

Living on 12 volt solar power for zero EMF

Part 4 – Miscellaneous



This is the fourth part of a series about low-voltage solar living for ultra-low EMF exposures. This part provides suggestions for financing, working with contractors and inspectors, and useful resources.

The other articles in this series are available at www.eiwellspring.org/offgrid.html

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12. Plan for the future

Most people with electrical hypersensitivity, who move to a safe house, get better. Maybe not so they can move back to a normal house, but enough that they want to do more. Make sure your system can meet your future needs, not just what you need today.

You may also want to sell the house someday. It is much easier to sell a house that has the features other people would want, including other people who are electrically sensitive, but perhaps more functional.

It is much easier and cheaper to include wiring while the house is being built, than later when the walls are closed in.

Here are some general suggestions:

- possible to later convert to 120/240 AC (inverter or grid connection)
- 12 volt outlets throughout the house
- spare slots in breaker box
- room for additional wires around breaker box
- room for additional batteries
- room for additional solar panels
- telephone outlets in the walls
- space and outlets for AC, refrigerator, stove, etc. inside house
- use more circuits, with fewer lights/outlets each, than for a 120 volt system

13. Electricians and building inspectors

The contractor and building inspector may not be familiar with low voltage solar systems, as they are not common. Even in off-grid rural areas, the solar systems of today tend to use higher voltages and inverters, which look more like regular grid-powered homes.

13.1 Working with an electrician

Wiring a house for low voltage DC solar is not much different than regular wiring. The main differences are mostly on the solar side, so it can be helpful to get a contractor who has worked on a solar system before

It is probably difficult to find someone who has experience with low voltage systems. Such experience is not necessary, if the contractor is willing to read this document and follow the instructions. Some contractors are only comfortable with what they have learned on the job, and do not like to do something unfamiliar and follow instructions from a book.

On one project, there was a problem with a contractor, who had no experience with low-voltage systems, and was trying to convince the owner that the thicker wires were not needed. In that situation it is best to look for another contractor. Contractors can be difficult to work with if they have to do something they think should be different. Costly mistakes are then quite likely.

Also be aware that contractors are very unlikely to fully understand what a low-EMF house entails and why you want to have one. He may suggest other technologies not included in this document, such as other charge controllers, voltage converters, inverters, etc. Make sure you understand the health implications of these technologies. Just because the contractor seems very confident in what he says, doesn't mean it is good advice.

13.2 Building inspection

The purpose of the building inspection is to make sure the house has the most basic features, such as a toilet, running water, heat, and an adequate electrical system. The inspections are also meant to prevent health hazards, such as electrocution, fires, and a collapsed roof. The inspector may catch the contractors cutting corners a little too much. Shoddy work is a big problem in the building industry.

A good building inspection is a benefit to the new homeowner, and all future owners of the house as well.

If you are converting an existing home, you may not need to have the work inspected, but it depends on the local authority.

The inspection works differently across the country. In some places the inspectors may be a problem if they see something they are not familiar with. Some places have inspection of 12 volt systems, some do not. There are probably not many places that do not require a complete 120 volt system in the house at final inspection. That means having wiring for both a 12 volt and a 120 volt system.

It can save a lot of trouble later on to informally discuss the electrical system with the building inspector on one of his earlier visits. If one inspector seems more reasonable than others, make sure to schedule him for the all-important final inspection. Building inspectors are often also building contractors of some sort. They can be very closed minded and unwilling to learn anything new. A difficult inspector can cause a lot of expensive trouble, so make sure to stay friendly with them no matter what.

The inspectors do not check everything in a house. They do spot checks and then go with the overall impression. If what they see is tidy and looks professional, they will assume that the work is done by someone who knows what they are doing. Neatness really counts.

If you cannot get in agreement with the inspector, try the chief inspector or county engineer. You could also ask for a variance — this entails making a 5–10 minute presentation in front of the zoning board. If you need to work through the system, a letter from a doctor and references to existing houses can be most helpful. However, the officials may simply refer to their staff rather than really look into an unfamiliar subject.

As a last resort, the 120 volt system could quietly be converted to 12 volt after the final inspection. This may cause problems if discovered, however.

14. Legal issues

It is illegal to be off the grid in a few places. These prohibitions seem to be in place to protect the utilities, though there could be some misguided attempts to protect property values (some people equate off-grid and clotheslines with poverty).

Some municipalities have ordinances that require a house to be connected to all available utilities in an area (water, sewage, electricity), but have no restrictions in areas without utility service.

We're told that the country of Spain requires all homes to be grid connected, unless in an off-grid area.

