Cover photo: This house generates its own electricity from a 4.25-kW PV system beautifully integrated into the rooftop. A net-metering relationship with their local utility makes on-site electrical storage unnecessary for these homeowners. (Solar Design Associates, Inc./PIX 04470)

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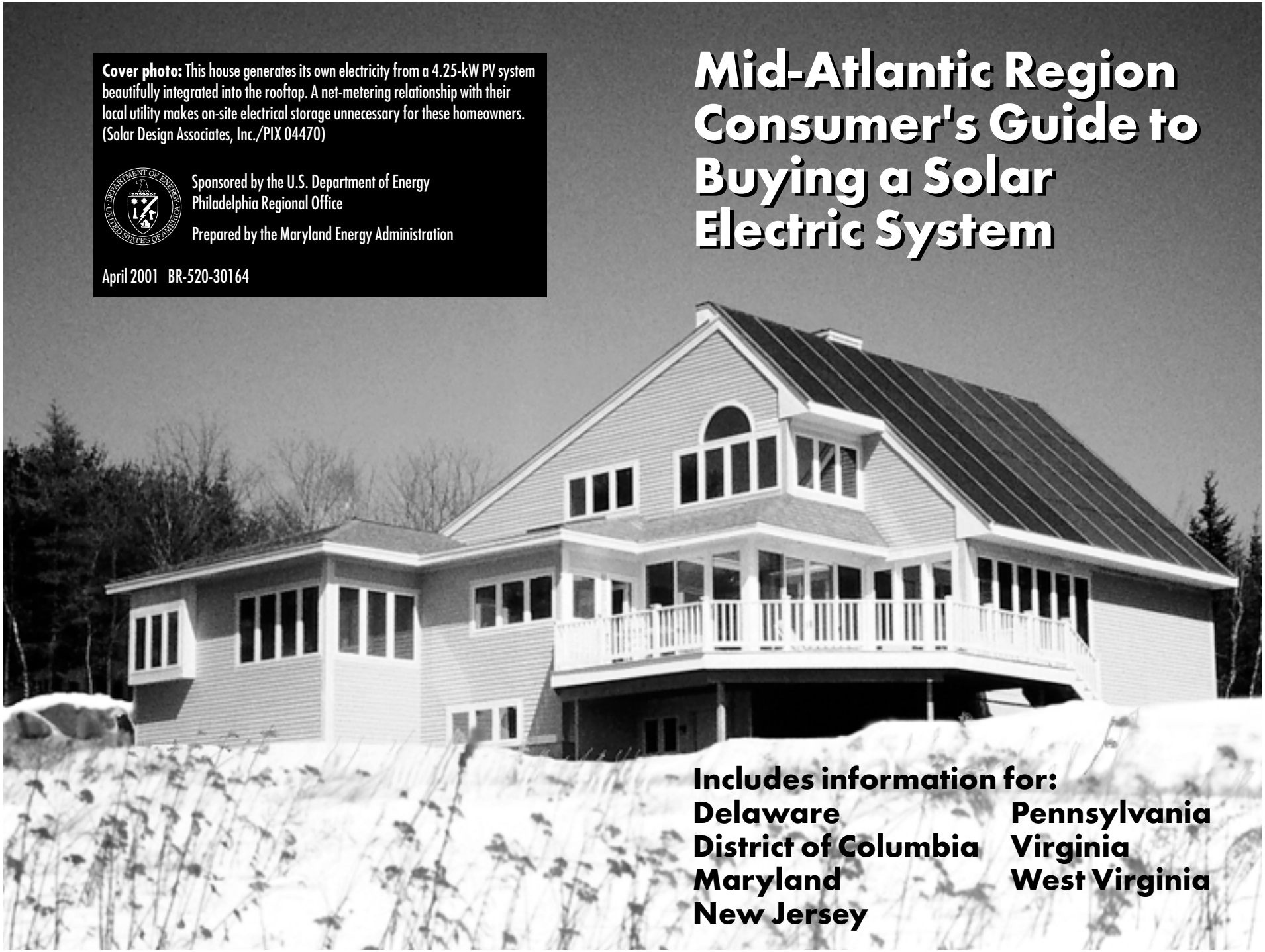
Mid-Atlantic Region Consumer's Guide to Buying a Solar Electric System



Includes information for:

Delaware
District of Columbia
Maryland
New Jersey
Pennsylvania
Virginia
West Virginia

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Introduction

Are you thinking about buying a PV system for your home or business? If so, this booklet will provide basic information that you need to know. Consumers in the Mid-Atlantic region are showing increased interest in solar electric systems for their homes and businesses. Photovoltaic—or PV—systems are reliable, pollution free, and use a renewable source of energy—the sun.

Aside from the excellent technological advances and cost reductions in PV technology, several state and federal PV programs and incentives are available to customers that are making PV systems more economical than ever before. For example, several state government offices offer financial assistance in the form of grants and tax credits to prospective PV customers.

