

A Guide to Residential Solar Installation in Carroll County



Table of Contents

Zoning Requirements.....	2
Permitting & Inspections.....	3
Process	4-5
Calculating Solar Needs.....	6-9
Commonly Used Terms	10
Finding a Certified Installer	10
Questions to Ask	11
Frequently Asked Questions	12
Buying vs. Leasing	13
Financing Options.....	14
Grants & Incentives	15
Add'l Online Resources	16
Contact Info.....	16

Dear Carroll County Resident,

The Environmental Advisory Council (EAC) created this document to help start you on your way as you consider installing solar power on your residential property. Solar panels are appearing in neighborhoods all over the county, and technology is improving each year. Now, more options are available than ever.

Solar panels for accessory residential use are being marketed by over 100 companies in the State of Maryland. Residents need to be savvy and selective when beginning the process. Recent changes to Carroll County regulations have expanded the opportunity for residential solar use, including both roof- and ground-mounted units.

This booklet is designed to assist you in finding helpful resources and to encourage you to think about the questions you want to ask. *It is not intended to be a comprehensive manual containing everything you need to know.* Rather, it is a consumer resource which is not produced in favor of any particular company or choice. While some of the information is more general, much of the information is specific to residents of the unincorporated areas of Carroll County. Always consult local zoning, development, and permitting codes and regulations to ensure that you have the most up-to-date information. Talk with the appropriate County or municipal staff to ask more specific questions that may affect your decisions. If you live within one of the eight Carroll County municipalities, consult the municipal zoning regulations to make certain you are in compliance, as they may be different than Carroll County's. *Don't rely on one source. Follow up with additional research to ensure you have all the information you need to make an informed decision.*

We wish you the best as you pursue this renewable energy source!

Carroll County Environmental Advisory Council



Why Install Solar at your Home?

- ⚙ Save money on your energy bill
- ⚙ Earn tax incentives & rebates
- ⚙ Reduce or eliminate energy bills
- ⚙ Help the local economy



- ⚙ Help the environment
- ⚙ Invest in your home
- ⚙ Increase your home value
- ⚙ Option to live off grid

Carroll County Zoning Requirements

Solar energy conversion systems are permitted as an *accessory* use to your residence in the "R" Residential or "C" Conservation zoning districts. (See the accompanying definition of Accessory Use related to solar energy conversion facilities that can be found in the Carroll County Code, Chapter 158, Zoning). Solar energy conversion systems, as they are referred to in Carroll County's Code, are only permitted as accessory uses in these districts. Commercial solar facilities are prohibited, and wall-mounted systems also are not permitted.

The size of a roof-mounted system is limited to the size of the roof, or roofs of structures, situated on your property. The maximum size of a ground-mounted system is limited to the square footage of solar panel surface area shown in the figure below and is based on the size of your lot. A combination of roof-mounted and ground-mounted systems can be used, but the total solar panel surface area cannot exceed the aggregate square footage of the roof areas on your property.

No variance or waiver to the *size or setback* requirements of the ground-mounted system is allowed in the Residential districts. A variance *may* be requested under §158.130(F)(2)(f) for lots more than three acres in size in the "C" Conservation district. Documentation from a North American Board of Certified Energy Practitioners (NABCEP) certified professional solar panel installer must be included with the variance request to demonstrate that the total size allowable is inadequate to power 100% of the home and accessory structures based on the previous 12 months of usage. Also, identify the additional size and number of panels needed to meet 100% of the expected energy use.

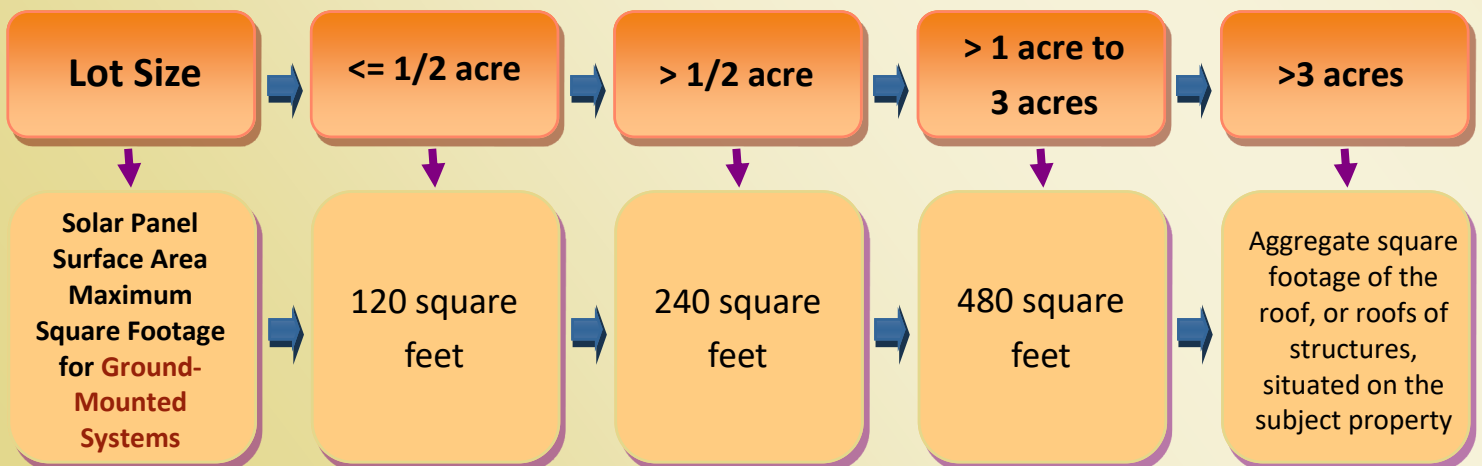
The specifications for solar energy conversion facilities in Carroll County's (unincorporated) residential zoning districts (R-40,000; R-20,000; R-10,000; R-7,500; and Conservation) can be found at §158.153 of the [Carroll County Code of Public Local Laws and Ordinances](#). You should review the details of these specifications before you proceed.

