

Solar Freedom and Survival Guide



Slash Your Bills, Break the Chains of the Power Company, and Survive Anything With Solar Power.

by **Kriss Bergethon**
SolarSphereOnline.com



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Preface

About the Author



Kriss Bergethon is an author, entrepreneur, and off-grid homeowner from Colorado. Kriss has been involved in solar power and green building since 2003. Kriss has an engineering degree and worked in the mining industry before 'seeing the light' and moving into clean energy and green building.

He now owns Solar Sphere, www.Solar-Sphere.com, an online retailer of solar panels, components, complete systems, training, installer directory, and dispenser of free information. Please feel free to email him your comments or questions about this book at Kriss@Solar-Sphere.com.

A Note From the Author

Thank you for downloading *Solar Freedom and Survival Guide*! This book is intended to give the layperson a good summary of solar power. This subject is pretty technical and can be a little dry, but I've tried to make it as easy to understand as possible, and maybe even a little fun. Hopefully you'll have an idea if solar is right for you, and maybe even help you decide if a career in solar is something you want to pursue.

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Thank you and enjoy *Solar Freedom and Survival Guide*!

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Forward: Top Ten Reasons to Install a Solar Power System

Here are 10 reasons why solar is a great option:

1. Incentives: Recently Congress lifted the cap on tax incentives for solar power systems, and extended the 30% credit. So if you spend \$20,000 on a system, your tax bill will be reduced by \$6,000 (.3 x 20,000). And if you don't have \$6,000 in taxes (you lucky duck!) you can carry it over to the next year. Now states and utilities are getting into the act as well. Everything from rebates to tax incentives are being offered, and some of these can offset the cost of your system by as much as 80%! Check out the DSIREUSA.org website for information on incentives in your area.

2. Maintenance cost: Solar panel systems require very little maintenance. Sometimes clearing and cleaning is necessary, and having an annual checkup by a professional is recommended. But most owners can expect to do very little for their panels over their lifetime.

3. Fuel Cost and Availability: Obviously sunlight is free. Fossil fuel prices are rising dramatically, and will probably rise even more sharply with carbon taxes and caps on the horizon. And the sun will probably be around showering us with its wonderful energy for another 5 billion years or so. With solar, knowing that your fuel source is infinite and free is pretty cool. And lets face it: money is green too.

4. Reliability: Solar panels have no moving parts and therefore are not likely to break down. The process that makes them work (which is explained later) can be done day after day without major changes in efficiency. And they can improve the availability of your entire electrical system if you live in areas prone to utility blackouts.

5. Durability: Most panels these days come with a 20-30 year warranty. Can you think of anything that comes with even a 15 year warranty?! Some of the panels that were created as part of the space race 50 years ago are alive and kicking to this day. Arrays have endured all kinds of weather and climatic changes and have proven to be extremely durable.

6. Quiet: Solar panels make little to no noise as they produce energy, something you AND your neighbors can be happy about.

7. Safety: Photovoltaic cells are very safe and produce at such a low amperage that electrocution is extremely rare. They also are rare in that they produce power without fuel combustion, a very volatile and dangerous process whether it's in your backyard or at the power plant.

8. Energy Independence: Knowing that you can produce your own energy, much like having your own vegetable garden, is very satisfying. And knowing that you are sending less money, or maybe none at all, to a large conglomerate or supporting a violent nation is good for you, our country, and the world.

9. Low Pollution: Both the process of producing solar panels and producing solar energy is a low pollution process. Solar panels make up for the energy used to produce them in 2-4 years, and then produce energy for decades. Plus almost the entire array is recyclable, so when their life is over they can be broken down and used for something else.

10. That 'Green' Feeling: Perhaps the most powerful reason (other than the feeling of saving money) is knowing that you are DOING SOMETHING. You're helping clean up the planet, promoting independence, and most of all getting us further away from the destruction and pollution inherent in the

use of fossil fuels. What else do you need?

