

# Solarize 2022

Cornish - Plainfield - Windsor – Hartland

Feb. 26, 2022

## A Guide to Solar

### Why install solar?

**It saves money - Solar reduces your electric bill. If you generate more power than you use, you'll earn credits.**

**It adds value to your home - Solar systems increase the market value of an average-sized home by about \$15,000.**

**You'll lower your carbon footprint - Solar PV installations mitigate the effects of the climate crisis. The more we install, the better.**

**More energy independence - Generating your own makes you less reliant on utilities. During blackouts, your solar – plus home batteries – will keep your home humming.**

**Increase grid stability - If you share your solar with your local utility during peak demand times, they won't need to buy dirtier options, like coal.**

**For more benefits, check out this U.S. Department of Energy overview:**

<https://www.energy.gov/energysaver/benefits-residential-solar-electricity>

### Types of solar

Your own rooftop - "PV" (Photovoltaic) panels on rooftop racks and mounting systems.

Carport, canopy, or garage - smaller alternatives in sunnier places.

Fixed ground-mounted arrays and trackers that follow the sun across the sky.

Renting from an off-site array - leasing shares from a net-metering group.

Community-owned solar - going in with area homeowners in a special arrangement.

### Off-grid or grid-connected?

Living off the grid might be the best choice if you:

- Yearn for self-sufficiency
- Never want to pay an electric bill
- Live in a remote area without grid access

But the disadvantages add up:

- Higher up-front equipment/battery costs
- No way to recharge your EV after dark
- Scant generation on rainy/dark days
- Being more frugal with electricity in winter
- Wasting your surplus power if your batteries are full (you can't feed it to the grid)
- Using a back-up generator when guests stay
- Might complicate renting or selling your home

## Selecting a contractor

Get at least two (and preferably three) estimates; it's surprising how different they'll be. Be present at the site visit to answer questions (your roof's age and structural integrity, etc.) Don't sign a contract unless you understand (and are comfortable with) the fine print. Still have questions? Contact your energy committee.

**For contact info to our six installers, see "Resources"**

## What to look for in a solar estimate

1. Your current electrical usage and what your future consumption might be.
2. A site analysis using "Pathfinder" (or equivalent) to determine the best location for panels.
3. Whether your roofing and roof structure are strong enough to handle an array.
4. Two important numbers:
  - **Return On Investment (ROI)** - How much you'll save in what amount of time.
  - **Payback Period** - How long it will take for your solar system to pay for itself.
5. A list of the solar equipment the installer will use.
6. An itemized budget showing labor, equipment, and other costs.
6. Who will obtain (and pay for) which permits:
  - Utility interconnect applications;
  - Local permits;
  - Town inspections (Plainfield may be the only one requiring this);
  - Financing (loan applications).
  - Costs for purchasing and installing an additional meter
7. The amount of the federal tax credit you can expect to receive.
8. Payment schedule and financing options.
9. Warranties on panels, inverters, workmanship, and servicing.
10. Added options to consider (heat pumps, home batteries, water heaters, etc.)
11. The project's start and completion date.
12. A list of any subcontractors the installer will use.

## When the installation is complete

Your installer should inspect the system, verify that it's operational and working as it should, and provide you with all documentation: warranties, manuals, and loan papers.

If you own your solar system, you will be responsible for maintaining it. If a third party owns it, they will maintain it, though you may need to do specific tasks. If so, that should be written into the contract. Either way, it's a good idea to keep your eye on it. If something looks wrong, it gets damaged, or is excessively dirty, get in touch with your installer.

## Financing

Search for "solar," "green energy," or home equity loans at banks and credit unions, and don't forget – many solar installers offer competitive choices.

Mascoma Bank <https://www.mascomabank.com/personal-banking/loans/solar-and-energy-efficiency-loans/>

Vt. State Employees Credit Union, (VSECU) <https://www.vsecu.com/financial/clean-energy-loans/about>

PACE - a solar (or energy efficiency) loan that you repay through an assessment that's added to your property tax bill. <https://efficiencyvermont.com/services/financing/homes> or <https://www.cesa.org/new-strides-residential-pace-space/> Not available in all towns.

A Solar Financing guide from the Clean Energy States Alliance. Provides the pros and cons of three popular residential loan options.

<https://www.cesa.org/wp-content/uploads/Homeowners-Guide-to-Solar-Financing.pdf>

### **Don't forget...**

Electric rates are rising. The longer you wait, the higher your utility bills will be.

Solar technology is improving, but government incentives are not.