The availability of net metering across the region is also providing an environment more conducive to the provision of cost-effective PV and renewable energy development. Net metering means that when your PV system generates more power than you need, the meter runs backwards, resulting in an even swap for the grid power that you use at other times. In essence, you receive full retail value for all the power that your PV system generates.

This booklet is designed to guide you through the process of buying a solar electric system. A word of caution: This is not a technical guide for designing or installing your system—for that information, we recommend you consult an experienced PV system designer or system supplier ("PV provider") who will have detailed technical specifications and other necessary information. A PV system can be a substantial investment, and, as with any investment, careful planning will help ensure that you make the right decisions.

These materials also provide information on PV programs, incentives, and policies for the states across the region. As the guide evolves, updated and more detailed information on state PV programs and policies will be provided.

Background

What is a solar electric, or photovoltaic, system?

Photovoltaic (PV) technology converts sunlight directly into electricity. It works any time the sun is shining, but more electricity will be produced on sunny days, when the light is more intense and is striking the PV modules directly (when the rays of sunlight are perpendicular to the PV modules). Unlike solar systems for heating water, which you might be more familiar with, PV technology does not use the sun's heat to make electricity. Instead, PV produces electricity directly from the electrons freed by the interaction of sunlight with semiconductor materials in the PV cells.

But you don't need to delve into detailed physics of how PV works to understand its appeal: investing in PV allows you to produce your own electricity with no noise, no air pollution, and no moving parts while using a clean, renewable resource. A PV system will never run out of fuel, and it won't increase our oil imports from overseas. In fact, PV may help to reduce the trade deficit, because many PV system components are manufactured in the United States. Because of these unique characteristics, PV technology has been called "one of the ultimate energy sources for the 21st century."

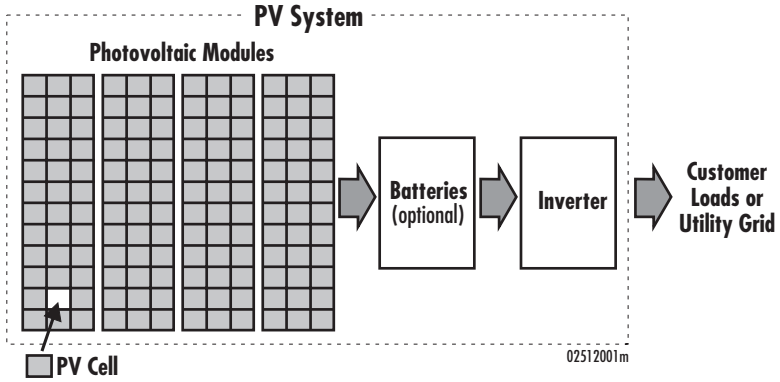
The basic building block of PV technology is the solar "cell." PV cells are wired together to produce a PV "module," the smallest component sold commercially, and these modules range in power output from about 10 watts to 300 watts. A PV system tied to the utility grid consists of one or more PV modules connected to an inverter that changes the system's direct-current (DC) electricity to alternating current (AC), which is compatible with the utility grid and able to power devices such as lights, appliances, computers, and televisions. Batteries may be added to the system to provide back-up power in case your utility experiences a power outage.

Some things you should know before purchasing a PV system

First, it produces power intermittently because it works only when the sun is shining. This is not a problem for PV systems connected to the utility grid, because additional electricity you need is automatically delivered to you by your utility.

Second, PV-generated electricity can be more expensive than conventional utility-supplied electricity. Improved manufacturing techniques have reduced the cost to less than one percent of what it was in the 1970s, but the cost (amortized over the life of the system) can be 2–3 times higher than the kilowatt-hour rate charged by the utilities in the Mid-Atlantic region. Net metering, which allows residents to spin their electric meters backwards and offset retail electricity costs, can help make PV more affordable, and various incentives can make it cost-effective

Finally, unlike electricity purchased month by month from a utility, PV power comes with a high initial investment and no monthly charge thereafter. This means that buying a PV system is like paying years of electric bills up front. You'll probably appreciate the reduction in your monthly electric bills, but the initial expense may be significant. By financing your PV system, you can spread the cost over many years, and state "buy down" grants and other financial incentives can help make the cost more manageable.



The 800-watt solar system being installed on this rooftop will provide about one quarter of the electricity needed by a typical household in the Mid-Atlantic region. If the home is built very efficiently with good exposure to sunlight, the system could supply up to half of the home's energy needs.
(David Parsons, NREL/PIX05579)

Investing in a PV system

Why should I buy a PV system?

People decide to buy PV systems for a variety of reasons. Some want to help preserve the earth's finite fossil-fuel resources and reduce air pollution. Others believe that it makes more sense to spend their money on an energy-producing improvement to their property than to send their money to a utility. Some people like the security of reducing the amount of electricity they buy from their utility, because it makes them less vulnerable to future increases in the price of electricity. Finally, some people just don't like paying utility bills and appreciate the independence that a PV system provides.