For questions on zoning requirements related to solar, contact the Carroll County Zoning Administrator at 410-386-2982 or cczoning@ccg.carr.org. 🌞

Accessory Use Definition

SOLAR ENERGY CONVERSION FACILITY, ACCESSORY. A solar collection system consisting of one or more roof and/or ground mounted solar collection devices and associated supporting equipment that is primarily intended to reduce on-site consumption of utility power by generating electricity solely for the use and/or benefit of the individual property owner upon whose property the device is situated. A system is considered an "accessory" facility only if it supplies power strictly for on-site use, except that when a property upon which the facility is situated also receives electrical power supplied by a utility company, incidental excess power generated, and not immediately utilized for on-site use, may be provided to the utility company in exchange for a credit. [\(§158.002 DEFINITIONS, Chapter 158, Zoning, Carroll County Code of Public Local Laws and Ordinances\)](#)

Ground-Mounted Systems



Permitting & Inspections

Your solar panels will require certain permits and inspections in order to ensure that they are safe for use. The Carroll County [solar panel requirements](#) should be reviewed before applying for a permit.

Permits Required

Your solar panels will require a [building permit](#) and an [electrical permit](#). Prior to the issuance of a building permit, you must apply for an electrical permit using the building permit number given at the time of building permit application. If the solar panels will power a hot water heater, a [plumbing permit](#) will also be required prior to the issuance of the building permit.

Permit Process

Many factors affect the speed with which your application is approved. For best results, it is critical that you carefully review your application and design documents prior to submission to ensure that all necessary documents are included and that the design is compliant with County Code. Normally, permits can be issued within 5-7 business days if the application is **complete**, accurate, and code-compliant.

Construction Document Requirements

Submitted documents **must** contain sufficient information for the plan reviewer to be able to review the proposed construction. If your solar panels will be attached to the roof of a structure, please provide:

- ☉ Two (2) complete sets of detailed construction plans – drawn to scale – to include manufacturer’s installation specifications

If your solar panels will be free-standing (ground-mounted), please provide the two (2) sets of detailed construction plans noted above, plus:

- ☉ Three (3) plot plans of the entire parcel – drawn to scale – to include:
 - Location of the proposed solar panels
 - Measurements from the proposed structure to each property line
 - Location of any existing structures
 - Measurements from the proposed solar panels to existing/proposed well and/or septic area
 - Road name



An inspection can be scheduled once the permit is issued, with inspections typically being performed the next business day. The building and electrical inspections can occur as one inspection.

Certifications

Upon inspection, your solar panels will need to be certified by a licensed Master Electrician as having been installed per manufacturer’s guidelines, product specifications, and all articles of the International Building Code (IBC) and National Electrical Code (NEC), as adopted in Carroll County. For solar panels under 75 kW, you will need to submit a [Certification of Solar Panel Installation under 75 kW](#). For those systems 75 kW and over, you will need to submit a [Certification of Solar Panel Installation 75 kW and Over](#).

Fees

For the relevant fees, see the Carroll County Permits & Inspections website at <https://www.carrollcountymd.gov/government/directory/public-works/permits-inspections/residential-projects/permits-inspections-requirements-solar-panels-residential/>.

- Building Permit Fee Schedule, Row F
- Electrical Permit Fee Schedule, Row P
- Plumbing Permit Fee Schedule, Row F

These requirements, as well as the permit applications and fee schedules, can be found on the Carroll County Bureau of Permits & Inspections website under “Solar Panels (Resident)” at <https://www.carrollcountymd.gov/media/6055/certificationofsolarpanelinstallation75kwandover.pdf>. For questions on solar permitting and inspections, contact the Chief of Carroll County Bureau of Permits & Inspections at 410-386-2674 or Istickles@carrollcountymd.gov. ☀

Process to Choose an Installer



Do Your Homework

Before contacting solar energy providers:

- 1
 - ⚙ Read this guide,
 - ⚙ Review Carroll County zoning code requirements for residential accessory solar energy conversion systems,
 - ⚙ Drive around your neighborhood to see how others are installed and how they look,
 - ⚙ Research on the internet, and
 - ⚙ Prepare the questions you want to ask.