### **Renewable Energy Certificates**

A **Renewable Energy Certificate (REC)** is a unit of clean electricity, whether produced by solar, wind, or some other renewable source. One megawatt-hour of clean electricity equals one REC. If you own the RECs that your solar system produces, you have the legal right to say that you consume renewable energy. This is important, because RECs have a monetary value. Utilities buy and sell them and are required to draw a certain percentage of their power from clean sources. If you don't own your RECs, you can't claim that you're consuming the clean power that your system is making. In effect, you're using whatever power the grid provides. If you're working with a third-party owner or with a developer, you might not have the option of keeping your RECs.

Either way, you'll need to decide at the outset, when you apply for a state permit. Unless you clearly state that you intend to retain ownership of your RECs, they will automatically go to the utility. Once the decision is made, you won't be able to change it.

If one of your goals in getting solar panels is to personally be using solar power, then you will probably want to consider keeping your RECs. For more detailed REC information, speak with your installer and Energy Committee member.

### **Info on RECs for N.H. (PUC):**

[https://www.puc.nh.gov/Sustainable%20Energy/Renewable\\_Energy\\_Source\\_Eligibility.htm](https://www.puc.nh.gov/Sustainable%20Energy/Renewable_Energy_Source_Eligibility.htm)

<https://www.puc.nh.gov/receligibility100kwol/RECEligibility100KWOL.aspx>

**Info on RECs for Vt. (Vermont Public Service Department):** (See p. 25)

[https://publicservice.vermont.gov/sites/dps/files/documents/Renewable\\_Energy/Vt%20Guide%20to%20Residential%20Solar%202016.pdf](https://publicservice.vermont.gov/sites/dps/files/documents/Renewable_Energy/Vt%20Guide%20to%20Residential%20Solar%202016.pdf)

### **What is net-metering?**

Net metering is how utilities compensate their customers for the clean energy they send to the grid. Your monthly electric bill will show how your electric production compares with what you've consumed. If you've generated more than you've used, your bill will show a credit. These credits accumulate in the summer, when days are long, and will be used up in the winter months, when your system is generating less power.

How Green Mountain Power customers show net-metering credits on a customer's bill:

<https://greenmountainpower.com/wp-content/uploads/2017/07/New-Net-Meter-Insert.pdf>

**In Vermont**, net-metering credits must be used within a year of the date they're generated. Since 2021, the state has held biennial (every other year) reviews of the rates Vt. utilities must pay for their customers' excess solar production. Depending on whether they rise or fall, it could work for customers or against them. To check the most recent net-metering updates, go to:

<https://legislature.vermont.gov/statutes/section/30/089/08010>

**In New Hampshire**, there's no limit on when customers are required to consume their credits; they can be banked for use in future years. There are three utilities in Plainfield and Cornish: Liberty Electric, Eversource, and New Hampshire Electric Coop.

Where to find net-metering information on a Liberty Utilities bill: [https://new-](https://new-hampshire.libertyutilities.com/uploads/NH_EL_Standard_Bill%20Explainer_Dec11-2015_2.pdf)

[hampshire.libertyutilities.com/uploads/NH\\_EL\\_Standard\\_Bill%20Explainer\\_Dec11-2015\\_2.pdf](https://new-hampshire.libertyutilities.com/uploads/NH_EL_Standard_Bill%20Explainer_Dec11-2015_2.pdf)

In NH, residential suppliers are compensated for 100% of the solar they generate, plus 100% of the transmission fees, and 25% of the distribution charges. But some fees (the systems benefit charge, storm recovery fee, and stranded costs) are not reimbursed. These credits will be listed on your bill at the end of the month. On a monthly basis, the utilities convert excess solar production into a monetary credit which can be carried forward as a bill credit. For most customers, it's a far better deal to consume this self-generated power – or stash it away for future use.

For more information, check New Hampshire's Public Utilities Commission website:

[https://www.puc.nh.gov/sustainable%20energy/Net%20Metering/Net\\_Metering.html](https://www.puc.nh.gov/sustainable%20energy/Net%20Metering/Net_Metering.html)

### **What happens to my rooftop panels if I move?**

If you own the system, you can take it with you. If you sell your house, the panels will boost its resale value. If you don't own them, the solar contract should say whether someone else is allowed to take over your solar lease (or net metering credit purchase agreement). If that's not an option, you may need to buy the lease out before you can sell your home.

### **Maintaining your solar panels**

Keep an eye on your system.

- Are birds or rodents nesting in the wiring?
- Are trees starting to shade the panels? Trim them back.
- Notice cracks or chips? These should be repaired; check if the equipment is still under warranty. If so, your installer should handle it. If not, ask your insurance agent.
- Keep the panels free of dust or excessive dirt buildup.
- In winter, remove heavy snow.