Whatever your reason, solar energy is widely thought to be the energy source of choice for the future, and electricity consumers in the Mid-Atlantic region have a unique opportunity to take advantage of a state and federally-sponsored programs to help make it their energy choice for today as well as tomorrow.

Is my home or business a good place for a solar system?

Can you orient your system for good performance?

A well-designed PV system needs clear and unobstructed access to the sun's rays for most or all of the day, throughout the year. You can make an initial assessment yourself, and if the location looks promising, your PV provider has the tools to trace the sun's path at your location and determine whether your home or business can make use of a PV system.

The orientation of your PV system (the compass direction that your system faces) will affect performance. In the Mid-Atlantic region, the sun is always in the southern half of the sky and is higher in the summer and lower in the winter. Usually, the best location for a PV system is a south-facing roof, but roofs that face east or west may also be acceptable. Flat roofs also work well for solar systems because the PV modules can be mounted flat on the roof facing the sky or mounted on frames tilted toward the south at the optimal angle. If a rooftop can't be used, your solar modules can also be placed on the ground to provide maximum performance.

Is your site free from shading by trees, nearby buildings, or other obstructions?

To make the best use of your PV system, the PV modules must have a clear view of the sun for most or all of the day—unobstructed by trees, roof gables, chimneys, buildings, and other features of your home and the surrounding landscape. It is important to note that even though the area where a system is mounted may be unshaded during one part of the day, it may be shaded during another. In such a case, this shading may substantially reduce the amount of electricity that your system will produce.

Do you have enough area on your roof or property?

The amount of space needed by a PV system is based on the physical size of the system you purchase. Most residential systems require as little as 50 square feet (for a small starter system) up to as much as 1,000 square feet. A typical 1-kilowatt (kW) system would occupy from 80 to 300 square feet, depending on the type and efficiency of modules employed. The table below displays typical roof-area requirements for a range of PV system sizes and module efficiencies. Although the efficiency (or percent of sunlight converted to electricity) varies with the different types of PV modules available today, higher-efficiency modules generally cost more. Therefore, to meet your long-term energy savings goal, both the cost and the efficiency must be considered when purchasing a PV system.

What kind of roof do you have, and what is its condition?

Some roof types are simpler and cheaper to work with, but a PV system can be installed on any type. Typically, composition shingles are easiest to work with, and slate is the most difficult. In any case, an experienced solar installer will know how to work on all roof types and can use roofing techniques that eliminate any possibility of leaks. Ask your PV provider how the PV system affects your roof warranty.

If your roof is older and needs to be replaced in the very near future, you may want to replace it at the time the PV system is installed to avoid the cost of removing and reinstalling your PV system. Panels often can be integrated into the roof itself, and some modules are actually designed as three-tab shingles or raised-seam metal roof sections. One benefit of these systems is their ability to offset the cost of roof materials.

How big should my PV system be, and what features should it have?

As a starting point, you might consider how much of your present electricity needs you would like to meet with your PV system. For example, suppose that you would like to meet 50% of your electricity needs with your PV system. You could work with your PV provider to examine past electric bills and determine the size of the PV system needed to achieve that goal.

You can contact your utility and request the total electricity usage, measured in kilowatt-hours, for your household over the last 12 months (or consult your electric bills if you save them). Ask your PV provider how much your new PV system will produce on an annual basis (also measured in kilowatt-hours) and compare that number to your annual electricity demand to get an idea of how much you will save.

Roof Area Needed in Square Feet (shown in **Bold Type**)

PV module efficiency* (%)	PV capacity rating (watts)							
	100	250	500	1,000	2,000	4,000	10,000	100,000
4	**30**	**75**	**150**	**300**	**600**	**1,200**	**3,000**	**30,000**
8	**15**	**38**	**75**	**150**	**300**	**600**	**1,500**	**15,000**
12	**10**	**25**	**50**	**100**	**200**	**400**	**1,000**	**10,000**
16	**8**	**20**	**40**	**80**	**160**	**320**	**800**	**8,000**

* Although the efficiency (percent of sunlight converted to electricity) varies with the different types of PV modules available today, higher-efficiency modules typically cost more. So, a less-efficient system is not necessarily less cost-effective.

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As you size your system, you should consider the "economies of scale" that can decrease the cost per kilowatt-hour as you increase the size of the system. For example, many inverters are sized for systems up to 5 kW, and if your PV array is smaller (say 3 kW), you may still end up buying the same inverter. Labor costs for a small system may be nearly as much as those for a large system. Therefore, it's worth remembering that your PV provider is likely to offer you a better price to install a 2-kW system all at once, than to install a 1-kW system this year and another next year—multiple orders and multiple site visits are more expensive.

Also, it is generally not economical to try to produce more power than you need. This is because in some states the utility is either not required to compensate the consumer for excess generation above the net metering period or is only required to do so at a low buyback rate. Typically, this rate is the utility's "avoided cost," which may be a mere fraction, say 20%, of the retail rate provided under net metering.