2 Research Licensed and Certified Installers

- 2
 - ⚙ Research licensed and bonded solar energy providers who do work in Carroll County.
 - ⚙ Check out “Finding a Certified Installer” on Page 10.

Meet with Solar Installers at Your Home to Evaluate Your Needs and Give You an Estimate

- 3
 - At the preliminary meeting:
 - ⚙ Assess with the provider the condition, size, and direction of your roof(s) and/or location of trees and structures plus size and slope of your lot,
 - ⚙ Ask your prepared questions,
 - ⚙ Review documentation of your annual electric usage,
 - ⚙ Evaluate amount of energy the system will produce, and
 - ⚙ Clearly outline with the provider the footprint of ground-mounted panels and understand the height and spacing of the panels, if applicable.

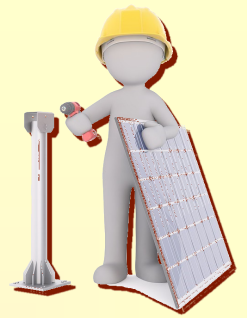
4 Read the Contract Carefully

- 4
 - ⚙ Seek legal advice if needed,
 - ⚙ Make sure all provisions of the contract are as you agreed, and
 - ⚙ Have installer include approximate start and completion dates.

Let's look at the process in more detail...

1. Before contacting solar energy providers, do your homework. In addition to reading this guide, review the Carroll County (or your municipality's) zoning code requirements related to residential solar energy conversion systems. You should also check with your homeowner's association, if you have one, to be sure there are no restrictions or covenants that would impact the installation of solar panels. Additionally, consider driving around your neighborhood and looking at roof- and ground-mounted solar panels that are installed to get a sense of where they can be installed and how they look. There is a lot of information about residential solar energy available on the internet. However, it can be challenging to find sites that are not simply sales pages. See "Additional Online Resources" on Page 16.
2. Research licensed and bonded solar energy providers who work in Carroll County. See "Finding a Certified Installer" on Page 10.
3. For preliminary information, meet with several solar installation companies that service your area. They may "prequalify" you by telephone to ensure that you meet their criteria for installations. However, once prequalified, the preliminary meeting should be face-to-face at your home and free of charge. If you are considering a ground-mounted system, be sure to ask the provider if they can install ground-mounted systems before setting up an on-site meeting. Before or during the on-site visit:
 - a. Utilize this guide and online information to prepare a list of questions for the face-to-face meeting with the providers. See "Questions to Ask" on Page 11 to get you started.
 - b. Have documentation available that indicates your annual electric usage (such as an itemized BGE or Potomac Edison bill).
 - c. The solar provider will walk around your property to assess the condition of your roof, the size of your roof, and the direction it faces (roofs need to have as much sun exposure as possible to maximize their performance). For ground-mounted systems, the provider will assess the size of your lot, the position of trees and structures that could shade the panels, and the slope of your lot (steep inclines are typically not suitable for solar panels).
 - d. For each manufacturer's system, evaluate the amount of energy it will produce. One objective is to get the most electricity for the smallest number of solar panels. However, it should be noted that high-efficiency solar panels are typically more expensive than less efficient panels.
 - e. For ground-mounted systems, solar providers may suggest different locations and panel configurations. Ask the provider to clearly outline the footprint of the panels (with cones or tape) on your lot so you can visualize how much space the complete system will require. Also, make sure you understand the height of the panels and ensure that the spacing between and below panels will allow you to mow underneath (assuming you do not eliminate grass under the panels).
4. Read the contract carefully. If you are uncomfortable signing a long-term contract without advice, seek legal counsel. At a minimum:
 - a. Make sure you understand all up-front and on-going expenses for the system. Government grants and incentives *may, or may not*, cover all of your costs for installation of the system.
 - b. Make sure the location and size of the solar panel array is specified in the contract and matches what you agreed to.
 - c. Make sure the minimum amount of electricity that your system will generate is specified in the contract.
 - d. Make sure the contract states who will be responsible for acquiring all State and County permits to complete the installation and what happens if permits cannot be obtained.
 - e. Make sure all other terms and conditions that you discussed with the installer's sales representative are clearly stated in the contract.
 - f. If possible, have the installer state the approximate start and completion dates for your project. Note that, depending upon permit requirements, this information could be expressed as a number of days following permit receipt.
5. Once the contract is signed, you should have little involvement in completing the installation. You will likely need to be available during installation to allow access to electrical panels inside the home so that the solar-generated electricity can be connected to the main power supply of the home. In addition, you will need to be present to review/learn about the operation of system components with the installation team and to sign-off on the completed work. 🌞

Calculating Your Solar Energy Needs



1

Determine your energy requirements

Estimate kilowatt hours (kWh) you use per month (check your utility bill).

2

Look up hours of sunlight in your area

Peak hours of sunlight per day vary by state.

3

Decide how much solar power you need to produce

If solar will not supply all of your energy needs, what percentage will it supply?

4

Figure out how many panels you need to meet your goal

Use an online calculator or estimate using this guide.

Let's look at the steps to calculating your solar energy needs in more detail...