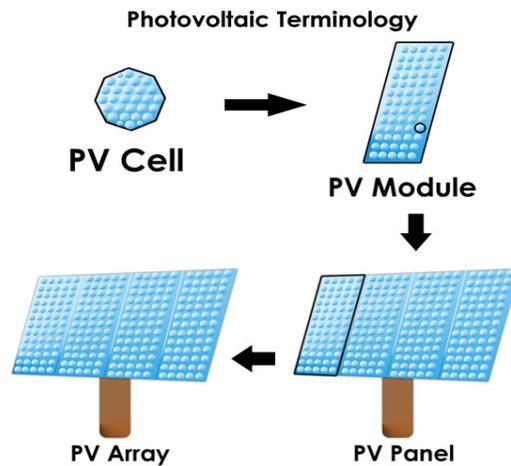
FAQ 1: How Does Solar Power Work?

Solar Cells

A solar panel is made of several photovoltaic cells. The cells are very thin, about 1/100th of an inch thick and usually 3 to 4 inches square. These cells convert sunlight to energy by the photovoltaic effect. These cells do not require fuel and have a standard lifetime of 20-30 years.

Solar Panels & Modules

Photovoltaic (PV) cells are assembled together to create a solar module. The module is what you are used to seeing as a panel. It has anywhere from 2 to 200 cells assembled together, encased in tempered glass and aluminum to make them weather resistant.



Tying Them Together

Like batteries, cells can be combined in series or in parallel to create larger and more specific voltages and amperages. For instance, four 1-volt/1-amp cells in series will combine for 4 volts, but the amperage will stay at 1 amp. By contrast, four 1-volt/1-amp cells in parallel will maintain 1 volt but have 4 amps of output. You can multiply the amperage by the wattage (in the example above 4×1) to get the watts generated.

Parallel wiring means that if two cells are side by side the positive ends are connected to each other, and the negative ends are connected to each other. To connect cells in series, you connect the negative of one to the positive of another.

Sizes and Shapes

Modules can be made in a many sizes and shapes to fit their application. Panels come in standard rectangular, triangular, fold-able, and even rolls. This means they can be used in a wide variety of applications, from boats and recreational vehicles to electric cars and space stations.

The Solar Array

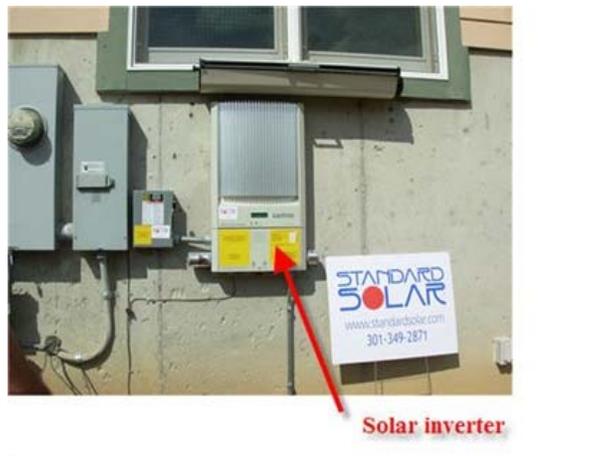
Modules are combined to create solar arrays. An array is a group of modules assembled together and designed to meet a certain electrical load. You've probably seen most arrays mounted on the rooftops of homes. These arrays are designed to generate a certain amount of electricity over the course of a year given the angle and installation.

FAQ 2: What Goes Into A Solar Power System?

In addition to solar panels there are several components that go along with them to create a system.

Inverters

We touched briefly on inverters before, they essentially 'make waves'. They can turn steady stream DC power into wavy AC power. There are several different kinds of inverters and they differ in the kind of wave they create. Modified sine wave inverters create current that resembles connected up and down stair cases, as the inverter creates steps in the current. Pure sine wave inverters create just that, a nice even up and down wave. Sensitive electronics, like entertainment equipment, require that pure wave to operate properly, while smaller electronics, like small kitchen appliances, work just fine with modified wave.



An inverter in a very typical grid-tie setup.

Charge Controllers

Whenever batteries are present in a solar power system, a charge controller is needed. This is needed because, unlike other power sources that have an off and on switch, solar panels are pretty much 'on' as

long as the sun is shining. This can be a problem if the batteries are at full capacity as overcharging them would ruin them. So the charge controller controls how much charge goes into the batteries and optimizes the energy they receive.



A charge controller showing the voltage in a battery bank.

