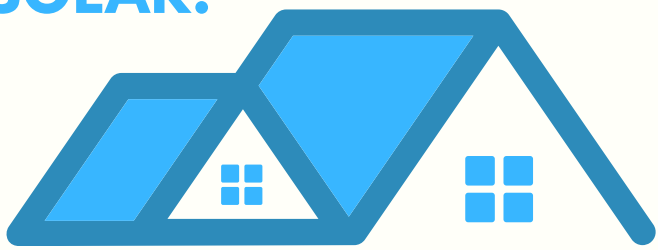
Key Factors

ROOF ORIENTATION

ROOF OBSTRUCTIONS

ELECTRIC PANELS

DESIGNING & PLANNING FOR SOLAR: PITCHED ROOFS



- Solar PV performs best on **south, east, and west-facing** sloped roof planes (south is best, north facing is not good).
- An **11/12 Pitch** (42 degree) roof is ideal for optimal solar production in Massachusetts, though most roof angles are still feasible.
- Current 2023 **fire code restrictions** mandate a clear 3ft path on one edge of two different roof planes. Local installers should have knowledge of how these restrictions are being enforced.
- **Consolidate obstructions** like chimneys, pipes, vents, and skylights on roof planes without solar.
- Asphalt shingle is the preferred pitched roof material. Metal roofs are also compatible with solar, but can be more costly to install on.
- Dormers on roof planes with solar potential add shading and increase the cost to install; they should be avoided if possible (opt for a shed dormer if a dormer is required).
- Plan for **2-4 PSF** of additional dead load capacity.

DESIGNING & PLANNING FOR SOLAR:
FLAT ROOFS

- Current 2023 **fire code restrictions** mandate a 4ft gap between the roof's edge (or parapet wall) and solar panels, so very small flat roofs are likely not good candidates for solar PV.
- Retain a clear, uninterrupted area for solar by placing vents 2ft from the roof's edge (within the fire code setback) or near other obstructions, minimizing rooftop equipment overall, and **consolidating required equipment** in one portion of the roof (preferably the north side). Panels should not cover drains or vents.
- White EPDM is the **preferred roof membrane type** as it deflects heat and is considered a cooler option for the building. TPO is less expensive to install, but more expensive for roof penetrations.
- Plan for **10 PSF** of additional dead capacity for fully a ballasted array, or 5 PSF for a fully attached array, though note that every attachment on a flat roof costs roughly an additional $100.

DESIGNING & PLANNING FOR SOLAR:
ALL ROOFS

- **Avoid large trees shading rooftops**, as they will greatly reduce the performance of solar panels. If possible, plant low growing trees and bushes around homes, and concentrate any taller trees on the northern side.
- If building townhouse-style condos, separate roofs to allow for separate solar arrays for each homeowner. This would mean that each condo owner should individually have roof rights and responsibility for their section of roof so they can go solar without consulting other condo owners.
- All major roof shingle and membrane brands have relatively straight foward ways for ensuring their manufacturer warranty continues after a solar installation. Your solar installer should manage this warranty continuation process, and procure a roof warranty continuation letter from the manufacturer following the installation.

DESIGNING & PLANNING FOR SOLAR: ELECTRICAL

Prepare the Electrical Panel on Single-Phase Utility Lines:

For **single-family** homes or townhouses**:**

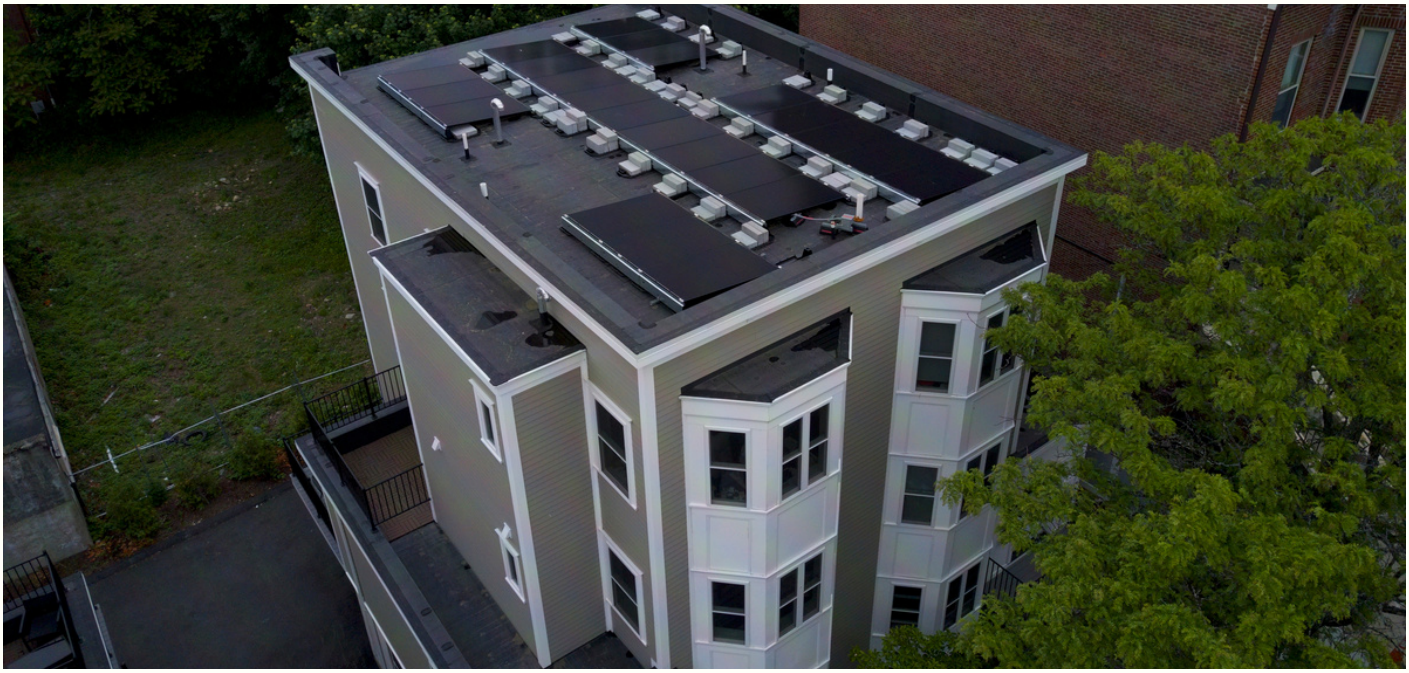
- Install a Main Circuit Breaker. Make sure that the house panel is installed with the main breaker in it, then installers can connect solar without an additional cost, following electrical code 705.12(A).
- The dedicated breaker for solar PV should be sized by a licensed electrician based on the specific size of the PV system.
    - A 5kW-AC system typically requires a dedicated 30amp breaker; and a 10kW-AC system requires a 60amp breaker.
- Internal conduit run can be planned as an aesthetic consideration to avoid conduit running along the outside of a home. As a general placeholder, we recommend 2" EMT conduit terminating in the attic space of a sloped roof, or on the roof of a flat roof.

For **multi-family** residences (ex. double/triple deckers):

- Solar can either tie into the common/house meter to offset centralized HVAC/laundry/electric hot water, OR it can be set up as standalone, with electricity credits sent at a chosen ratio to units.

DESIGNING & PLANNING FOR SOLAR: ELECTRICAL

All electric homes are ideal to have solar offset costs. Consider electric air source heat pumps, and heat pump hot water heaters to increase electrical usage.



Behind the Meter VS Stand Alone Meter

Behind the meter is the default setup for most rooftop solar projects. It allows electricity generated by the solar array to power a home directly and only export net monthly excess to the grid (net metering).

Standalone meters are more expensive to install. 100% of the output generates net metering electricity credits, which can be flexibly allocated to several different meters. This may make more sense for condominiums with a shared roof.