How much will my PV system save me?

The value of your PV system's electricity will depend on how much you pay your utility for electricity and how much your utility will pay you for any excess that you generate. Because many Mid-Atlantic utilities are required to offer net metering (and provide full retail credit for your generated, or net excess, electricity), your calculation is fairly easy because you and your utility will each pay the same price for each other's electricity.

A 1-kW system should meet about 12%-18% of the typical residential customer needs. Given the amount of solar resource available in the Mid-Atlantic region, it would produce about 1600 kWh annually under ideal conditions (i.e., a south-facing installation and proper slope of the roof). If you multiply this annual power output by your average electricity rate (8 cents per kWh or so) and then divide by 12, you come up with a monthly energy savings of about $11 per month. Depending on the grants and incentives involved, you should expect to see a system payback of less than 20 years—which is when the value of energy produced equals the initial investment of the system. This goal is achievable, given the state and local programs and incentives available across the region.

How much does a PV system cost?

There is no single answer, but keep in mind that the program offered greatly reduces the cost. Your system's price will depend on a number of factors, including whether the home is under construction or whether the PV is integrated into the roof or mounted on top of an existing roof.

The size of your system may be the most significant factor in any equation measuring your costs against your benefits. Small, single PV-panel systems with built-in inverters that produce about 75 watts may cost about $900 installed, or $12 per watt. These small systems will offset only a small fraction of your electricity bill. A 1-kilowatt system that will offset a large percentage of the electrical needs of a very energy-efficient home may cost $6,000 to $10,000 installed, or $6 to $10 per watt. At the high end, a 5-kW system that will completely offset the energy needs of many conventional homes may cost $30,000 to $40,000 installed, or $6 to $8 per watt. These prices, of course, are just rough estimates, and your costs will depend on your system's configuration, your equipment options, and other factors. Your local PV providers can provide you with estimates or bids.

Are incentives available to help reduce the cost?

Numerous state programs and incentives available help to "buy down" the cost of a residential PV system or otherwise make it easier to finance. These incentives may include: tax credits, state grants, and low-interest financing packages. Please see the final section of this pamphlet ("State PV programs, incentives, and contacts in the Mid-Atlantic Region") for the most up-to-date information on incentives and financing options for PV systems in your state.

If your home is used for a business, you may be entitled to a 10% federal tax credit and accelerated depreciation on the PV system. These tax benefits can substantially reduce the effective cost of your PV system and should be thoroughly investigated.

How can I finance the cost of my PV system?

There is nothing magical about financing the cost of purchasing and installing your PV system. Although there are some special programs available for financing solar and other renewable-energy investments, most of the options will be familiar to you.

One of the best ways to finance PV systems for homes is through a mortgage loan. Mortgage financing options include your primary mortgage, a second mortgage such as a U.S. Department of Housing and Urban Development (HUD) Title 1 loan, or a home-equity loan that is secured by your property. There are two advantages to mortgage financing. First, mortgage financing usually provides longer terms and lower interest rates than other loans such as conventional bank loans. Second, the interest paid on a mortgage loan is generally deductible on your federal taxes (subject to certain conditions). If you buy the PV system at the same time that you build, buy, or refinance the house on which the PV system will be installed, adding the cost of the PV system to your mortgage loan is likely to be relatively simple and may avoid additional loan application forms or fees.

If mortgage financing is not available, look for other sources of financing, such as conventional bank loans. Remember to look for the best possible combination of low rate and long term so that you can amortize your PV system as inexpensively as possible. Because your PV system is a long-term investment, the terms and conditions of your PV financing are likely to be the most important factor in determining the effective price of your PV-generated power.

Selecting a PV provider

Who sells and installs PV systems?

Consumers will need to select a vendor to install their PV system. We recommend that you contact the local chapter of the Solar Energy Industries Association to get help in selecting a contractor/installer (i.e., New York SEIA, Mid-Atlantic SEIA, and Maryland-D.C.-Virginia SEIA).

In some states with PV grant programs, residents may select any PV installer they wish. In others, the state government has already selected a qualified contractor through a competitive bid process. You should check with the local Regional Office (RO) of the Department of Energy or your state energy office contact listed in the final section of this report. The Philadelphia RO serves the Mid-Atlantic region; the Boston RO serves the New York region and Northeast.

In some locations, finding a PV provider can be as simple as and looking under "Solar Energy Equipment and Systems—Dealers" in the telephone directory. Be aware, however, that many of those listings are for solar *water-heating* companies, and these companies may not be experienced in PV system design or installation. Similarly, many electrical contractors, although proficient in typical electrical contracting work, may not have expertise in PV or with residential roof-mounting techniques.

How do I choose among PV providers?