Control Panels, Disconnects, and Wiring

There are a lot of fuse panels, disconnect switches, and wiring in a solar power system. These are mixed and matched to suit a particular solar power system. The wiring can get expensive, so the distances between components should be minimized. DC power runs most efficiently through thick, heavy gauge wire, much like water flows better through larger pipe. The bigger the wire, obviously, the more expensive.

Batteries

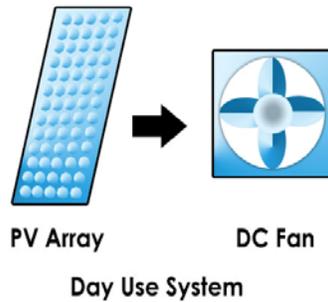
Batteries are used only when absolutely necessary in a solar power system. Large, heavy, full of chemicals, and expensive, they are something to be avoided. There are 3 basic types used in solar: lead-acid, sealed gel, and sealed absorbed glass mat (AGM). Lead-acid batteries are the most efficient and longest lasting, but require venting to avoid hydrogen gas explosions. Sealed batteries are just that, completely sealed, and don't require venting or adding liquids. This makes them best for boats and RV's where they can be jostled and tucked away.

FAQ 3: What Kind of Solar Power System Should I Get?

There are several types of solar power systems that are used in homes. Let's cover the most common.

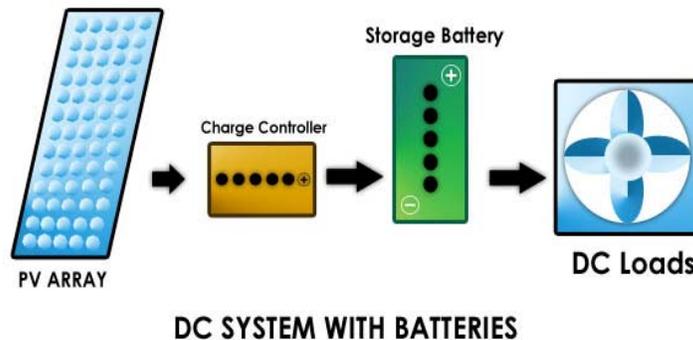
Solar Direct (or Day-Use Solar)

These systems are intended to be used only when the sun shines. There are no storage batteries, so as soon as the sun goes away, the power stops. These systems are great for certain water pumping applications, venting fans, and certain electronics. Rare in application, they are very affordable and easy to install.



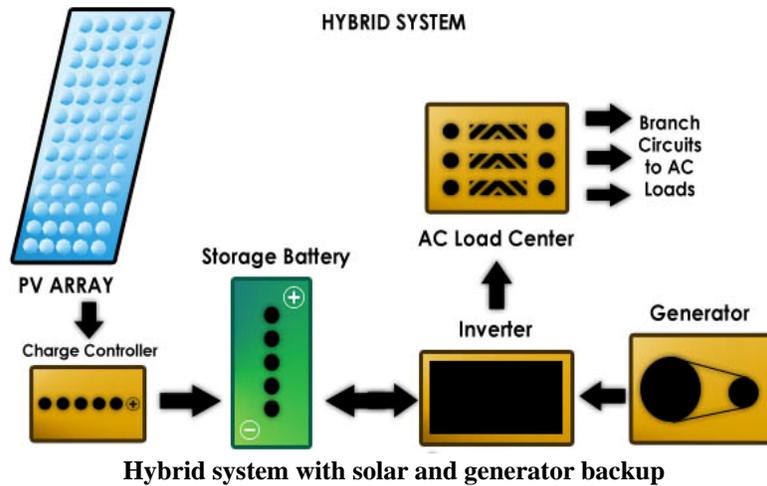
DC System with Batteries

These systems are great for small electronics that need to run day or night. Often times you'll see these systems employed on highway sign lights, gate openers, and communication boxes. Simple and affordable these systems have a wide variety of uses and are perfect for remote locations that require low voltage.