CURRENT INCENTIVES

FEDERAL & STATE INCENTIVES

The incentives reported in this section may change, run out, or be location-specific. Please confirm with the solar installer, DOER, or utility that the incentives apply to your project.

Federal ITC | **MA Tax Rebate** | **SMART/RECs**

INCENTIVES SUMMARY

These are the four primary benefits associated with a solar system. Depending on the ownership structure, these benefits may flow to the homeowner or the system owner. If the Habitat Affiliate is the system owner, they will receive these benefits.

FEDERAL ITC

- 30-50% reimbursement on the cost of a solar system
- Awarded to **system owner**

SMART

- Monthly cash payments sent as a direct deposit
- Available for first 10 years
- Awarded to **system owner**
- **May not be applicable for most projects. RECs may be applicable from the start**

RECS

- Renewable Energy Credit (REC) sold on the open market
- Available after SMART runs out
- Awarded to **system owner**

ELECTRICITY

- Ownership: Offsets the energy usage of the **homeowner**
- PPA: sold to the **homeowner** by the **system owner** at a fixed rate for a 20-25 year term (that should be lower than utility rates)

Federal Solar Tax Credit
+ Equivalent Reimbursement for Nonprofits

In August 2022, President Biden signed into law the Inflation Reduction Act (IRA). Among many other things, the IRA increased the federal solar tax credit to 30%, and offered the possibility to increase that credit significant through many different 'adders'. Listed below are only the adders most relevant to Habitat for Humanity MA projects. This federal incentive landscape is **in place until 2032**.

The adders are ONLY applicable if the nonprofit chooses to own the systems for at minimum 5 years and to claim the credit or if the system is owned by a 3rd party financing company they will receive the additional ITC. **If the system is owned by the homeowner, they are only eligible for a 30% benefit as a tax credit.**

30% Baseline

All US solar projects receive a Federal Solar Investment Tax Credit (ITC) worth at least 30% of the total cost of installation (labor, materials, etc.). Additionally, nonprofit system owners can now **receive this tax credit as a reimbursement**, in the form of 'Direct Pay', also known as Elective Pay.

+10% Environmental Justice Location

Solar arrays sited in New Market Tax Credit zones can apply to receive this adder, bringing the ITC up to 40%.

+10% Energy Communities & Brownfield Sites

Projects sited near former coal communities (parts of census tracts near Salem, Fall River, and Holyoke), or certified brownfield sites can automatically receive an additional 10% ITC adder.

+10% Domestic Content

Projects built using mostly domestically sourced materials can automatically receive this adder. As of 2023, the added cost to qualify for this adder exceeds the tax benefit, but this may shift in the coming years as more domestic manufacturing facilities come online, prices drop, and supply chain documentation becomes more available. Domestic Content Details & Incentive Map

STATE INCENTIVES

SMART
MASSACHUSETTS SOLAR PROGRAM

Solar Massachusetts Renewable Target (SMART) is the primary state solar incentive. SMART is a declining block program and may not be advantageous in some areas at this time. This incentive comes in the form of monthly cash payments paid by the utility to the system owner. Payments are based on the 'SMART rate' multiplied by the amount of electricity generated by an array. The sooner a project applies, the higher the 'SMART rate'.

As SMART blocks continue to fill up, certain projects will do better receiving and selling Renewable Energy Certificates (RECs) instead. As of 2023, an eventual replacement for SMART is being developed by state lawmakers. Projects already receiving SMART will not be affected.

The SMART program does not apply to projects in municipally-owned electric utility districts (also known as municipal light districts, or MLD's).

SMART incentives have declined since the writing this report so that it is not advantageous for most residential and small commercial applications. In the next few years, there will be a SMART 2.0 that may add additional incentives, but for now is no longer the most beneficial incentive.

PARTICIPATING UTILITIES:

nationalgrid EVERSOURCE Unitil

STATE INCENTIVES

RECS

Renewable Energy Certificates (RECs) are certificates granted to the owner of a solar array , are sold in an online marketplace.

