

How To Build A Solar Generator



In this guide I'm going to show you how to build a DIY Solar Generator.

This is an **exclusive guide I created for my valued *Off-Grid Living & EZ Green Energy*[™] newsletter subscribers** ...so I hope you enjoy it!

This guide is very straightforward and easy to follow. It also includes the exact parts I used to make my solar generator, so you know exactly what to get and can build your own without any guesswork.

This generator will be very useful if you want a portable power supply or a backup generator for essential electronics – which will come in very handy if there's a power outage or a grid-down situation.

So let's get started. First, here's the parts you need...

Parts You Need:

[Minn Kota Trolling Motor Power Center](#)

The reason I purchased this box is because it had a couple 12 volt ports already wired in and ready to go.

There are cheaper battery boxes out there but I think this is perfectly suited for a solar generator and the “*ready to go*” ports make this quick and easy ...and I’m all about trying to make this as easy as possible! 😊

[\[Find This Motor Power Center On Amazon Here\]](#)



[30Amp/500Watt Solar Charge Controller](#)

Charge controllers come in many shapes and sizes but for our solar generator, we recommend this [30 amp model](#).

You need a charge controller because these block reverse current and prevent battery overcharge. Some controllers also prevent battery over discharge, protect from electrical overload, and/or display battery status and the flow of power.

Our solar generator uses a 13 watt solar panel and it only puts out about .5 Amps/13 Watts, meaning I can (and will) add a couple of [100 watt solar panels](#) eventually. That would bring the generator to 4.5 Amps and 13 Watts, well below the rating of [this solar charge controller](#) (*but it gives me room to scale up later – which is what I want*).

[\[Find The Correct Charge Controller On Amazon Here\]](#)



[Thunderbolt Magnum Solar 13 Watt Briefcase Solar](#)

You have two options when it comes to the solar panels if budget is important to you.

- 1) You can buy an inexpensive and small solar panel (like a [13 watt briefcase solar panel](#))
- 2) Or you can easily put together your own 100 watt solar panel for about the same price using this [step-by-step system](#).

Everything I purchased for this solar generator was purchased with price in mind, I wanted to get this done for around \$300. I also wanted the ability to scale up when the time came, so each part in this generator is meant to allow scaling up at a later date.

The [13 watt solar panels](#) I got for the solar generator puts out .5 amps per hour in full Sun. That means these would take about 20 days to charge my 100 Ah battery.

[\[Find This 13 Watt Solar Panel On Amazon Here\]](#)



But if you want to charge your battery much quicker with a much more powerful solar panel (*and also don't want to spend a lot of money on it*), then I recommend you use this [DIY Home Energy System](#). They show you how to build 100 watt solar panel in their system for about the same price as the 13 watt solar panel I'm using in my generator.

[Cobra 800 Watt Power Inverter](#)

Like I said, I wanted the ability to add solar panels to this generator so I purchased an 800 watt inverter. This was a little more expensive than a smaller one but it will run most of my small appliances and most of my power tools.

[\[Find The Correct Power Inverter On Amazon Here\]](#)



Milwaukee 150 lb. Capacity Folding Hand Truck

You never know where you'll have to bring your solar generator. You may have to go up and down stairs or drag it across the dirt. And this folding hand truck makes this much easier.

Also, batteries should remain upright and can weigh around 75 pounds so you're going to want something like this to help transport that weight.

[\[Find This Hand Truck On Amazon Here\]](#)



[100 Ah \(Amp Hour\) Deep Cycle Battery](#)

A 100 Amp Hour battery is pretty big when it comes to batteries, but you would be surprised at how quickly the energy in the battery can get used up depending on the appliance or tool being used. The 100 Ah battery I used for my solar generator is [this one](#). It's not super cheap but I did want one that was 100 Ah (*because the reasons I describe below*).

[\[Find The 100 Ah Battery I Used On Amazon Here\]](#)



If you're a little more price sensitive and you can't get that 100 Ah battery, you can get this [18 Ah battery](#). Now, it's not nearly as big as the 100 Ah battery but you can still power electronics with it.

If price is a concern, but you still want a 100 Ah battery, you could also:

1. Get old or used 100 Ah/12v lead-acid/deep cycle batteries for free (*some shops give them away for free*)

2. Then [Recondition those batteries](#)
3. And use those “like-new” reconditioned batteries instead of buying new expensive batteries.

**note:* [this program](#) shows you how to do each of those 3 steps.

So how long would your power last for? ...The average laptop uses 50 watts per hour (that’s almost 4 amp hours it takes from the battery). And after 20 hours it would completely drain the 100 Ah battery if it wasn’t being charged.

That might seem like a lot, but that’s only 50 watts. Also keep in mind that you never want to completely drain your battery, it will decrease its lifespan.

How To Make Your Battery Last: If you aren’t familiar with good battery care, don’t know what’s good (and what’s bad) for deep cycle batteries, and want to learn how extend the life of 12v deep cycle batteries, then check out this [blog article](#).