Hybrid Solar-Generator Systems

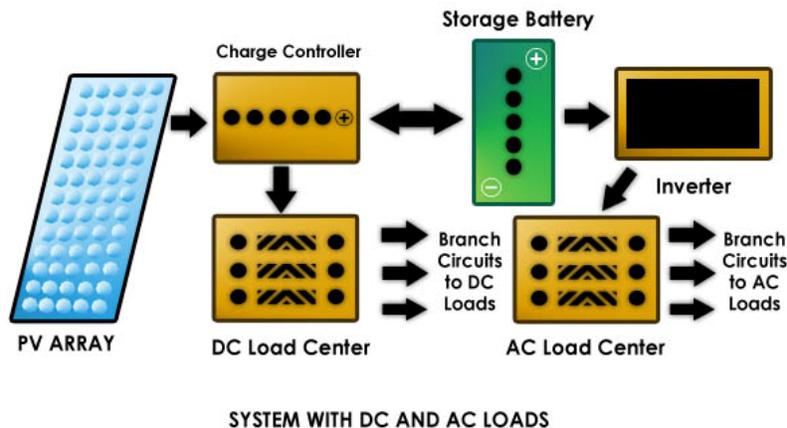
For off-grid and back-up power applications, most folks turn to a hybrid system. The hybrid system usually consists of a PV array, a charge controller, a battery bank, an inverter, and sometimes a tertiary power source such as a wind turbine or a gas generator. These systems are fairly complex and require a high level of expertise to design and install. With the popularity of off-grid living, however, there are more and more packaged systems for people to choose from. These systems will provide power if the grid shuts down and can still sell power back to a grid if desired.



The biggest disadvantage of these systems is the cost and complexity. The battery bank requires regular maintenance and must be replaced long before the panels are done generating. They are also fairly expensive. These costs, however, are often a better alternative to the cost and hassle of bringing in grid power to remote locations.

Off-Grid Solar Dependent Systems

For cheap power in remote locations, often these systems are the only choice. They generally consist of a small battery bank, a charge controller, and a solar array. People with these systems choose to use all DC appliances so as to avoid the cost and inefficiency of inverters. These systems have the advantage of lower initial cost. The batteries are still an issue for maintenance cost. And there is no backup power if weather doesn't allow the panels to charge the batteries.

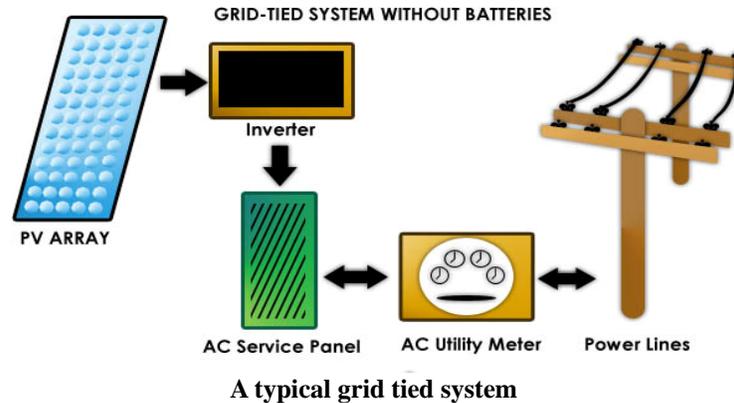


A typical off-grid solar power system

Grid-Tied Solar Systems

This is the easiest and most popular way to get started in PV power. These systems simply tie into your existing home power system and the utility grid. If your array generates more energy than you use, the

energy is sold back to the power grid and creates a credit for you. The advantages of these systems are the relative simplicity and lower initial cost. A system like this typically requires a few panels, some wiring boxes and disconnects, and an inverter. The inverter converts the electricity from your panels to power that your home and the grid can use.



This system also requires an interconnection agreement with the local utility. This outlines just how the connection to the grid should be made and what the inspection schedule is. It is generally advisable to get your power company involved early on for a grid-tied system. Since there are often incentives and rebates in place from the state and the utility, it's well worth the call.

FAQ 4: Where Should I Put My System?

The basic rules of placing a solar power system are pretty easy. We need:

- **Good southern exposure.** We want a space that's going to get tons of sunlight all year round. Getting good morning light and evening light is not nearly as important as getting good midday sun exposure, when the most energy is going to be hitting the ground.
- **Angle at or near latitude.** The angle of the panels should be as close to your latitude as possible. The sun is directly over head at the equinox in March and September, which means that the sun is nearest that angle for the greatest part of the year. Having the panels at that angle will maximize your system's efficiency.
- **Minimal shading.** Even small objects like roof vents can affect our panel's performance significantly. And don't forget that trees grow, and your panels will be around for 30 years or more.
- **Access without nuisance.** This means we can get to the panels (they are not on top of a 50' pole) but they're also not in the way (where the kids will be bouncing soccer balls off them).
- **Close to consumption.** As we talked about earlier, the panels produce DC power which tends to lose voltage over distances. The closer the panels are to the main area of consumption (like your main AC panel and power meter) the more power you'll get to actually consume.