- Value is determined by market supply and demand.
- Typically, an installer will help set up the client to sell their RECs.
- Solar PV owners who receive SMART for a period of time will receive RECs once their SMART period has expired.

  Installers will typically not support the brokerage set up at this stage, since it would be either 10 or 20 years after installation.

Solar installer will select a broker to set up RECs. The installer will walk the client through the necessary steps and set up the process on the client's behalf.

Example REC Brokers/Aggregators:

- Hampshire Owner
- Knollwood Energy

Note: Resonant Energy offers no endorsement for specific vendors for this service.

STATE INCENTIVES

Massachusetts Solar Rebate

Massachusetts offers a residential income tax credit of 15% of the solar array cost up to $1,000. This would only be applicable if the homeowner purchases the solar array so long as the cost of the system is itemized as part of the sale price to the homeowner such that they could clearly point to an amount paid for the solar PV system. If the Affiliate purchases the array, but waits to turn on the array until the homeowner technically owns it, the homeowner may be able to qualify for this credit.

Massachusetts Solar Property Tax Exemption

While Solar PV can increase the value of a home, the system itself is exempt from property tax for a 20-year period (link), as long as it is:

- Sized 25 kW AC or less (typically all residential projects); or
- Does not produce more than 125% of the annual on-site electricity needs of the property (also typical on all residential projects)

Net Metering

Most solar arrays will produce more electricity than needed at certain times of the day or in particular seasons. Net Metering allows solar PV owners to receive credit for this excess energy to use on electricity later on in the day, month, or year. Both Eversource and National Grid offer Net Metering in Massachusetts, so that the value of electricity generated by the residential solar array will be the same as what one would pay the utility for electricity.

There is currently a net metering cap of 10kW AC, though legislation may increase this to 25 kW AC. For now, it is advisable to stay within the 10 kW AC cap so Habitat or the homeowner can reap the benefits of net metering.

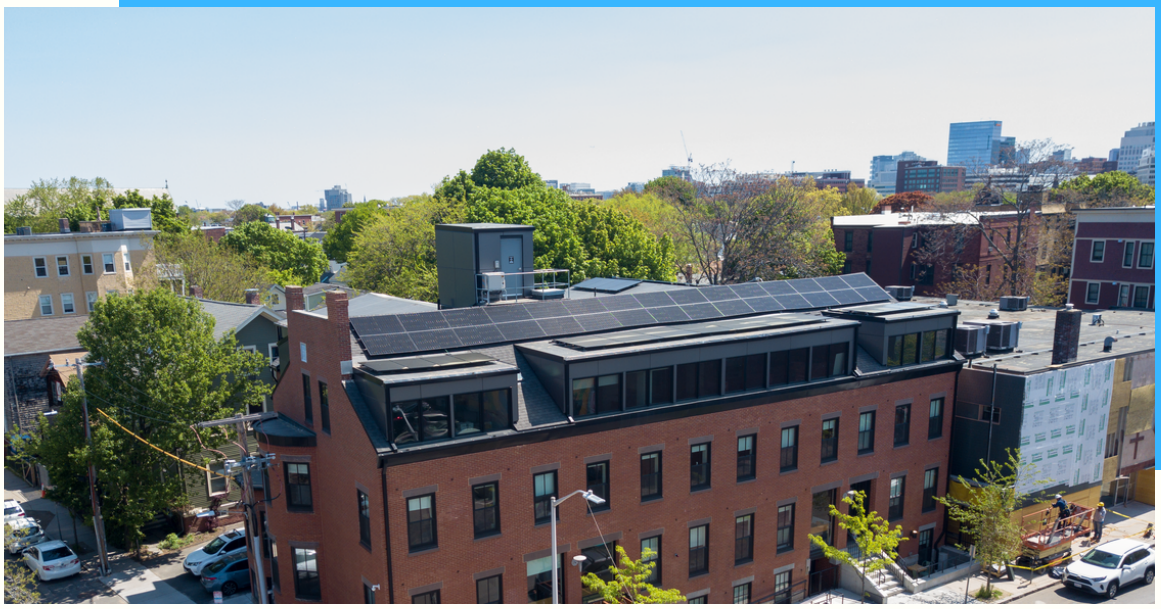
FACTS

Did you know Massachusetts has one of the highest Electricity rates in the country?