Solar companies will provide you with an estimate of the amount of energy you need and can produce. You can request the calculations if not provided. However, if you would like to calculate your own estimate, the following will help guide you through the steps.

To calculate how many solar panels are needed to meet your goals, follow these four steps to calculate your solar energy needs:

- 1) Determine your energy requirements.
- 2) Determine how much sunlight you can expect on average in your area.
- 3) Determine how much sunlight power you need to produce.
- 4) Determine how many panels are needed to produce your energy generation goal.

1) Determine your energy requirements. (How much solar energy do you need?)

The first step is to determine how much solar energy you want to produce. Most people want to save as much money as possible. Do you want to generate all the energy you use? Many people want to be self-reliant and establish a solar energy system that meets their average annual energy consumption. Start with looking at your electricity bills. In order to compute your *daily* average usage of electricity in kWh, identify your average monthly power usage then divide by 30. Alternatively, if your average annual usage is provided on the bill, simply divide it by 365.

According to Electricitylocal.com (<http://www.electricitylocal.com/states/maryland/>), the average monthly residential electricity consumption in Maryland is 1,005 kWh per month. This ranks 20th in the country compared to all states. Using the Maryland average (1,005 kWh per month), the average daily rate of energy usage is 33.5 kWh/day (1,005 kWh/30 days).

You may decide you want to cover only a portion of your energy needs through solar power. In this case, you will likely need to decide what appliances in your home you want to power with solar energy.

For example, some people just want to run their hot water heater by solar energy, since that's one of the greatest consumers of electricity in your house. An electrical hot water heater typically represents 18% of your electric bill per year according to the Department of Energy (DOE) (see energy.gov). Running an average of three hours a day, an average 50-gallon, 5500-watt heater will range in cost from \$500 to \$800 for a year of electricity. Your hot water heater should have a yellow EnergyGuide label listing the Estimated Yearly Electricity Use as well as the Estimated Yearly Operating Cost. You can use this to estimate the kWh energy usage of your hot water heater. Another option is to use the online [DOE Appliance Energy Calculator](#) tool.

Solar energy hot water heaters are becoming popular. They cost more than conventional hot water heaters, but you may save money in the long term. The DOE web site has excellent information about solar water heaters (<https://energy.gov/energysaver/estimating-cost-and-energy-efficiency-solar-water-heater>).

Repeat this exercise for each of your major appliances. Identifying the energy needs of your appliances will help you decide how much energy you want to generate through solar power. If you only need to power a



portion of your energy needs with solar, you then can size your solar panel needs based on the average yearly energy consumption of those appliances and other items using electricity at your home.

2) Determine how much sunlight you expect on average in your area.

The next step is to determine the amount of peak sunlight hours expected to produce your preferred amount of energy. The more sunlight available, the less solar panels that will be needed.

The National Renewable Energy Laboratory (NREL) (<http://www.nrel.gov/gis/solar.html>) has calculated solar maps for the entire United States. These maps provide monthly and annual average availability of solar PV resource potential. Using the maps available at the NREL website, you will see that Maryland's average peak daily sunlight hours provide about 4.5-5 kWh per square meter of solar panels per day.

3) Determine how much solar power you need to produce.

You can now calculate the amount of electricity the panels will need to produce to supply the electricity needs you identified in the first step. This is done by dividing the daily energy requirement for your house by the daily peak sunlight hours to get the energy needed per hour from the solar panels, then multiply by 1,000 to convert to hourly production in watts. Use the average of 33.5 kWh/day if you do not know your daily energy usage. In Maryland, the peak sunlight hours generally total about 4.5 kWh/day.

Solar Power Needed

$$\text{Daily Energy Requirement} / \text{Daily Peak Sunlight Hours} \\ = \text{Energy per Hour from Panels} \\ (33.5 \text{ kWh} / 4.5 \text{ kWh} = 7.4 \text{ kWh})$$

$$\text{Convert kWh to Watts} \\ (7.4 \text{ kWh} \times 1,000 = 7,400 \text{ watts})$$

4) Determine how many panels you will need.

The number of panels needed to meet your goals will be partially determined by the quality of panel you choose to install. There's a sizable range in solar cell efficiency. "The type and quality of panel as well as the size of the array affects the final price of an installation. Manufacturers price their products based on their efficiency, longevity, and system configuration. Panels that retain their efficiency longer are usually more expensive. Monocrystalline units are the most costly but generate the most watts per area, so you will need fewer panels and not as much space. Building integrated panels are also on the expensive end, but they are a good choice if appearance is important." ("Complete Solar Panel Cost Guide." *Solar Panels Cost Guide*. Solar Power Advice, n.d. Web. 25 July 2017.)

Most residential solar panels installed today are in the 185- to 240-watt range and are usually assembled with either polycrystalline or monocrystalline silicon cells. (solarpoweradvice.com/) The least costly and lowest wattage production panel is 150 watts. Wattage production goes up to 350 watts generating power, but with increasing expense.

To determine the number of panels needed, divide your home solar energy requirement by the wattage output per panel. At 7,400 watts per day, using 150-watt panels will require 49 panels. Less than half that number of panels (21) will be needed with the 350-watt panels.