Most people will find the easiest place to put their panels is the roof. However, if the roof is heavily shaded or doesn't face south, there are still plenty of options for mounting solar panels!

FAQ 5: How Much Room Do I Need for Solar Panels?

Many people wonder how much space systems take up. A good rule of thumb is to remember that the panels will take about 1/10th of their space in square footage. So if you determine that a 5kw system will suffice for you needs:

$$\begin{aligned}5\text{kw} \times 1000\text{W/kw} &= 5,000 \text{ Watts} \\5,000 \text{ watts} \times 0.1 \text{ sq.ft/watt} &= 500 \text{ sq.ft.}\end{aligned}$$

So you would need about 500 sq ft for the panels in the example above. The inverter and disconnects will take up about a 3'x3' area on a wall.

If you have an off-grid system or a system with batteries, you can expect to need the area of a medium sized closet, approx 6'x6', to house everything.

FAQ 6: Are There Incentives and Rebates For Solar?

Uncle Sam is continuing to make it easier for homeowners to include solar energy as a viable, and affordable, means of powering their homes. Not to be outdone, the majority of states are also devising ways to encourage their residents to “switch on” to renewable energy, many times through electric companies. Renewable energy includes leveraging the power of the sun. Here are some examples of how both forms of government are attempting to do so. Be sure to check out DSIREUSA.org for more information on all incentives as they can be complicated and are constantly changing.

Federal Tax Credits

With the adoption of the Energy Policy Act of 2005 and the subsequent Energy Improvement and Extension Act of 2008, Americans are now eligible for a 30% rebate through the Federal Government toward a residential solar power system. In addition, there is now no limit to the amount that can be claimed toward the cost of a photovoltaic system. In the past, the amount was restricted to \$2,000. The rebate currently covers both the cost of the materials and the labor. For example, a PV system with a cost of \$25,000 would be eligible for a \$7,500 credit. A credit, unlike a deduction, is applied directly to the taxes owed, so would therefore reduce your total taxes owed to the IRS by \$7,500.

Along with their normal tax forms, residents would use IRS Form 5695 to earn their rebate. Something to keep in mind however is how this relates to other incentive programs. Talk to your accountant on how to treat this credit, plus any other rebates and incentives you might be receiving. Generally the 30% credit is taken on the cost of a system AFTER other rebates.

Municipal Financing

Another attempt at making solar power attainable for the everyday homeowner is a program that allows

the cost of the PV to be covered by municipal tax funds over an extended period of time. In most cases, this payment plan lasts for twenty years. If the home is sold before that period is up, the solar power system, and whatever tax liability remains, go to the new owner of the home. The program is usually funded by municipal bonds. Many cities in California have incorporated this program, as well as some cities in Colorado, Maryland, and Louisiana.

Net Metering

Many energy companies are implementing programs that enable residents with a photovoltaic system to “sell” the extra electricity they obtain back to their energy companies. If the customer's system generates more than they consume the specially built meter simply spins backwards. All utilities in the US are required to purchase back consumer-produced power, but the rates at which they do so varies widely.

Renewable Energy Credits (REC)

Producing renewable energy is seen as a good thing of course, and installing a system can create a credit which traditional utilities and state governments want to buy. This usually takes form as a check written directly to the homeowner for a percentage of the system. In Colorado for example, Xcel Energy will pay \$1.50 per watt in REC's when you install a system and connect it to their grid. Some manufacturers, such as Sharp, will even deduct this amount off the price of the system and then pursue the credit from the utility.

Feed-in Tariffs (FiT)

As an extension to the process of buying back energy, the state of California and the city of Gainesville, Florida have begun enacting feed-in tariffs (FiT). FiT's are designed to pay for the installation of a solar power system plus a small profit. Overall, the tariffs range from 8 to 81 cents per kilowatt-hour, which means you would get paid that amount for the energy you produce. This amount is often 3 to 4 times the amount the utility charges customers.

