









# Off-Grid Power: What do I need?

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Energy Source	Charge Controller	Power Storage	Inverter	Appliances
				
<p><b>Why do I need it?</b></p> <p>In order to live “off-grid” you need a source of electricity that is self-renewing (e.g. comes from the sun, wind, or water).</p> <p>Solar panels, wind-mills, hydro-electric dams, and bicycle-generators are all examples of a renewable energy source you can use to create electricity.</p> <p>The problem is that the electricity is created and disappears if it’s not used immediately. The amount of power generated by these units is also constantly changing (on sunny days, for example, they generate more power). Wind mills change the amount of power they generate constantly. In other words, the power generated directly off these devices is not yet “useful”, so we need some method of storing the electricity created by these units so that it can be delivered to our appliances with consistency.</p> <p><b>How much will I pay?</b></p> <p>Price depends 100% on how much power you want to generate. A very small set of solar panels will cost around \$200.</p>	<p><b>Why do I need it?</b></p> <p>Charge controllers regulate (control) the amount of power coming from your energy source going into your batteries. Their job is to make sure you never have too much power being fed into your battery (on an especially windy day, you don’t want your batteries charging too quickly). They also shut off the flow of electricity to the batteries when the batteries are full (over-charging will damage your batteries).</p> <p><b>How much will I pay?</b></p> <p>Charge controllers are the cheapest part of the system. You can buy a good charge controller for a low-end solar setup for as little as \$20. High-end controllers used in homes cost a few hundred.</p>	<p><b>Why do I need it?</b></p> <p>One of the challenges with renewable energy source is that most of them don’t generate power 24x7, and when they do, the amount of power is inconsistent.</p> <p>Using batteries to store the power allows you to have access to electricity when your energy-sources aren’t working (example: when it’s not windy, or at night when your solar panels aren’t working).</p> <p>Batteries also provide a clean, steady stream of power.</p> <p><b>How much will I pay?</b></p> <p>A typical “car battery” will run around \$50. The more you spend, the more power you’ll be able to store. The trick is balancing the amount of power your energy sources can produce with the amount of storage-capacity you have on-hand. Too much of one or the other and you’re throwing money away.</p>	<p><b>Why do I need it?</b></p> <p>Most electrical devices run off AC voltage. (The stuff you have in your home). The problem is that batteries (and energy sources) produce DC voltage, so we need some way of converting (inverting) the DC from the battery into AC.</p> <p>If you have items that run off DC (example: it uses a cigarette lighter adapter in your car) then you don’t need an inverter to operate those items. They can be plugged directly into the battery (you can buy adapters at Radio Shack to do this).</p> <p><b>How much will I pay?</b></p> <p>The cost of the inverter, once again, depends 100% on how much power you need to run through it. A small inverter that can operate a laptop computer will cost around \$20. A high-end inverter that can run a wheat grinder will cost around \$200.</p>	<p><b>Why do I need it?</b></p> <p>These are your “things” that you are trying to power. Your wheat grinder, your ham radio, your iPod, your satellite TV, and your snow-cone machine.</p> <p><b>How much will I pay?</b></p> <p>The appliances are the final determining item in how big each of the other items in your power setup need to be.</p> <p>If you have appliances that consume a lot of electricity, you’ll need bigger inverters, bigger batteries, bigger charge controllers, and bigger energy sources. All of these translate into bigger cost.</p>

# A few Examples of Turn-Key Systems

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Xantrex Xpower	Xantrex 600	Xantrex 1500
		
<p><b>Description</b></p> <p>This is a TRUE all-in-one unit that includes your solar panel, charge controller, batteries and your inverter.</p> <p>The battery is a 10amp/hour battery The inverter is 400 watts</p> <p>Note: It takes approximately 30 hours of sunlight to charge the battery off the included solar panel.</p> <p><b>THIS UNIT WILL NOT RUN HEAVY APPLIANCES, SUCH AS A WHEAT GRINDER</b></p> <p><b>Runtimes:</b></p> <p>Laptop Computer: 2.5 hours Fluorescent Light: 6 hours 3/8" Drill: 16 minutes</p> <p><b>Cost</b></p> <p>Amazon sells this unit for \$126.25 with free shipping.</p>	<p><b>Description</b></p> <p>This is unit that includes your charge controller, batteries and your inverter. The only thing missing is the actual energy source (e.g. solar panel)</p> <p>The battery is a 28amp/hour battery The inverter is 600 watts</p> <p>Note: A 60-watt solar panel can charge this battery in about 8 hours. (This unit does not come with a solar panel)</p> <p><b>THIS UNIT WILL NOT RUN HEAVY APPLIANCES, SUCH AS A WHEAT GRINDER</b></p> <p><b>Runtimes:</b></p> <p>Laptop Computer: 7 hours Fluorescent Light: 20 hours 3/8" Drill: 50 minutes</p> <p><b>Cost</b></p> <p>Amazon sells this unit for \$129.99 with free shipping.</p>	<p><b>Description</b></p> <p>This is unit that includes your charge controller, batteries and your inverter. The only thing missing is the actual energy source (e.g. solar panel)</p> <p>The battery is a 60amp/hour battery The inverter is 1,500 watts</p> <p>Note: A 100-watt solar panel can charge this battery in about 10 hours. (This unit does not come with a solar panel)</p> <p><b>Runtimes:</b></p> <p>Laptop Computer: 17 hours Fluorescent Light: 50 hours 3/8" Drill: 2 hours</p> <p><b>Cost</b></p> <p>Amazon sells this unit for \$344.95 with free shipping.</p>