On average, electricity rates rise 3% year over year.

Municipal Incentives

Local and Municipal incentives vary more than the federal and state incentives. This is a list of local incentives that are currently offered in Summer 2023. They may run out of funding, decrease in value, change, or become no longer applicable.



- Concord Municipal Light Plant - Residential Energy Efficiency Rebate Program
- Wakefield Municipal Gas & Light Department Solar Rebate Program
- Wellesley Municipal Light Plant - Residential Energy Efficiency Rebate Program
- Mansfield Municipal Electric Department - Residential Energy Efficiency Rebate Program
- Hudson Light & Power - Photovoltaic Incentive Program
- Taunton Municipal Lighting Plant - Residential PV Rebate Program
- Town of Ipswich Electric Light Department Solar PV Rebate Program
- Shrewsbury Electric & Cable Operations Solar Rebate Program

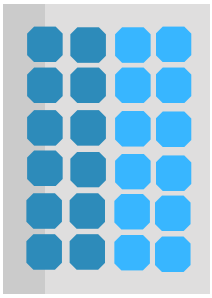
Check out this website and filter to see incentives available in Massachusetts.

IMPLEMENTING SOLAR

RECOMMENDED EQUIPMENT & FINANCIAL OPTIONS

There are a multitude of ways receive the benefits of a solar energy, and lots of different equipment to pick from. We'll outline the options best suitable for Habitat for Humanity Affiliates and homeowners.

EQUIPMENT RECOMMENDATIONS



MODULES

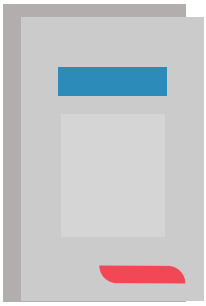
*We recommend using **Tier One Module Manufacturers** according to Bloomberg. Tier One list ranks panels' bankability and can change quarterly. Modules not only vary in size but color and warranty length. Standard modules typically come with a 12 year product warranty and a 0.5% - 0.7% degradation rate in their 25 year production guarantee, while premium modules offer a 20-25 year product warranty and as low as a 0.25% degradation rate.*

Standard Modules:

- Canadian Solar
- Hanwha Qcell
- JA Solar
- Trina, and more.

Premium Modules:

- REC - *20 yr*
- Maxeon (formerly Sunpower) - *25 yr*
- Panasonic - *25 yr*



INVERTERS

If you are adding optimizers (MLPEs) make sure they are the same brand as the inverter. We do not personally recommend pairing any MLPEs with inverters of a different brand even if it claims to be compatible.

- **String Inverters:** SolarEdge (use SolarEdge optimizers)
- **Microinverters:** Enphase

RACKING

Most racking is high quality, most brands are sufficient.

Sloped Roof

- Snap n Rac
- IronRidge

Flat Roof

- Unirac/ Ecolibrium (most common)
- Panel Claw
- IronRidge
- Sollega

IMPLEMENTING SOLAR

Overview

There are various ways to include solar PV in future home builds. Some affiliates have ongoing relationships with local solar installers to donate a few systems a year. Others receive significant discounts or grants. However, not all affiliates can rely on charitable contribution for all of their builds.

In theory, the simplest way to include solar PV in home builds is to model monthly utility expenses when determining mortgage payments. Therefore, higher efficiency buildings and solar PV would be valued, and mortgage payments could then be higher, while monthly operating expenses for homeowners would be much lower, providing a net benefit to homeowners. However, at this point most Affiliates have very little flexibility in the way they determine mortgage payments, so this remains a theoretical solution, but not a practical one.

Many affiliates have left significant state and federal incentives on the table. The following pages include practical models for including the cost for solar in project builds while maximizing the use of incentives, as well as guides to support homeowners who want solar PV on homes built without it.