Bank Financing

It's definitely worth a call to your bank to see if they offer financing with solar power systems. Many banks look at it the same way as any home-improvement loan, and many people use a home equity line of credit for the purchase. Some banks are even offering reduced rates for loans because they realize that the loan will actually help you pay your bills every month since you'll have reduced utility payments.

FAQ 7: How Much is a Solar Power System Going to Cost Me?

So, you've got a basic understanding of system layout and terminology, lets get down to the nitty-gritty and talk about system cost. We'll tackle the grid-tie system first since it is the most common.

Grid-Tie System Costs

It's difficult to estimate exactly what you are going to pay for a system. Prices and installation costs

vary widely based on local competition, hardware availability and the difficulty of installation. There are some basic rules of thumb we can use to estimate system cost. Solar panels have been coming down in price recently as worldwide production has increased.

An easy number to remember is **\$7-8/watt for an installed system**. That means that if you decide you want a 2,000 watt system you can expect to pay between \$14,000-\$16,000 before incentives. So what goes into that number? Generally equipment runs about \$4-\$4.50 per watt for panels, mounting, wiring, inverter and various fasteners. Panels themselves are running about \$3.00/watt.

Off-Grid System Costs

Off-grid systems are much more complicated (complicated = expensive if you haven't picked up on that already). Off-grid system can run anywhere from 20-50% more than grid-tie systems. So a budgetary number is around **\$11-12/watt for an off-grid system**.

Why so much more? One word: batteries. Batteries add a tremendous amount of expense and complexity. One deep-cycle battery for off-grid use can run \$300, and often times a system requires *16 batteries*. We're talking about \$5,000 for batteries. Then there's the charge controller, the copper wiring for all the batteries, and most systems need some kind of enclosure.

There are some plug and play kits, check out SolarSphereOnline.com, for much less (around \$7.50 per watt) but they are intended for small homes and you have to install them yourself.

FAQ 8: How Much Will A System Save Me?

Invariably people who are thinking about a solar power system ask 'So how much power will this thing produce?' Generally in North America, for every 1000 watts installed, you will generate 120 kilowatt-hours per month. This will vary great by installation and geographic location. But this gives you a general idea. So if your utility charges .15 per kilowatt hour, you will save on average $120 \times .15 = \$18$ per month for every 1000W you install.

FAQ 9: How Do I Get a System Installed?

If you've decided that a solar power system makes sense for you, most people decide to use a professional installer .



A professionally trained solar can save you the headache of installation.

Finding Installers

So where can you find installers? Of course there is the phone book, but that is *so* 1990. Start at our own [Solar Contractor Finder](#), by clicking on the link at left, or simply going to [SolarSphereOnline.com](#) and looking for the Solar Contractors link. A couple other sites are [Findsolar.com](#), [SolarPowerDirectory.com](#) and [SEIA.org](#), which is the Solar Energy Industry Association trade association website.

Licensing

Find out what industry certifications the company and its employees have. Important certifications in the solar power installation industry in the US include NABCEP (North American Board of Certified Energy Practitioners), of which there are fewer than 300 nationwide; and the state level Solar Energy Industry Association (for instance CALSEIA is the California Solar Energy Industry Association), which advocates for the solar power industry at the state level. Companies that belong to these industry association must prove experience, keep a standard of ethics, and often take extensive qualification exams.

Insurance

Most contractors who do roofing and electrical work must carry at least \$1,000,000 in general liability insurance. This policy protects you and the contractor. If something were to go wrong with the system or one of the company's workers should get hurt working on your house, you could be liable. A high limit policy, along with workman's compensation insurance, is imperative. Any legitimate contractor will be willing to give you a certificate authenticating insurance limits and coverages.

Permits

Beware of a contractor who says you don't need permits for a solar power system. These people are usually trying to avoid the added responsibility and time required to get a proper inspection. The permit inspection protects you and your system. Many building departments are waiving fees for renewable energy systems and the application process is generally pretty simple.

FAQ 10: Is Do It Yourself Solar Power DOABLE?

Invariably people who are handy and familiar with home improvement projects ask 'Can I install my own solar power system?'. The answer is 'Maybe'. A lot of it depends of course on you. The solar manufacturers have recognized the need for simplicity in these systems. With the groundswell of both DIY homeownership and clean energy, many of them are making kits that homeowners can install. Some are completely self-contained prepackaged systems designed for the average homeowner. Let's talk about the literal and figurative tools you'll need to install a system yourself.