Compile a list of prospective PV providers. You might first consider those closest to you, because the contractor's travel costs might add to your system price. Next, contact these providers and find out what products and services they offer. The following questions may give you a good sense of their capabilities:

Has the company installed grid-connected PV systems? If not, has it installed grid-independent PV systems?

Experience installing grid-connected systems is valuable because some elements of the installation—particularly interconnection with the local utility—are unique to these systems. Because grid-connected systems are relatively uncommon, most contractors with PV experience have worked only on systems such as those that power remote cabins far from the nearest utility line. Therefore, they have experience with all aspects of PV system installation except the connection with the utility grid. Although grid-connection work is different from off-grid work, a competent company with PV experience should not be eliminated just because it has not installed grid-connected PV systems in the past. In fact, experience with off-grid systems is valuable because grid-independent systems are more technically complicated than grid-tied systems.

How many years of experience does the company have installing PV systems?

This issue speaks for itself: A company or contractor that has been in business a long time has demonstrated an ability to work with customers and to compete effectively with other firms.

Is the company properly licensed?

PV systems should be installed by an appropriately licensed contractor. This usually means that either the installer or a subcontractor has an electrical contractor's license. You must contact the appropriate state agency to verify that a given contractor is licensed to perform the installation. Local building departments also may require that the installer have a general contractor's license. Consumers should call the city and county in which they live for additional information on licensing. Some states even require that properly licensed installers must demonstrate that they possess special knowledge about installing PV systems. You should check with your state energy contact. See the list of state energy contacts listed in the final section of this guide.

Does the company have any pending or active judgements or liens against it?

As with any project that requires a contractor, due diligence is recommended. The Consumer Protection Division of your state's Attorney General's Office may be able to tell you about any judgments or complaints against a state-licensed electrician. You should call the city and county in which you live for additional information on how to check up on contractors. The Better Business Bureau is another source of information on contractors.

How do I choose among competing bids?

If you have decided to get more than one bid for the installation of your PV system (and it's generally a good idea to do so), you should take steps to ensure that all of the bids you receive are made on the same basis. For example, comparing a bid for a system mounted on the ground against another bid for a rooftop system is like comparing apples to oranges. Similarly, different types of PV modules generate more electricity per square foot than others. Bids should clearly state the maximum generating capacity of the system (measured in watts or kilowatts). If possible, have the bids specify the system capacity in "AC watts," or specify the output of the system at the inverter.

You may want to obtain some estimate of the amount of energy that the system will produce on an annual basis (measured in kilowatt-hours). Because the amount of energy depends on the amount of sunlight—which varies by location, season, and year to year—it is unrealistic to expect a specific figure. A range of ±20% is more realistic. Bids also should include the total cost of getting the PV system up and running, including hardware, installation, connection to the grid, permitting, sales tax, and warranty. Your warranty is a very important factor for evaluating bids. The installer may offer longer warranties. Also ask yourself, Will this company stand behind the full-system warranty for the next two years?

Is the lowest price the "best deal"?

It might not be. Often, you get what you pay for. Remember that a PV company is a business just like any other, with overhead and operating expenses that must be covered. It's always possible that a low price could be a sign of inexperience. Companies that plan to stay in business must charge enough for their products and services to cover their costs, plus a fair profit margin. Therefore, price should not be your only consideration.

Remember, if your state has an incentive program for solar energy, it may be through a pre-selected group of contractors. If so, you can only get the incentive by using one of those contractors. Furthermore, most state programs

require the prospective PV customer to first contact the state to apply to the grant program and verify that incentives are still available. You should not expect to receive incentives or grants after you have installed a system on your own. So be sure to contact the state *before proceeding* with your solar project.

Rick Brook, second from left, and Lyle Rawling, right, President of FIRST, a solar integrator, carry solar photovoltaic panels to the roof of Brook's home in New Jersey. When the first summer storm knocks out the grid in 1998, "we'll still have power," says Brook. "I think that will be a good time for a party." (Bob Gibson, UPVG/PIX08095)

Before connecting a PV system to the grid

What about permits?

If you live in a community in which a homeowners association requires approval for a solar system, you or your PV provider may need to submit your plans. Gain approval from your homeowners association before you begin installing your PV system.

Most likely, you will need to obtain permits from your city or county building department. You will probably need a building permit, an electrical permit, or both before installing a PV system. Typically, your PV provider will take care of this, rolling the price of the permits into the overall system price. However, in some cases, your PV provider may not know how much time or money will be involved in pulling a permit. If so, this task may be priced on a time-and-materials basis, particularly if additional drawings or calculations must be provided to the permitting agency. In any case, make sure the permitting costs and responsibilities are addressed at the start with your PV provider.

Code requirements for PV systems vary somewhat from one jurisdiction to the next, but most requirements are based on the National Electrical Code (NEC). The NEC has a special section, Article 690, that carefully spells out requirements for designing and installing safe, reliable, code-compliant PV systems. Because most local requirements are based on the NEC, your building inspector is likely to rely on Article 690 for guidance in determining whether your PV system has been properly designed and installed. If you are among the first people in your community to install a grid-connected PV system, your local building department may not have approved one of these systems. If this is the case, you and your PV provider can speed the process by working closely and cooperatively with your local building officials to help educate them about the technology and its characteristics.