Model #1: **Affiliate Donation** *(Maximum Homeowner Benefit)*
Model #2: **Internal Operating Lease** *(Recoup Affiliate Investment)*
Model #3: **Building Solar Ready with Homeowner Coaching**
Looking Forward: **Solar For All Grant**

Habitat includes solar in home build

Solar greatly reduces monthly costs for homeowner

Solar generates monthly SMART payments, Tax Credit, & MA rebate

IMPLEMENTING SOLAR

MODEL #1:
Affiliate Donation

In this model, the Affiliate purchases the solar array, then waits to place the array in service until after the home is sold. The **array is included in the sale of the home and itemized as a cost in the purchase and sale agreement.** The homeowner *may* then able to claim both the MA state tax credit for residential systems (worth up to $1,000), as well as the Federal investment tax credit (worth 30% of the total cost of the system). *Note: no adders are available for the IRC 25D solar credit when the homeowner claims the credit directly.*

This is a good option for Affiliates that have access to capital, don't mind not recouping any return on their solar investment, and are seeking the most straightforward avenue to including solar in homes while **maximizing homeowner benefit** and allowing the homeowner to claim all available incentives.

Here's an example: 5.6 kW Array

$19,000 Affiliate net cost

-**$19,000** upfront cost (not including any installer discounts or solar specific grants)

$46,900 Homeowner net benefit

+**$42,000** utility savings over 25 years
-**$5,000** maintenance costs
+**$6,700** state and federal tax credits
+**$3,200** REC/SMART revenue

Benefit to Habitat

- Simple approach from a legal/admin perspective
- Affiliate has no ongoing liability or responsibility for solar

Benefit to Homeowner

- Receive free electricity for the lifetime of the array
- Increased property value without increased property tax
- Receive tax credits worth a significant portion of the cost

IMPLEMENTING SOLAR

MODEL #2:
INTERNAL OPERATING LEASE

For Affiliates installing solar on more than 3-4 homes a year, an Internal Operating Lease may make sense. In this model, the Affiliate has a site license to use the roof of the home. For at least five years (the tax credit recapture period), the Affiliate owns the array, claims all of its associated incentives, and **charges a steady monthly payment (less than the average cost from the utility) to the homeowner for use of all of the electricity**. Instead of purchasing most of their power from the utility or another energy supplier, the homeowner would purchase the energy generated by the array. This will guarantee the homeowner savings while helping to pay back the cost system to the Affiliate. **Affiliates can decide how large of a monthly payment to charge, or charge as little as $0** if full return on investment is not a priority. The homeowner would be responsible for system maintenance.

Due to the complexity of this model, we recommend setting up a separate legal entity to own the solar systems. The ongoing administrative requirements of the model should also be considered, as the entity would be responsible for billing. **This model will not make sense for many affiliates**, but could to those for whom some legal & administrative complexity is not a significant barrier.

Example Payment Structure

Monthly Homeowner Payment	Total Recouped Over 25 Yrs
$0	$0
$25	$7,500
$50	$15,000
$75	$22,500

Here's an example: 5.6 kW Array

$9,100 Affiliate net cost

-$19,000 upfront cost to Affiliate
+$9,900 ITC Direct Pay & SMART/RECs
+$0 - $20,000 *monthly payments from homeowner over 25 years*

$37,000 Homeowner net benefit

+$42,000 utility savings
-$5,000 maintenance costs
-$0 - $20,000 *monthly payments to Affiliate over 25 years*

Benefit to Habitat

- Receive federal and state incentives worth at nearly 50% of total cost
- Receive monthly payment from homeowner to **recoup as much of the investment as is desired**

Benefit to Homeowner

- Steady, predetermined, affordable monthly rate for electricity for 25 years
- Cost-effective **option to purchase the system outright in years 5-25**

IMPLEMENTING SOLAR

MODEL #3:
Solar Ready with Homeowner Coaching

For projects that are not able to incorporate solar into the budget, we highly recommend **building solar-ready using our roof & electrical recommendations**. Affiliates can then provide support to homeowners who may want to go solar on their own (either through a no-cost, third party PPA or by purchasing a system themselves).
The landscape for solar for low income homeowners will likely shift dramatically after the implementation of the state's Solar For All program (see next page). **We recommend homeowners should wait for Solar For All before making any decisions**. Homeowners looking to get solar now should know the following:

Financing **Homeowner Ownership**

For ownership, solar PV financing can typically be attained with better terms than traditional loans. **We recommend a solar loan** via UMassFive Credit Union's MySolar Loan Program, or support via the Capital Good Fund.