Permitting and Inspection

Check with your local building department to see if they even allow homeowners installed systems. If they do, be sure to get a clear idea of what the inspector wants to see and what stages of the installation need to be signed off. The local utility will also want to inspect it to make sure that you know what they require.

Familiarity with Electricity

While you don't need to be a NASA engineer to figure out these prepackaged systems, basic electrical knowledge is a must. If you can use a volt/ammeter, understand basic grounding techniques, and can use electrical terminology, you're probably a great candidate. Ability to run wiring efficiently and troubleshoot electrical circuits is a huge plus. We always, ALWAYS suggest that you talk to a master electrician before and after every installation so that you can be sure that you have installed your system correctly and in a manner that will maximize energy efficiency.

Roof Type and Composition

The trickiest part of it all can be the actual roof attachment. Generally for asphalt shingle roofs the homeowners must attach the panel mounts directly to the rafters. If you live in a gabled home with an accessible attic, this might not be a big deal. If you live in a home with a complicated roof line this can be a huge deal. Checking this out ahead of time and gaging the complexity of the roof mount will save you a lot of time and headache later.

Basic Carpentry Skills

Much of the actual installation of a system involves basic carpentry layout and nuts and bolts assembly. The racking systems come with instructions and are generally no harder than assembling that entertainment center your spouse bought at Target. Layout will include making a simple drawing, snapping a chalk line, and basic measurements.

Get Trained

So you think you are up to the task? The details of solar installation is beyond the scope of this book. But there are plenty of other resources out there. Many websites have videos and books that will help you with the nitty gritty details of solar installations. Get as much information as you can. There are also tons of hands-on training sessions held around the country for novices and experts alike. And who knows, after you get your system done you may have found a new career. Check out our training options on SolarSphereOnline.com.

FAQ 11: Where Can I Get Solar Equipment If I Want To Install My Own System?

That's easy, you can get it right on our website, SolarSphereOnline.com. We can custom design a kit for any situation, or they may be a prepackaged system that fits your needs that can be delivered in a couple days.

FAQ 12: Do The Systems Require Much Maintenance?

Solar power offers a great way to save cash and help preserve the environment. However, most of us are not quite used to the maintenance that comes along with a grid-tied system. Like everything else, a little bit of TLC goes a long way with your photovoltaic (PV) panels. Most home solar systems are guaranteed to last 25 years, but experts agree that they can last 30 years or more when properly maintained. Some that were installed in the 1960s are still being used to generate power today. How can you keep your panels working for you? Follow these simple steps:

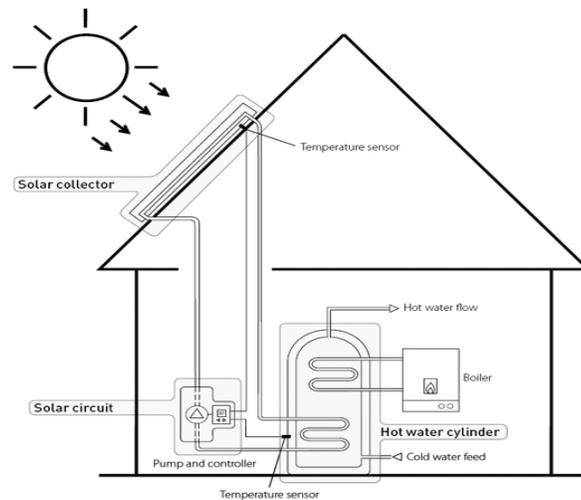
- Keep the panels clear of snow, dust, and pollution
- Check electrical connections every 2-3 months
- Check panel output to make sure there are no disconnected or broken panels
- Get the utility to perform a regular inspection
- Check the panels for cracked or broken glass after a severe storm
- **Spread the Word: Brag about Your System!**

FAQ 13: Can I Get A Small System And Add Onto It Later?

Absolutely, yes. Solar power is extremely flexible and easy to upgrade or add-on. In fact, with the new micro inverter technology, we now offer a starter kit for less than \$1000 that can be expanded to any size later on. For more information check out our Grid Tie Start Kits [here](#).

FAQ 14: Can I Heat My Home With Solar?