The number of panels needed is also a function of other factors, such as the area and shape of the roof, shade effects, etc. There are other factors that affect the number and configuration of installed solar panels. Roof aspect, slope, and location of shade producers, such as trees, will affect the productivity and placement of solar panels. The size of a typical residential solar panel today is about 18 square feet, or a little less than 3½ feet x 5½ feet. They will vary in size, depending mostly on the rated wattage and technology of a particular product's solar cells.

Some solar companies have sophisticated software to calculate your "ideal" solar panel configuration. You provide them with the average annual energy use found on your utility bill, and they compute the appropriate number of panels based on aerial and map information for your home address. This information might be used to locate trees and potential shade on the solar panels that might affect energy production. The dimensions and sizing of your roof and other structures based on this data may be used to calculate the configuration of solar panels needed on your roof to produce your desired amount of energy.

In doing so, many assumptions are made as to the roof size, slope, and aspect to compute the placement location and cost of the solar cells needed to meet your energy needs. The software calculates your cost of purchasing or leasing the solar panels and the savings based on the average increase of 2% in energy costs per year. If not offered, you may request a prepared final cost estimate based on an actual site visit to ensure it is based on accurate information about actual conditions on your property.

According to the DOE, you can estimate the installation cost by using an average cost per watt that is commonly charged by companies. So for your 7,400-watt system, average costs vary from \$3 to \$4 per watt, meaning the estimate for installing a system that produces 7,400 watts is between \$22,000 to \$30,000. (\$3 x 7,400 watts = \$22,000)

Alternative: Compare your estimate to an online calculator

An easy way to calculate your needs is to use an online calculator. You may also use these calculators to compare your own calculations. To find an online calculator, simply search in your browser for "residential solar needs calculator" (or something similar). Some examples (not an endorsement) include GoGreenSolar.com, AffordableSolar.com, and US.SunPower.com.

Installation Cost

$$\begin{aligned} \text{Cost per Watt} \times \text{Average System Output in Watts} \\ = \text{Average Total Installation Cost} \\ (\$3 \times 7,400 \text{ watts} = \$22,000) \end{aligned}$$

For more detailed information on solar cells and method to calculate how many panels you will need, visit solarpoweradvice.com.

2017 Fun Facts from Maryland Solar Industry

As of June 8, 2017

- ⚙️ **Solar Installed:** 716.9 MW (276.9 MW in 2016)
- ⚙️ **National Ranking:** 14th (13th in 2016)
- ⚙️ **# of State Homes Powered by Solar:** 76,000
- ⚙️ **% of State's Electricity from Solar:** 2.64%
- ⚙️ **Solar Jobs and Ranking:** 5,429 (12th in 2016)
- ⚙️ **Price Declines:** 64% over last 5 years
- ⚙️ **# of Solar Companies in State:** 212 companies total; including 15 manufacturers, 116 installers/developers, plus 79 others
- ⚙️ **Total Solar Investment in State:** \$2,212.48 million (\$740.15 million in 2016)
- ⚙️ **Growth Projections and Ranking:** 2,021 MW over next 5 years (ranks 14th)

Source: "Maryland Solar." Maryland Solar, SEIA, 29 Aug. 2017, www.seia.org/state-solar-policy/maryland.

Commonly Used Terms

Alternating Current (AC): The type of power used in our homes.

Direct Current (DC): The type of power generated by solar panels. Only flows one direction.

Grid (electrical): An interconnected network for delivering electricity from suppliers to consumers, consisting of generating stations that produce electrical power, high-voltage transmission lines that carry power from distant sources to demand centers, and distribution lines that connect individual customers. (Source: Wikipedia)

Insolation: The amount of sun radiation that hits the ground during a given period of time (varies from region to region).

Inverter: The equipment that transforms DC (from the sunlight) into AC (that can power your home).

Net Metering: Paying for electricity used that you did not produce yourself.

Photovoltaic (PV): Creating electric current by being exposed to light. ☀

Finding a Certified Installer

Choosing to use an installer that has been trained, tested, and certified through the North American Board of Certified Energy Practitioners (NABCEP) will provide you with a greater degree of confidence throughout the solar energy facility installation process.

The NABCEP is a non-profit 501 (c)(6) corporation with a mission “to support, and work with, the renewable energy and energy efficiency industries, professionals, and stakeholders to develop and implement quality credentialing and certification programs for practitioners.” (“About NABCEP.” *About Us, NABCEP, 30 Aug. 2017, www.nabcep.org/about-us.*)



An easy way to find an NABCEP-certified installer in Maryland is to use the “Find A Certified Professional” tool on the NABCEP website. Click the link below to go to the list of the certified installers in Maryland. If you choose to request a variance from Carroll County’s zoning requirements, you will be required to use an NABCEP-certified professional to provide the documentation needed for the request. (‘158.153(B)(2)(a) of the [Carroll County Code of Public Local Laws and Ordinances](#))

<https://www.nabcep.org/nabcep-professionals/>



MDV-SEIA (representing Maryland, DC, and Virginia) also provides a solar professional locator tool on its website.

