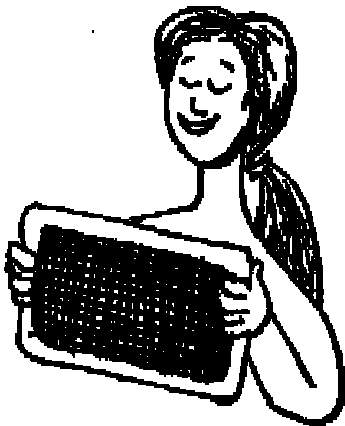


How to Make a Solar Power Generator for Less Than \$300



Using parts easily available from your local stores, you can make a small solar power generator for \$250 to \$300. Great for power failures and life outside the power grid. Power your computer, modem, VCR, TV, cameras, lights, or DC appliances anywhere you go. Use in cabins, boats, tents, archaeological digs, or while travelling throughout the third world. Have one in the office store room in case of power failures in your high rise. I keep mine in my bedroom where it powers my cd player, turntable, lights, modem, laptop, and (ahem) a back massager. I run a line out the window to an 8" x 24" panel on the roof.



1. Buy yourself a small solar panel. For about \$100 you should be able to get one rated at 12 volts or better (look for 16 volts) at an RV or marine supplies store.



2. Buy yourself a battery. Get any size deep cycle 12 volt lead/acid or gel battery. You need the deep cycle battery for continuous use. The kind in your car is a cranking battery--just for starting an engine. Look for bargains, it should cost about \$50-60.

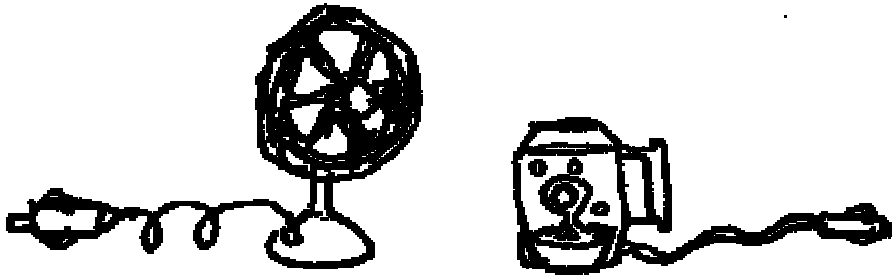


3. Get a battery box to put it in for \$10. (This is good for covering up the exposed terminals in case there are children about If you going to install the system in a pump shed, cabin, or boat, skip this.)



3. Buy a 12 volt DC meter. Radio Shack has them for about \$25.

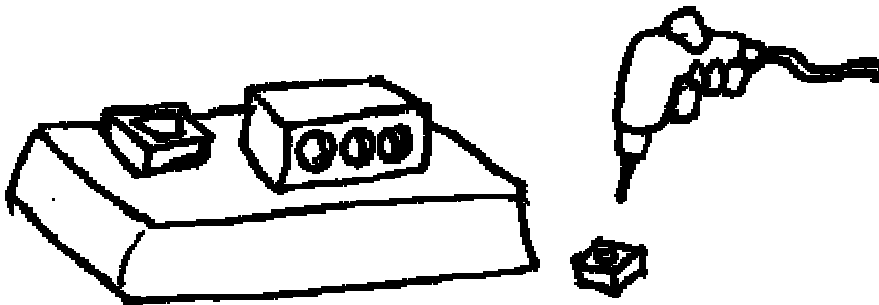
4. Buy a DC input. I like the triple inlet model which you can find at a car parts store in the cigarette lighter parts section for about \$10. This is enough to power DC appliances, and there are many commercially available, like fans, one-pint water boilers, lights, hair dryers, baby bottle warmers, and vacuum cleaners. Many cassette players, answering machines, and other electrical appliances are DC already and with the right cable will run straight off the box.



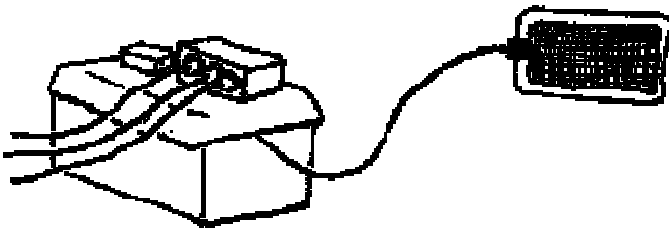
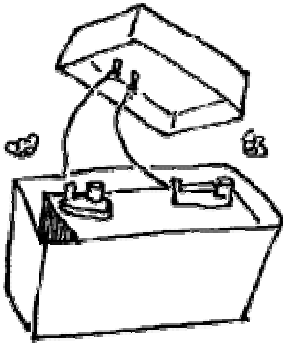
5. But if you want to run AC appliances, you will have to invest in an inverter. This will convert the stored DC power in the battery into AC power for most of your household appliances. I bought a 115 volt 140 watt inverter made by Power-to-Go at Pep Boys for \$50. More powerful inverters are available by mail. Count up the number of watts you'll be using (e.g., a small color television(=60 watts) with a VCR(=22 watts), you'll need 82 watts).



6. Use a drill to attach the meter and DC input to the top of the box.



7. Use insulated wire to attach the meter to the wing nut terminals on the battery. Connect the negative (-) pole first. Only handle one wire at a time. Connect the DC inlet to the battery in the same way. Connect the solar panel to the battery in the same way.