If there are such rules in your area, contact your local town hall, county or other political body to see if you can get a variance. Politicians give variances to businesses all the time, so they can do that to help out a citizen as well.

15. Financing

15.1 Saving money

There are ways to save money by deferring or omitting expenses.

With a solar system, you pay for the electricity up front and by replacing the battery bank every four to six years. If you can reduce your expectations and accept to conserve electricity by only having a couple of lights on at a time, the system can be a lot cheaper than if you want to have lights on throughout the house and outside as well.

LED lights save a lot of electricity, halogens save about 20% compared to incandescents.

Some people have both high and low-wattage lights in places like the bathroom, to save electricity.

Using natural light saves a lot of electricity. Make sure natural light can be used on cloudy days, when solar power is in short supply.

You can buy fewer solar panels and batteries and just plan for more later. Make sure the system is big enough to handle the essential loads, such as pumps. In the winter, you can use a generator to charge the batteries where needed.

An under-sized system may not be as comfortable to live with, but many folks have made do.

Be sure to make room for extra panels and batteries later and that the wires and charge controller can be easily upgraded, if needed.

Cheap RV/marine batteries and off-brand golf cart batteries can save a lot of money. They may not last as long as the higher-priced models, but they may be economical in both the short and the long run. If you are new to solar, you are likely to make some mistakes which will shorten the life of the batteries — it's best to ruin a cheap battery.

A tracker is expensive and often not cost effective, unless you use a lot of power in the summer.

The cheapest way to mount the solar panels is probably with a self-built ground-mounted rack.

It is probably not a good idea to skimp on the wiring if building a new house. It is expensive to upgrade wires and add new outlets after the walls have been closed. The possible savings are probably not worth it.

15.2 Loans and government programs

Banks are rarely interested in providing loans for off-grid solar. If you live in an area with many solar homes, a local bank may be willing to issue a loan. The Permaculture Credit Union in New Mexico may grant such loans.

You may be eligible for various subsidies for the solar system, such as the solar panels and other expenses directly related to the solar system. The batteries are not covered by some programs.

Some programs only cover grid-connected solar systems, not off-grid systems.

In the United States, there are federal tax credits as well as tax deductions in most of the states. The credits can be substantial, often 50% of the covered expenses.

The rules vary by state and country as well as which year the system is actually installed.

16. Recommended articles

Battery Box Basics, John Meyer & Joe Schwartz, Home Power 119, June/July 2007.

Build Your Own Adjustable PV Mount, Baran Galocy, Home Power 97, Oct/Nov 2003.

How to install a Polemounted Solar-Electric Array, Part 1 and 2, Joe Schwartz, Home Power 108 and 109, Aug/Sep 2005 and Oct/Nov 2005.

Flooded Lead-Acid Battery Maintenance, Richard Perez, Home Power 98.

Off-grid Batteries – 30 Years of Lessons Learned, Allan Sindelar, Home Power 140, Dec/Jan 2011.

Sizing a Generator for Your RE System, Jim Goodnight, Home Power 138, Aug/Sep 2010.

Starting Smart – Calculating Your Energy Appetite, Scott Russell, Home Power 102, Aug/Sep 2004.

PV-Direct Water Pumping, Dan Fink, Home Power 145, Oct/Nov 2011.

Pumping Water with the Wind, Kevin Moore, Home Power 122, Dec/Jan 2008.

Home Power magazine articles are available from their website (www.homepower.com). Back issues may be purchased at 1-800-707-6585. The magazine used to cover simple low-voltage systems (before issue 100 or so), but today assumes any system has an inverter.

Articles about low-voltage solar

See, www.eiwellspring.org/offgrid.html.

Recommended Book

Photovoltaics Design and Installation Manual, Solar Energy International, New Society Publishers

17. Resources in the United States

Ameresco
(855) 43-SOLAR

Sells the no-EMF ASC charge controllers

Backwoods Solar
www.backwoodssolar.com
(208) 263-4290

Has a very informative catalog with products needed for 12 volt off-grid living. Very helpful staff.

Kansas Wind Power
(785) 364-4407

Also a very informative catalog and helpful staff.

Lehman's
www.lehmans.com
1-877-438-5346

Has many non-electric appliances for their Amish customers.

Northern Tools
<http://NorthernTool.com>
1-800-317-1260

Sells many generators. Also sells the no-EMF 7 amp charge controller.

Northern Arizona Wind and Sun
<http://store.solar-electric.com>
1-800-383-0195

Sells solar panels, racks, etc. at good prices.

Southwest Solar
www.southwestsolar.com

Low-voltage swamp coolers

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