<http://mdvseia.org/directory/#!/directory/map/lbl=5879a78207ac80066a15a72b>

Other affiliations that may help contribute to ensuring you find a quality professional may include, but are not limited to, the [Solar Energy Industries Association](#), [U.S. Green Business Council](#), [LEED AP](#), and master electricians. ☀

Questions to Ask Installer/Solar Company

There are many different factors to consider in making all the decisions related to installing photovoltaic (PV) at your home. Prepare a list of questions ahead of time to ask solar companies and/or installers when you contact them. The following are some of the more common questions you may want to ask. Most of these questions were compiled from the Southern Maryland Electric Cooperative website found at <https://www.smeco.coop/services/net-metering/solar-faq>.

- ⊗ Does your company have a current Maryland license to install solar panels in Carroll County? Are you bonded (promise of performance backed by type of insurance policy to protect property owner)?
- ⊗ How many systems have you installed in the area, and do you have references that I can check? Ask for names and contact information for local electric customers for whom they've done PV installations.
- ⊗ How much energy do you estimate I will produce?
- ⊗ Based upon my annual electric usage, what percentage of my total electric needs can be provided by roof-mounted panels?
- ⊗ Can the solar panels be installed anywhere on my property or only on my roof?
- ⊗ If the amount of electricity that can be provided by roof-mounted panels is less than 100% of my electricity needs, can I use a ground-mounted system? NOTE: You should review Carroll County's zoning requirements for ground-mounted systems (see Page 2, "Carroll County Zoning Requirements").
- ⊗ What does the system's warranty cover (purchased system versus leased system)? Note that the inverter is typically the most expensive part of a solar panel system. Make sure you understand the warranty for this item and the cost of replacement.
- ⊗ How long can you expect the panels to last before they require maintenance or replacement? What sort of routine maintenance is required to keep the panels working at peak performance? Who is responsible for the maintenance costs, and how much are they on average?
- ⊗ For roof-mounted systems, how are the solar panels attached to the roof, what guarantees are there against leaks, and what are the consequences should my roof need repairs and the panels need to be temporarily removed? Who is responsible for the cost of removing and reinstalling the panels?
- ⊗ How large is the solar panel array? Can it be set up as two (or more) smaller arrays?
- ⊗ When you size my system based on my home, can you give me different options on efficiency, sizes, and costs? How will they affect the amount of energy I will use from the grid?
- ⊗ How much will the installation cost be? Do I have to pay anything up front? Are there financing options or monthly fees?
- ⊗ Are there tax credits for which I can apply?
- ⊗ If leasing, what are the details of the lease agreement? Number of years? Interest rate?
- ⊗ Can you provide a comparison between both the short- and long-term estimated cost of buying versus leasing and the benefits of each?
- ⊗ What happens if I sell my home? Is the lease transferable to a new homeowner? What if the new homeowner does not want the solar cells, what options do I have with the solar vendor?
- ⊗ What if my roof needs new shingles or I want the system removed? Is there a buyout option?
- ⊗ Do I need special or additional homeowner's insurance?
- ⊗ Will I need any upgrades to my electric system? If so, who will pay to make the upgrades, and how much will they cost?
- ⊗ Who will be responsible for acquiring all required permits? What happens if they cannot be obtained? 🚫



Frequently Asked Questions

☀ *Will I still receive an electric bill if I'm generating my own power?*

Utility companies charge for metering and other services. As long as your utility company provides a meter and power to your location, you will receive a monthly bill for the service fees.

<https://www.smeco.coop/services/net-metering/solar-faq>

☀ *If the power company has a power outage, will I still get power from my PV system?*

It is possible to install a system with full battery back-up or a generator, but you will need additional equipment to isolate the PV system from the generator and the electric grid. Batteries and back-up systems substantially increase the price of the project.

<https://www.smeco.coop/services/net-metering/solar-faq>

☀ *What if I have a homeowner's association?*

Maryland General Assembly House Bill 117, passed in 2008, prevents restrictive covenants that impose unreasonable limitations on the installation of solar panels. Homeowners associations (HOAs) cannot prevent you from installing a PV system. However, they may require certain approvals and reasonable restrictions. If your community has an HOA, you will want to contact them to ensure you submit the proper information to the design review committee and obtain approvals before installation.

<http://solar-estimate.org/showfaq.php?id=65>

☀ *Which direction does my available roof space need to face?*

South, west, and east are considered the most effective.

<http://kenergysolar.com/residential-faq/>

☀ *Can I install solar as I am building a new home?*

Customers building a new home may be able to include the cost of their PV system in the mortgage, which may save on financing costs. Talk to your lender to get details before you install your system. In addition, with a lower monthly utility bill, you may have a better income to debt ratio, which may allow you to borrow more for your mortgage.

<https://www.smeco.coop/services/net-metering/solar-faq>

☀ *Can I buy and install my own solar equipment?*

The first questions to ask yourself are "Should I install and maintain my own solar power system? What is involved in this process? Will I need professional assistance during the installation?" Many self-installers have an electrician or other professional do the wiring and metering into the house. It is recommended that, unless you are already licensed and experienced in solar PV installation, you hire certified and licensed professionals to do this work for you.