How Solar Charging Works

A solar panel collects energy from the Sun. And the wattage of your solar panels is how much energy you can collect from the Sun. The reason this is important is because everything you buy for your solar generator needs to be able to handle the energy the solar panel collects.

You will need to decide what you want to use the solar generator for and figure out how many amp hours you will need so you properly size your solar generator. But remember, you can always add more solar panels if your charge controller and inverter are large enough.

Also, you can just use the exact parts we recommend in this guide if you're not sure what size generator you want – because all the parts we recommend in this guide work together (*and they're what I used to build my generator*).

The Charge Controller

I already explained this a little above, but think about your future needs when you get the charge controller. My charge controller can handle 500 watts, if I plan on going over 500 watts I will need to get another charge controller.

The charge controller has positive and negative leads that come in from the solar panel, and positive and negative leads that go out to the battery.

The Battery

There are many different shapes and sizes of batteries. The main thing to keep in mind with batteries is the Amp hours. My 100 Amp hour battery will last 100 hours at 1 Amp, or 5 hours at 20 Amps etc.

There is quite a bit more that goes into this but you never want to discharge your battery 100%. My rule of thumb is 50%, I have a 100 Ah battery, so I have 50 Ah.

The Power Inverter

A power inverter takes the DC current from your battery and changes it to alternating current (AC) that household appliances use. In an emergency situation if all you had was a power inverter you could hook it up to your car battery to plug in a lamp...not very practical, but it works.

There are pure sinewave and modified sinewave converters, this is less important than the wattage of the inverter. The wattage is what you will be able to run off that inverter. If the grid goes down and you plan on running 2 lights, a heater and a small refrigerator you need to have an inverter that will handle that wattage all at once.

Confusing Power Conversions

Now let's get into how this all works, I'm going to try and make this as simple as possible so bear with me. This can all get a little confusing but that's why you probably want to create a smaller generator and then scale it up later (*so you get an idea about the process before you spent a lot of money*).

Important: None of these calculations factor in efficiency and loss. These are just simple equations to give you an idea of how it works. The actual figures will be different...always err on the side of caution.

I created the cheat sheet below to make it a little easier to make these calculations. All you need to remember are these 3 calculations...

- **Amps = watts / volts**
- **Volts = watts / amps**
- **Watts = volts X amps**

Let me give you a few examples and explain how to use the cheat sheet.

Light Bulb Example:

A 20 Watt bulb running for 5 hours would be $20 \text{ (watts)} \times 5 \text{ (hours)} = 100 \text{ Watts}$.

To figure out amp hours you take $100 \text{ (watts)} / 12 \text{ (volts from battery)} = 8.33 \text{ amp hours}$. My 100 amp hour battery will be drained to 92% ($100 - 8.33$) if I run this 20 watt light for 5 hours.

What if your appliance doesn't tell you watts?

My air compressor doesn't tell me how many watts it uses, but it does say how many amps it uses. To figure out how many watts it uses just remember $\text{Amps} \times \text{Volts} = \text{Watts}$

Air Compressor Example:

My small air compressor is 2 amps x 110 volts (AC wall outlet) = 220 watts.

How many watt hours is that? Watt Hours are the number of watts X number of hours.

Example: Air compressor is 220 watts X 3 hours = 660. Then divide the watts (660) / 12 (Volts DC) = 55 ah (amp hours.) My hundred amp hour battery will be drained to 45% if I run this Air compressor for 3 continuous hours.

Laptop Example:

With items that have a power supply you need to look at the output on the adapter. My Laptop power supply is 2.3 Amps and 19.5 Volts. That would be:
2.3 Amps X 19.5 Volts = 44.85 Watts. My laptop for 2 hours would use 90 (Watts) / 12 (Volts DC) = 7.5 ah (Amp Hours) My 100 Amp hour battery will be drained to 92.5% if I have my laptop on (sitting idle) for 2 continuous hours.

How Much Power Will My Solar Panel Produce?

This one is fairly simple, my 13 watt solar panels will put out 13 watts of power an hour with maximum Sunlight. I can get 7 hours of direct sun light on a good day so I could collect 13 (Watts) X 7 (Hours) = 91 Watts.

To get the Amp Hours going back into the battery take the 91 Watts / 12 (Volts) = 7.58 Amp Hours

On a perfect day I can only get about 7 Amp Hours out of my 13 Watt solar panel, that means if I use anything over 8 Amp Hours per day I will be draining the battery. Like I mentioned earlier, that's why you will want to scale up later and add more solar panels (or use [these more powerful but inexpensive solar panels from the start](#)).