Financing **Third Party Power Purchase Agreement/Solar Lease**

- We **caution against working with large national vendors** for residential PPA's or solar leases. In general, these organizations have not had a demonstrated track record in educating and serving low-income consumers.
  - It is imperative that homeowners read the PPA carefully
  - Maximum rate escalator of 2% per year, less is preferred
- PosiGen is a provider with significant track record serving low and moderate income households nationally, & is currently operating in Worcester/Springfield.

Ongoing Care

- Check monitoring monthly (sign up for the provided monitoring app to make this easier).
- If producing less electricity than expected, contact the installer ASAP.
- If desired, sign up for a third party maintenance plan to have a third party monitor the system.
- Do not clean the panels; personal injury or damage to the equipment can result.
- Some brands of inverters may need replacement after 12 years. It is important to define who is responsible for the system and who would replace the inverter after the warranty if necessary.

LOOKING FORWARD

Solar For All Program

The DOER and Mass CEC are applying for a $250 million Solar for All Grant from the EPA, as part of the Greenhouse Gas Reduction Fund. Funding will likely be available that could dramatically improve economics for solar projects for low income households. “Low Income” will likely be determined by the R-2/R-4 utility rate class.

R1 Non-heating customers who use gas for cooking only, and/or clothes drying, and/or water heating are billed on the R-1 rate.

R2 Eligible non-heating customers billed on the R-2 rate receive a discount on their monthly gas bill.

R3 Customers using gas for heating.

R4 Customers primarily heating the residence with electric heat and qualify for a discount via government assistance programs.

All Habitat for Humanity homeowners should qualify for R2 and R4 rates, which reduces electricity costs by 25%. **Making sure new homeowners have submitted income verification forms and qualified for these rates should be a priority for Habitat Affiliates.**

Keep informed on this program as there may be applicable funding for Habitat for Humanity projects if you apply.

LOOKING FORWARD

CONCLUSION

There are multiple ways for Affiliates to include solar PV in their home build costs. For smaller Affiliates, including the solar array in the home sale may strike the best balance between simplicity and homeowner benefit.

For larger Affiliates, the Internal Operating Lease model can help sustain many solar arrays without significant burden on staff or reduction in benefit to homeowners.

Lastly, for projects that simply cannot include solar up-front, our guide to building solar ready and educating homeowners on ownership or PPA options can help reduce the energy burden on homeowners.

We hope the guidance in this Solar Toolkit encourages Affiliates that haven't installed solar before to try it, and for more experienced Affiliates to explore a slightly more complex (and beneficial) option like Internal Operating Leases.

We are facing both a housing crisis and a climate crisis. While it isn't a cure-all solution, solar has the capacity to reduce carbon emissions, provide emission-free energy, and financially empower both Habitat Affiliates and Homeowners. Let's get to work!

MASSACHUSETTS CLEAN ENERGY CENTER®

Habitat for Humanity®

RESONANT ENERGY

CITATIONS

- https://oilprice.com/Energy/Energy-General/Solar-Is-Cheapest-Energy-Source-Says-IEA.html
- https://www.seia.org/initiatives/solar-tax-exemptions
- https://www.epa.gov/hw/solar-panel-recycling
- https://solarisrenewables.com/blog/what-is-the-carbon-footprint-of-solar-panel-manufacturing/
- Graph: https://www.consumerreports.org/energy-saving/real-cost-of-leasing-vs-buying-solar-panels/
- https://programs.dsireusa.org/system/program