☀ *What is the process to record an (solar access) easement?*

For more information on the process to record a solar access easement in Carroll County, property owners may visit Deeds.com at <https://www.deeds.com/forms/maryland/easement-deed/carroll/>

OR Guidelines for Carroll County, Maryland e-Recording at <http://ccgovernment.carr.org/ccg/collect/Guidelines-E-Recording.pdf>. ☀

Solar panels generally have an expected useful life of 25-35 years.

The best potential locations have a southerly facing roof, no shade, and direct sun from 10 AM to 2 PM.

FAQ

Buying vs. Leasing

If you are weighing the options of buying versus leasing your solar energy system, consider the pros and cons of each before deciding. Research more advantages and disadvantages online.

Buying

Leasing

Pros

- ↑ You own the system.
- ↑ Cost savings on energy bills may be immediate.
- ↑ Choose to power all or just a portion of your energy needs.
- ↑ Tends to increase the value of your property and not hinder selling your home.
- ↑ Potentially good investment if you have the cash to invest.
- ↑ Tax credits and government incentive programs may help with costs.
- ↑ May have zero energy costs once paid off.

vs.

- ↑ Usually no upfront costs or expenditures.
- ↑ Maintenance or repair of panels likely responsibility of solar company.
- ↑ A quick easy way to start saving with clean energy.
- ↑ No need to consult with an accountant for tax credits or incentive programs.
- ↑ Right contractor will take care of everything.
- ↑ You may be given the option to buy at a discounted price at end of lease.
- ↑ Immediate savings without cash outlay.

vs.

vs.

Cons

- ↓ Large, upfront, out-of-pocket expenditure (even though technically an investment).
- ↓ You are responsible for maintenance and care of the system.
- ↓ Responsibility for construction of the solar arrays and any permits that are required for installation may be yours.
- ↓ If you need roof repair, you may need to pay someone to uninstall and reinstall roof-mounted panels.
- ↓ Tax incentives may expire.

vs.

- ↓ May limit or restrict your ability to sell your home.
- ↓ You generally do not get maximum electric savings benefits (the leasing company gets their share).
- ↓ The leasing company gets tax incentive benefit, not you.
- ↓ May increase homeowner insurance premiums.
- ↓ Long-term contract, usually around 20 years.
- ↓ You must deal with a company that has ownership of the panels that are attached to your house. You do not have control over them.

Financing Options

Financing your solar panels is an important issue to most homeowners. Fortunately, there are several options. The following guides and websites can provide more resources regarding your options.

Homeowners Guide to Solar Financing

"The Clean Energy States Alliance has released a guide to help homeowners navigate the complex landscape of residential solar PV system financing. The free online publication helps homeowners make sound decisions and select the best financing option for their needs. The guide describes leases, loans, and power purchase agreements (PPAs) and explains the advantages and disadvantages of each, as well as how they compare to a direct cash purchase. It clarifies key solar financing terms and provides a list of questions homeowners should ask before deciding if and how to proceed with installing a solar system."

(Source: <http://energy.gov>)



Homeowners Guide to Financing a Grid-Connected Solar Electric System

This guide provides a summary table comparing financing options as well as descriptions of each.

(Source: <http://energy.gov>)

Paying For Solar - Tips For Financing a Residential System

"After you've made the decision to go solar, the next step is figuring out how to pay for it. Assuming you don't have the cash to buy your solar energy system upfront, like the vast majority of Americans, there are a variety of financing options to help you hitch onto the solar bandwagon and start increasing the value of your home." (Source: <http://energy.gov>)

Solar Panel Financing Options

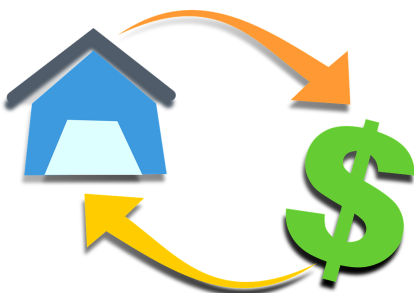
"There are affordable solar financing options for every budget. Whether you want to maximize your financial returns or find an easy solar solution to save money and help the environment, there is a financing option that works for you." (Source: <http://energysage.com>, under "[Financing your solar panel system](#)")

Understandsolar.com Solar Financing Options

While this site mainly focuses on options for residents of Arizona, it will provide you with some insights to consider in making your decision. (Source: <http://understandsolar.com>)

Third-Party Solar Financing

"Third-party financing allows more Americans to "go solar" by lowering the cost of solar installation and maintenance of a system. Companies continue to develop new products and services to meet growing demand for solar. SEIA is committed to supporting policies that enable this innovation to continue and lower costs for consumers." (Source: <http://www.seia.org/policy/finance-tax/third-party-financing>)



Best Way to Finance Solar Panels

Going solar can literally cost tens of thousands of dollars – not a lot of homeowners can afford to pay in cash. Luckily there are many good financing options. In this article, we'll help you sort through them, and find which one would be the best choice in your situation. (Source: <http://energyinformative.org/best-way-to-finance-solar-panels/> 🌞)

Grants & Incentives

Grants and other incentives are available to help finance your solar panels. Do some research online to find out what is available. The following federal, Maryland, and Carroll County programs are a good place to start.