Solar thermal is pretty simple. Generally a liquid, either water or a liquid containing antifreeze (glycol), is circulated through exposed piping that absorbs heat. The pipes transfer the absorbed heat to the liquid, and the heated liquid is then circulated back to its intended use. The pipes are embedded in large panels, that look similar to photovoltaic panels. The pipe is coated in black material for maximum heat absorption.



A common closed-loop solar thermal system

Best Uses

There are many uses for solar thermal, here are some of the best:

- **In floor heat.** Many homes now use in floor pipes to heat the house. Solar thermal is perfect for this use.
- **Hot water.** Some folks who have cabins and remote cottages use the water to bath and cook with just like the water that comes out of a traditional hot water tank. Even regular homes can use solar hot water to supplement their water heating needs and reduce their gas consumption.
- **Swimming Pools.** Many folks use these systems to heat their swimming pool water. Often the same pump that circulates the pool water can be used and it can extend the season by weeks or even months. Some people even use the system to *cool* the water at night in hot climates.

Costs

For simple above ground pool heating, systems can be had for as little as \$500. Most systems however run from \$1000 to \$5000 depending on the size and the degree of installation complexity.

Installers

Most solar power companies now offer solar thermal systems. And many heating, ventilation, and air conditioning companies install them. Our own [Solar Contractor Finder](#) is a great resource for solar thermal contractors.

Solar Air Heaters

Recent advancements in solar air heating have made this a nice option for those folks in cold and somewhat sunny climates. This units basically draw in colder air near the floor inside the house, circulate it through heat absorbing baffles in an outside collector, then circulate the warm air back into

the house. Affordable and ingenious, these devices may become standard items in homes of the future.

Appendix A – *Solar Freedom and Survival Guide* Checklist

Getting Started In Solar Checklist

1. Finding a place to put the panels:

	Yes	No
Does it have good southern exposure?		
Does it have minimal shading year round?		
For a roof installation, is your roof in good condition?		
Are you a good candidate for a solar tracker?		

Resources: Using a Solar Pathfinder will help you determine the best location for your solar power system

Actions: If you have answered yes to all of the above, you can move on to the next step. If you have some 'no's, you may still be able to install a solar power system but it may be best just to call a solar professional

2. Incentives & rebates in your area

Does your utility offer incentives?		
Does your city or county offer incentives?		
Does your state offer incentives?		
Have you talked to your accountant about these incentives?		

Resources: log on to DSIRE.org to find out more about incentives and rebates in your area.

Actions: Its a good idea to call your local utility no matter what, they will guide you on solar standards and incentives in your area, and may have some good advice for you.

3. Determine your budget

Did you factor in all the incentives?		
Can you spend the money up front and wait for rebates?		
Have you calculated how much a system will generate in your area?		
Is the payback acceptable to you?		
Will your bank help you with a loan?		
Have you determined an approximate system size and/or performance?		

Resources: Findsolar.com has some nice calculator tools that will help you determine how much money you can save and system costs.

Actions: After you've determined a budget for the project, you don't necessarily have to figure out payback and system production. A good solar installer company can help you with that.

4. Choosing solar contractors

Have you talked to others who have installed solar power?		
Have you checked the Better Business Bureau for complaints and members?		
Have you made a shortlist of contractors to include at least 3 companies?		
Do they all have insurance, licenses, past customers you can call?		
Have you called the installers past customers?		
Are you clear on schedule and payment terms?		

Resources: Findsolar.com can help you find contractors, as well as your local BBB Chapter website.

Actions: Don't be afraid to call contractors from a few towns away, almost every company will travel for the right job.

5. Making your home energy efficient

Are you using passive solar and window coverings to their maximum affect?		
Have you had your heating and cooling system serviced and checked lately?		
Are you using CFL or LED lightbulbs exclusively?		
Have you adjusted your thermostat up or down a little to save energy?		
Are you purchasing Energy Star appliances now and in the future?		
Is your whole family becoming Energy Stars?		

Resources: Treehugger.com has great information and products on energy efficiency and green products.

Actions: Challenge the entire family to the energy game and try to reduce your consumption by 30% over 6 months.

If you've answered yes to most of these questions, you are ready for solar power! Good Luck!

And as always check out SolarSphereOnline.com for great solar products, information, classes and more.