8. Close the lid (I use a bungee cord to keep it tight). Put the solar panel in the sun. It takes 5-8 hours to charge a dead battery; 1-3 hours to top off a weak one. It will run radios, fans, and small wattage lights all night, or give you about 5 hours of continuous use at 115 volt AC, or about an hour boiling water. This system may be added on to with larger panels, inverters, and batteries.

Options: A pop-up circuit breaker may be added between the positive terminal and the volt meter. Some of you will want an amp meter as well. The panels I recommend have built-in bypass diodes, but I recommend charge controllers for people who have panels without diodes. Another option is a voltage regulator, which is not necessary for a system this small, but a larger system would require one.

Basic Solar Power Generator

8" x 27" MBC-131

Uni-Solar soft panel

Rated power (Watts, peak): 5.50

Typ. 12 Volt Charging (Amp. Hrs/Wk) 13.00

Voltage, Typ. Max Power (Volts) 15.60

Current, Typ. Max Power (Amps) .35

Weight (pounds) 1.5

10 feet cable with battery ring,
terminals, fuse, and convenient
2 pin plug

Marine 12Volt battery (lead/acid) holds deep cycle 95 to 102 Amps for long periods of use. Two ports for cigarette lighter inverters, analog window shows charge level, AC

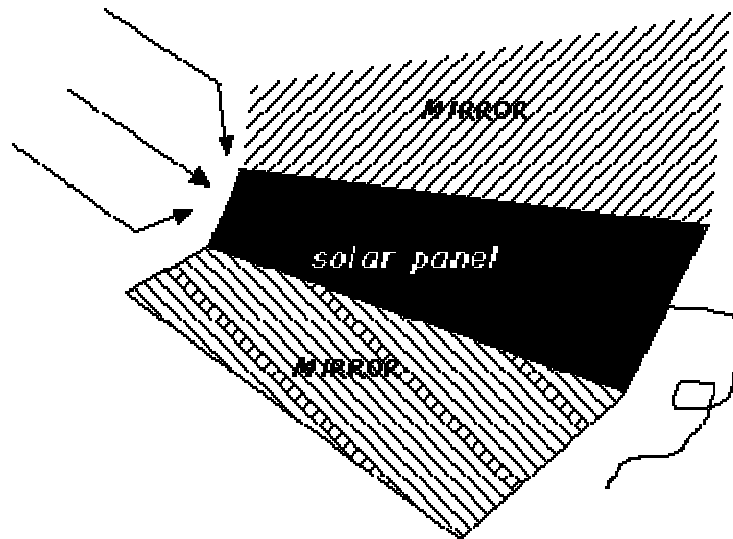
plug out to charge battery when AC is available. Push-button fuse.

System includes inverter (12Volt DC to 115 Volt AC). Detaches easily to use with cigarette lighter in car for AC power on the road.

The principle of photovoltaic power (converting light into electricity) was discovered in 1836 when it was found that sunlight striking a surface emits electrons. With positive and negative poles a DC current could be obtained. With the development of solar cells and solid state electronics, solar power generators have become reliable alternatives to the power grid. These can be stand-alone systems, such as are currently in use to power entire hospitals in Zaire and remote archeological digs, or they can be portable such as the one illustrated here.

Optimizing Your Solar panel

Hate the high price of solar panels? Not getting enough juice out of your array because of cloudy days? Stop! Before you buy another panel, make sure you are getting the maximum that you can get from the panels you already own.



I wanted to get the most out of my panel and noticed that it was rarely working at maximum output. I recently got a DC refrigerator and realized I'd need three more panels to run it straight off my array.

While mirrors are common for passive photovoltaic systems and parabolic reflectors for solar heaters, I haven't noticed mirrors employed for active systems. Frisnell lenses are used to magnify sunlight on cells, but I didn't have any. It occurred to me to reflect beams of light onto my panel from the sides with mirrors. On cloudy days I could get much better performance from my panel with two mirrors set up as above. I still didn't max out my panel, but maybe with more mirrors I can. My testing equipment isn't that great, but I'm getting a much bigger reading.

Does your panel totally stop working on cloudy days? Does a small bit of shade keep your whole panel from working? If so, your panel is shade-intolerant. I'm using soft panels. They have no glass glazing, are flexible, unbreakable, and lightweight. They have bypass diodes between every

cell, which makes them the only commercial module that is shade tolerant. Nor do they whimp out at high temperatures. There's a company called Uni-Solar that makes them. Mail order is cheapest. You can order them from Real Goods or Jade Mountain. They both have web sites.

Basically, I spent a few dollars on cracked, broken mirrors at the thrift store and got the equivalent of a couple hundred dollars more solar panels (on a cloudy day).

Makers of solar panels have emailed me, saying that such a set up will violate their warranties. What a bunch of wussies. They just don't want people to stop buying their overpriced and underpowered devices. They should spend their time trying to make a better product than harassing people like me.

Some good solar sites:

- [Solstice: Sustainable Energy & Development Online.](#)
 - [Home Power Top Page.](#)
 - [Jade Mountain.](#)
 - [Questions? Here's Mr. Solar \(don't bug me, bug him\).](#)
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