## How to tell how much electricity your system is producing

PV systems now come with online monitoring options. Checking your production is as simple as going to a website. Your inverter will have a display screen and error lights. Check it periodically, preferably on a sunny day, to make sure it's functioning properly. If an inverter goes off-line, the display will usually indicate why.

A complete shut-down is easy to spot. The usual reasons include blown fuses, wiring issues, breakers, or ground faults. Call a professional to have these repaired. If your system is still under warranty, file a claim for a "qualified" repair or replacement to avoid any problems with the warranty. These are the most common problems:

1. **Natural panel degradation:** Most warranties protect you from any wear and tear causing over a 0.5 percent drop in output per year.
2. **Dirt buildup:** Clean the panel's surfaces.
3. **Snow:** Winter output will be lower, depending on snow buildup.
4. **Shading:** It doesn't take much to reduce output. Trim overgrown foliage.
5. **Damaged cells/panels:** If you can't tell what's wrong, have a technician inspect the panels and make repairs (or assist with warranty claims).

## System Safety

Safety measures can save lives. Quick fixes that fail to meet electric code could seriously harm utility workers working to restore power during blackouts.

If you have a central inverter, have it installed in an accessible and protected location. Micro-inverters are usually placed on individual panels. Make sure that all lines are properly grounded. The inverter will display error codes; if you suspect that there's an electrical problem, call a qualified electrician. Don't attempt to fix it yourself.

**Rapid Shutdown** - All systems should be equipped with Rapid Shutdown, which cuts power to all wires coming from the solar panels once the breaker or inverter is shut off.

**Roof clearances for firefighter access** - A 36-inch-wide path on the roof, from the lowest edge up to the highest ridge, must be available on one side of the array. In addition, there must be specific ridge clearances: where PV panels cover up to 33% of the roof, the panels must be at least 18 inches away from a horizontal ridge – on both sides – to create the 36-inch path. Where panels cover more than 33% of the roof, a 36-inch wide path is required on both sides of the ridge.

## Insurance

Let your insurer know that you've installed solar. Your current coverage may already include provisions for solar installations, but you may need to add a separate rider. Check its limits, what it covers, (fire, hail, etc.), and what it will provide (repair or replacement). Best of all, talk to your insurance company before you install. If someone else owns your system, that party may be responsible for insurance.

## Meters

Since your utility owns your primary electric meters, they will be responsible for maintaining them. If you need additional meters to track your system's output, you may decide to purchase and maintain them. Meter warranties usually last two years.

## Panel lifespan and removal

Most panels last a good 25 years, and increasingly, up to 50! If you're leasing them or have a net-metering credit purchase agreement, your contract should specify how they'll be removed. Some components are recyclable. Ask your installer about recycling and disposal, and contact them if you need the panels removed. Unless you're a trained professional, don't attempt to remove them yourself.

## Solar Glossary

**CPG (*Certificate of Public Good*):** A permit issued by the Vt or NH Public Service Board required for connecting a solar system to the grid.

**Grid (*or electric grid*):** The coordinated network of electric wires, generators (including big power plants and small solar systems), and electricity consumers.

**Group net metering:** A system in which multiple customers group together in one location to generate solar power. Participating members receive net-metering credits for their portion of electrical output.

**Kilowatt (*kW*):** A unit of power. The generation capacity of solar panels and solar systems is described in terms of kilowatts.

**Kilowatt-hour (*kWh*):** Kilowatt-hours are a measurement of kilowatts over an amount of time. If you use one kilowatt for an hour, you've used one kilowatt-hour. The output from solar panels, and a home's energy consumption, is usually given as kilowatt-hours.

**Lease:** A contractual agreement in which a third-party owns the solar panels and you rent the panels from that owner, whether the panels are at your home or elsewhere.

**Net metering:** A system that allows a customer with solar panels to receive credits from the utility for surplus electricity produced and fed to the grid.

**Net Metering Credit Purchase Agreement:** A contractual agreement in which somebody else (a third-party owner) owns the panels, and you buy the output they produce. The panels may be at your home or elsewhere. Also known as a power purchase agreement (PPA).

**Orientation, tilt, and shading:** *Orientation* refers to a roof's compass direction. *Tilt* refers to the roof's slope. *Shading* describes how much (if any) shade obscures the roof. Combined, these factors determine how much sun your panels will get and how much electricity they'll be able to generate.

**"PV" or Photo-Voltaic** - Materials that convert sunlight into electricity.

**Renewable Energy Certificate (REC):** A priced unit of renewable energy.

**Tax credit:** A tax credit is the amount that you deduct from the income tax that you owe. In 2022, the federal solar tax credit is 26% of your solar system's installation costs.

**Third-party owner:** A company that owns the solar panels and either rents (leases) them or sells their electric production through a net metering credit purchase agreement.