What about insurance?

If you are buying a PV system for your home, your standard homeowner's insurance policy is usually adequate to meet the utility's requirements. However, you may wish to contact your insurance carrier or one of the groups listed in the final section of this booklet. In some states, the electric utility may require additional insurance.

How does the PV system interface with my existing utility connection? What are my options?

There are basically three ways that PV systems can be wired for residential homes: grid-connected, grid-connected with battery storage, and off-grid.

Grid-connected implies that the PV system interfaces directly with your current utility connection. This set-up allows the you to put excess generation (when PV generation exceeds current consumption) back on the grid. In times when consumption exceeds generation by the PV system, you simply obtain the additional power from the local utility, as always. Grid-connected systems are increasingly popular because they do not require battery storage and are more efficient in converting solar energy to electricity. Provided the utility allows net metering, grid-connected systems

also tend to be the most cost effective. Net metering means that you get full credit for the excess electricity from your PV system back to the utility for the same price that you paid for electricity. In essence, your electric meter will run backwards when you are not using all the power that your PV system generates. This topic will be addressed in more detail in the following section on net metering. Several Mid-Atlantic states offer net metering, although the terms and conditions vary in each case.

A second option is *grid-connected with battery storage*. The included battery system provides back-up power in case of a utility power outage. Batteries add value to your system, but at an increased price.

A third option is to operate the PV system *independent of the utility grid*, in cases where the home has no electric service to begin with, or to provide power to outbuildings on a residential property, for example. In cases where a house is off the grid and there are no utility lines available, PV often becomes the most economical choice for both the consumer and the utility. The cost of running a special line is usually more than the cost of installing a PV system.

What about net metering?

Net metering has been generally accepted as one of the best, unobtrusive ways for states to encourage consumers to purchase renewable energy systems. Basically, net metering allows customers to only pay for their "net" electricity, which is the amount of power consumed from the utility minus the power generated at the customer's home via the PV system. Excess generation (power not consumed during the billing period) may be met with a reimbursement at the utility's avoided cost (usually a much lower rate) or not at all.

Once the utility has been contacted and has cleared your PV system for net metering, you should check that you are receiving credit. On a bright sunny day, when few or no lights or appliances in your house are running, examine your electric meter. You should observe it spinning in reverse. You should note the meter reading, then check again in a few hours of bright sunshine and see if the meter reading is lower. In most circumstances, the "old-fashioned" meter with mechanical dials works fine. However, some newer electronic meters have trouble registering electricity flow in reverse. Your PV installer should be able to let you know if you will have a problem.

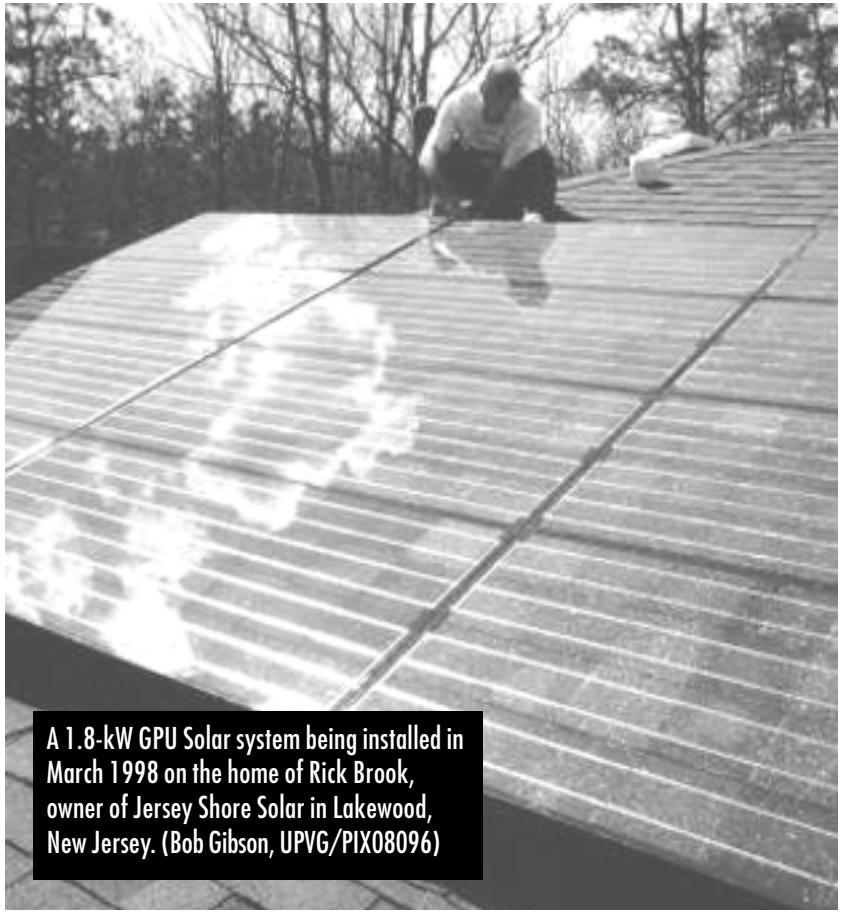
What about utility and inspection sign-off?