Federal

As of July 2017, the Federal Residential Renewable Energy Tax Credit allows taxpayers to claim a credit of 30% of qualified expenditures for a solar energy system. The system has to serve a residential unit located in the United States that is owned and used as a residence by the taxpayer. Expenditures with respect to the equipment are treated as made when the installation is completed. If the installation is at a new home, the "placed in service" date is the date of occupancy by the homeowner. Expenditures include labor costs for on-site preparation, assembly or original system installation, and for piping or wiring to interconnect a system to the home. If the federal tax credit exceeds tax liability, the excess amount may be carried forward to the succeeding taxable year. For more information on the Federal Residential Renewable Energy Tax Credit, visit the DOE website at <https://energy.gov/savings/residential-renewable-energy-tax-credit>.

Maryland

Residential Clean Energy Grant Program

Maryland Energy Administration (MEA) offers grants for clean energy systems installed at primary residences in Maryland through its Residential Clean Energy Grant Program. MEA has recalculated the Clean Energy Grant incentives based on several factors including available funds, economies of scale, a desire for more equitable distribution of funds, the cost of clean energy technologies, capacity factors, potential annual production, and data analysis from past Clean Energy awards.

Grants are allocated on a first-come, first-served basis across technologies and are subject to change in amount and existence based on funding availability. For more information on MEA's grants, visit their website at <http://energy.maryland.gov/residential/Pages/incentives/CleanEnergyGrants.aspx>.

Maryland Home Energy Loan Program

The MEA and the Maryland Clean Energy Center (MCEC) are partnering to provide loans of up to \$20,000 at a 9.99% interest rate to Maryland property owners interested in improving the energy-efficiency of their homes. The Maryland Home Energy Loan Program (MHELP) is designed to complement existing utility rebates to help homeowners overcome the up-front cost barriers associated with whole-house energy efficiency upgrades. For more information or to apply for a loan from MEA, visit MEA's website at <http://energy.maryland.gov/residential/Pages/incentives/mhelp.aspx>.

Carroll County

Carroll County's **Energy Saver Loan Program** (ESLP) provides Carroll County residents with low-interest rate loans. The purpose of the program is to help reduce the homeowner's energy bills. Loans are available for terms no longer than 5 years at 2.5% interest with a maximum of \$15,000 per homeowner. Qualifying home improvement energy efficiency projects include renewable energy improvements and home improvement retrofits, such as solar panels, geothermal heating and cooling systems, home insulation, storm windows, and other Energy Star-approved projects. Contact the Carroll County Department of Planning at 410-386-5145 or ccplanning@carrollcountymd.gov for more information.

Additional information on Maryland energy grants, rebates, loans, and incentives can be found at the Energy-Grants.net website at <http://www.energy-grants.net/maryland-energy-grants-rebates-loans-incentives/>. 🌞



Additional Online Resources

Resource guide for those considering solar provided by the Maryland Energy Administration (MEA), including calculators, incentives, financing, FAQs, installer resources

<http://solar-estimate.org/> AND <http://solar-estimate.org/?page=faq>

The Solar Institute – switching to solar at no cost down

<http://thesolarinstitute.org/solar-for-middle-class-new/>



Veteran homeowners eligible for solar panel program

http://nationalsolardepartment.com/veteran.html?lp=veteran¬e=Xinyi_Imgtest_V38T3_7S_Ds_0207&sid=2dqz0p6zxzvh

Estimates to get free quote from top Maryland Solar Contractors

http://estimates.solar/city/maryland-solar?traffic_source=smsn5&campaign=cities&group=maryland&keyword=maryland%20solar

Find top-rated home solar energy contractors

http://www.homeadvisor.com/sem/category.Home-Solar-Energy.13032.html?entry_point_id=32161777&iv=iv_m_b_c_1694762813_k_24329420682_g_1795601255_p_2_b_bb_d_c_vi_&kw_id=24329420682&c_id=1694762813&gatc=bb

USA solar grants

<http://www.usagrantsapplications.org/v8/?tc=ya>

Solar rebates

https://www.bgesmartenergy.com/residential/home-performance-energy-star?utm_medium=Search&utm_source=Bing&utm_campaign=2017_BGE_HPwES

Maryland Energy Administration

<http://energy.maryland.gov/Pages/default.aspx>

US Department of Energy (DOE): tax credits, rebates, & savings

<https://energy.gov/savings>

Residential Clean Energy Grant Program

<https://egov.maryland.gov/mea/CleanEnergy/>

Maryland Public Service Commission: community solar regulations

<https://cleantechnica.com/2016/06/15/maryland-psc-approves-final-community-solar-regulations/> 



Contact Info

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<https://www.carrollcountymd.gov/government/boards-commissions/environmental-advisory-council-eac/>