Assembly

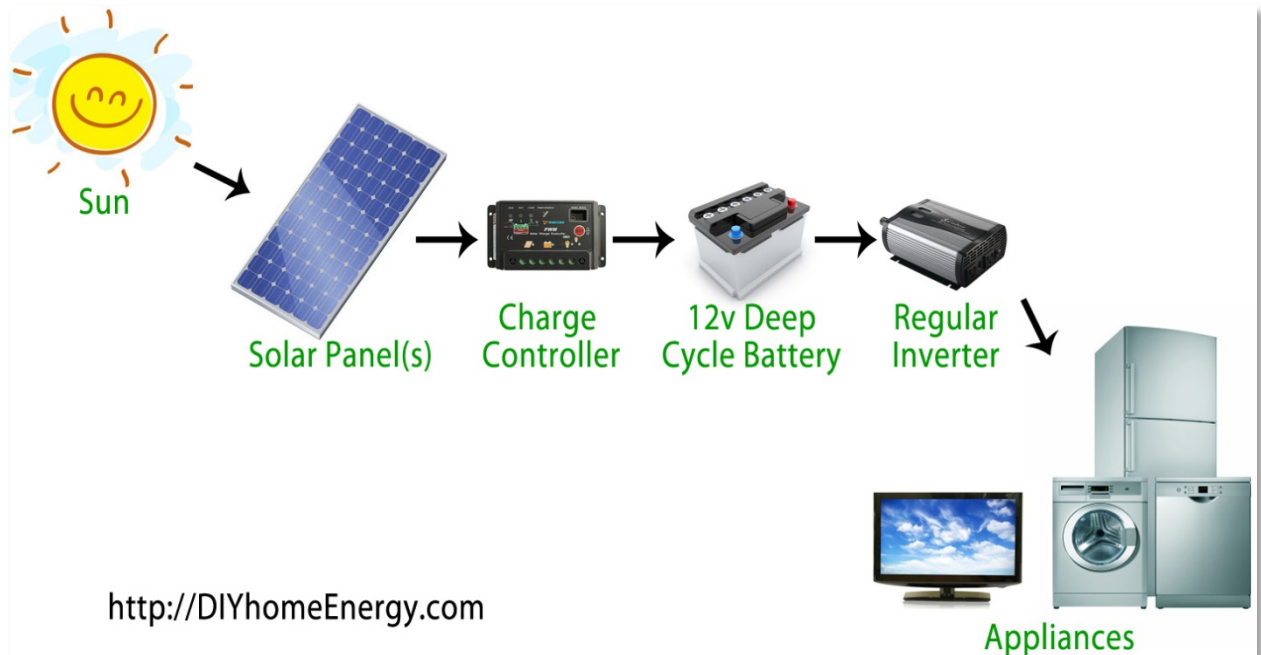
The battery box will help you carry the battery and keep your solar generator organized.

The solar panel will have positive and negative leads → Connect those leads to the charge controller.

From the battery (and battery box), connect the positive and negative leads to the power inverter.

Then you'll be able to plug in your appliances to the power inverter!

Basically, your solar generator will be connected like this (*diagram courtesy of [DIYhomeEnergy.com](#)*):



All of the parts we recommended for your solar generator (*in the “Parts You Need” section*) come with easy to follow instructions for how to hook them to another device.

So your charge controller will actually have diagrams for how to hook your solar panel into it ...and how to hook the charge controller to the battery (The same goes for the inverter).

Conclusion

Building a portable solar power generator is quite simple. These can be extremely useful if:

- There’s a power outage,
- You want portable energy source

- You want backup energy for a grid-down situation, natural disaster, terrorist attacks, or EMP

Using a [full size solar power generator](#) is just like using a gas generator and can be used as either a backup power or main power source.

Plus, if you lose electricity over a long term period, gas generators will eventually become useless (*because gas pumps stop working if the grid is down*).

Solar generators are also silent which eliminates the high theft rates of gas powered generators during natural disasters and other times of need.

To see plans to build a full size solar power generator, [Click Here](#).

Resources & Parts:

Below is a short list of a few retailers and resources I have found to be very helpful when building my solar generator:

- The cheapest and easiest way to have a very high quality battery in your solar generator: <http://EZbatteryReconditioning.com>
- Learn how to build an affordable full-size solar generator: <http://DIYhomeEnergy.com>
- To learn how to prolong the life of the 12v lead-acid deep cycle battery you use in your solar generator, check out this [blog article](#).
- You can find the 13 Watt Solar Panel we used on Amazon by [Clicking Here](#)

- You can find the 30 Amp Charge Controller we used on Amazon by [Clicking Here](#)
- You can find the 800 Watt Inverter we used on Amazon by [Clicking Here](#)
- You can find the 100 Ah Battery we used on Amazon by [Clicking Here](#)
- You can find the “Battery Box” Motor Power Center on Amazon by [Clicking Here](#)
- You can find the Folding Hand Truck on Amazon by [Clicking Here](#)
- Discount Solar, Wind, and Off-grid equipment – [Amazon.com Shop Page](#)