After your new PV system is installed, it may need to be inspected and "signed off" by the local permitting agency (usually a building or electrical inspector) and perhaps by the electric utility. Inspectors may require your PV provider to make corrections, but don't be alarmed—this is fairly common in the construction business.

What about warranties?

Warranties are key to ensuring that your PV system will be repaired if something should malfunction during the warranty period. PV systems should carry a full ("not limited") 2-year warranty, in addition to any manufacturer's warranties on specific components. This warranty should cover all parts and labor, including the cost of removing any defective component, shipping it to the manufacturer, and reinstalling the component after it is repaired or replaced.

Be sure you know who is responsible for honoring the various warranties associated with your system—the installer, the dealer, or the manufacturer. The vendor should disclose the warranty responsibility of each party. Know the financial arrangements, such as contractor's bonds, that assure the warranty will be honored. Remember, a warranty does not guarantee that the company will remain in business. You must clearly understand who you should contact if there is a problem. To avoid any later misunderstandings, be sure to read the warranty carefully and review the terms and conditions with your retailer.



A 1.8-kW GPU Solar system being installed in March 1998 on the home of Rick Brook, owner of Jersey Shore Solar in Lakewood, New Jersey. (Bob Gibson, UPVG/PIX08096)

Appendix

Regional and State PV Programs, Incentives, and Contacts

The PV roof shingles on the inner portion of this institute's lower roof were laid out and nailed down using the same methods used to lay conventional shingles. This rooftop array of PV roof shingles was developed by United Solar Systems and Energy Conversion Devices under the DOE PV:BONUS program. (John Haigwood/PIX04577)

Mid-Atlantic Regional PV Programs, Incentives, and Contacts

Virginia Alliance for Solar Electricity (VASE)

The Virginia Alliance for Solar Electricity (VASE) is a partnership that began between BP Solar, Virginia Power, Virginia's Center for Innovative Technology (CIT), the Virginia Department of Mines, Minerals, and Energy (DMME), and DOE to accelerate the commercialization of a new generation of PV modules being manufactured in Virginia by BP Solar. The VASE partnership has expanded from its original partners and now includes other states in the Mid-Atlantic region, including New Jersey, Pennsylvania, Maryland, and North Carolina.

The VASE program was awarded cost-share funding from the DOE under the Commercialization Ventures Program through a cooperative agreement made to DMME. This cost-share funding is being used to "buy down" the cost of BP Solar's new tandem-junction amorphous silicon thin-film photovoltaic modules manufactured at their Virginia plant. The VASE partners are identifying eligible building owners and developers interested in installing this PV technology. For more information about the VASE partnership, VASE-funded projects, and technology applications, please visit the VASE web site (*www.vase.org*). The VASE contact at BP Solar is Clive Sinnott, 410-981-0270.

For more information about BP Solar, their products, and manufacturing facilities, please visit the BP Solar Web site (*www.bpsolar.com*).

State PV Programs, Incentives, and Contacts in the Mid-Atlantic Region

Delaware

Incentives and Programs

Energy Alternatives Program

The Energy Alternatives Program pro-vides rebates for photovoltaic and solar water heating systems. The intent of the rebate program is to reduce the net cost of the approved energy savings products to the end user and thereby increase system sales in the Delaware market. By increasing consumer demand of photovoltaic and water heating systems, contractors will gain valuable product knowledge; Delaware homes and businesses will operate more efficiently and economically, new jobs will be created and cleaner electricity will be produced.

Program participation is available for photovoltaic systems not smaller than 300 watts and no larger than 25 kilowatts (kW) and for domestic water heating systems with a minimum 80 gallon capacity. Rebates for qualifying systems will be available through the Delaware Economic Development Office.

State Contacts and Other Resources

Charlie T. Smisson, Jr.
Energy Program Administrator
State Energy Office
149 Transportation Circle
Dover, DE 19901
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District of Columbia

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This organization is the regional Trade organization of the photo-voltaics and solar-thermal manufac-turers, distributors, and component suppliers. Their membership also includes companies that design, sell, install, and maintain solar energy equipment for residential, commer-cial, and institutional customers throughout the region.

Maryland

Maryland has been providing incentives for PV installations for several years. Homeowners, schools, farms, local governments, nonprofits and businesses have all benefited from these incentives.

Maryland is a partner in the federal Million Solar Roofs Initiative (MSRI). The Maryland Energy Administration (MEA) is the lead agency in the state for promoting local solar initiatives. MEA not only promotes education and outreach activities but also provides a limited number of grants to fund a portion of the costs to install solar in the state.

Incentives and Programs

Maryland Solar Energy Grant Program

Beginning in January 2005, the Maryland Energy Administration offers a limited number of grants to certain qualified applicants. Individuals, businesses and local governments are eligible to apply for grants. The incentives are 20 percent of system cost up to a maximum grant amount for three separate categories:

Category	Maximum Grant Amount
Solar Water Heating	$2,000
Residential Photovoltaics	$3,000
Nonresidential Photovoltaics	$5,000

Due to limited funds, it is possible that some qualified applicants may not receive funding.

Net Metering

This law allows Net-Energy Metering for electric customers who produce electricity from PV for system sizes up to 80 kilowatts (kW). The PV systems must meet all applicable safety and performance standards. On certain times of day when the PV output exceeds the building's load requirements, the electric meter spins in reverse and electricity is fed onto the electric grid, further reducing monthly monthly electric bills.

Federal Incentives

Commercial and industrial PV projects are eligible for a number of federal incentives for PV. They include tax credits and other incentives. For up-to-date information on federal and state incentives, go to the Database for State Incentives for Renewable Energy (DSIRE) Web site: http://www.dsireuse.org.

Maryland Solar Rooftops Program Overview

The program is a statewide initiative to promote the increased use of solar energy. The long-term purpose of the program is to develop a self-sustaining regional market for solar energy. This includes an infrastructure of manufacturers, distributors, installers, electricians, and builders incorporating PV into their daily business practices. Benefits to the increased use of the local solar resource include cleaner air and economic development.

State Contacts and Other Resources

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New Jersey

Incentives and Programs

New Jersey offers incentives for installation of solar energy systems under the customer-sited Clean Energy Generation program. New Jersey will also offer incentives under a grid-supply program.

Net Metering

Net-metering regulations, now published in draft form, apply to systems up to 100 kW in size. Systems below 10 kW will be expected to comply with the national standards.

Net-metering regulations for systems above 10 kW are under discussion. Regardless of system size, the regulations may allow for annual netting of energy purchases against energy produced. No compensation would be given to the producing entity for any excess electricity production. For information and status of net metering regulations, call Victor Bozzo of the New Jersey Board of Public Utilities, Division of Energy, at 973-648-2375.

State Contacts and Other Resources

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Pennsylvania

Incentives and Programs

Net Metering

The Pennsylvania net-metering law addresses PV and other renewable energy sources (including fuel cells) for residential and other customer classes. The law sets a limit of 10 kW for net-metered customers. A customer's net excess generation is granted to the utility at the end of each month.

Renewable Energy Pilot Program

The Renewable Energy Pilot program schedule requires four of Pennsylvania's electricity distribution companies to develop solar water heating and/or photovoltaic applications for the Low-Income Usage Reduction Program. Roughly $3.7 million in grants will be made available over the next few years. The Energy Association of Pennsylvania (formally known as the Pennsylvania Electric Association) is coordinating this effort on behalf of Allegheny Power, PPL Corporation, and GPU Energy.

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Virginia

Virginia offers tax exemptions and net metering, and is also home to the Virginia Alliance for Solar Electricity program, which was recently expanded across the Mid-Atlantic region.

Incentives and Programs

Local Property Tax Exemption for Solar Energy

This statute allows any county, city, or town to exempt or partially exempt solar energy equipment or recycling equipment from local property taxes. Residential, commercial, or industrial property is eligible. The statute broadly defines solar energy equipment as any application that would otherwise require a conventional source of energy. Recycling equipment is defined as equipment that is "integral to the recy-

cling process and for use primarily for the purpose of abating or preventing pollution of the atmosphere or waters." It addresses the following technologies: passive-solar space heat, active-solar water heating, active-solar space heating, solar-thermal electricity, and photovoltaics. To determine if your locality offers this property tax exemption, contact your local commissioner of revenue and cite the following Section from the Code of Virginia, §58.1-3661. The cities of Alexandria, Charlottesville, Falls Church, Hampton, Lynchburg, and Roanoke; the Town of Richlands; and the counties of Albemarle, Chesterfield, Fairfax, Hanover, Isle of Wight, King and Queen, Loudoun, Prince William, Pulaski, Spotsylvania, Warren, and Wise all offer the exemption.

Net Metering

In March, 1999, Virginia's state legislature enacted Virginia Assembly bill S1269, which requires net metering for small solar, wind, and hydroelectric systems. The law requires all of the state's utilities to offer net metering to residential systems of 10 kW or less and non-residential systems of 25 kW or less. The law limits the amount of net-metered generation to 0.1% of the previous year's peak electricity demand. Customers can apply the credit for electricity generated from their system to the following month; however, at the end of the year, any excess generation is granted to the utility. For more information on net metering, contact your local utility provider, visit the Web site at *www.state.va.us/scc/division/eaf/compete.htm*, or contact:

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