

*Squeaky-clean energy from your own yard.  
And maybe a hammock.*

## DIY Solar

### BASIC SOLAR SYSTEM

A **3 kW** photovoltaic array is a good point of reference for a basic home system. This will require twelve panels, take up at least two hundred square feet, and provide about four thousand kWh/year, which is enough to power an efficient home.

In Columbia, MO, the final cost for all the equipment for a 3 kW PV system is about **\$3,000**. (My utility offers a 50-cent/Watt rebate; Federal tax credits cover 30% of remaining total costs. )

Doing the installation yourself is satisfying and not terribly difficult. It also improves your understanding of your system, electric usage in your home, and your relationship to the utility grid.



Tom O'Connor, PE • 573-289-2153 • [tom@h2oc.com](mailto:tom@h2oc.com)



This information is provided out of my love for local, distributed, individually-owned and operated, renewable energy (in this case PV systems), and any use or misuse of it is at your own risk. And also at your own reward.

1,440 Watt Grid-Tied Photovoltaic System on Cedar Pergola  
Total Equipment Cost (after rebates and incentives): ~ \$2,000

# For about \$3,000, you can install a 3 kW photovoltaic system that meets your electricity needs. Here's how.

## 1. LOWER YOUR NEEDS

The average home uses about 900 kWh of electricity/month. By paying attention, making efficiency a priority, and turning stuff off, you can easily beat the average by more than half.

## 2. SOLAR SITE SURVEY

Take a close look at where your sun shines throughout the day and year, and decide whether you want your panels on your roof, an existing outbuilding, or a new structure, such as a pergola, shade canopy, or carport.

## 3. DO YOUR HOMEWORK

There are plenty of resources available regarding photovoltaics—DOE, NREL and other government websites, [builddsolar](http://builddsolar.com) and other communities of Do-it-Yourselfers, Yahoo groups, Youtube videos, etc. Get your Google on.

It also helps to read a good, old-fashioned paper book on the design and installation of photovoltaic systems. And look at [dsireusa.org](http://dsireusa.org) for the latest in rebates and incentives for your area.

## 4. GO SHOPPING (BUT DON'T BUY YET)

Solar panels and related equipment are sold on many websites, some of which are also good informational resources. Of course, some others are simply trying to sell you something you may not need, so be educated and careful. Get an idea of what you want, but don't buy until you have an approved plan and permits.

## 5. MEET WITH UTILITY & BUILDING INSPECTION PEOPLE

The folks at your electric utility and building inspection department will help you with the whole process. Most of the forms you'll need are available online, so it



and you're just doing it now.

You've probably already installed some of it already, haven't you? I see how you are.

## 9. INSTALL IT

Run strings, dig holes, pour concrete, build the ground mount, keep level and plumb, anchor the racks, attach the panels and inverters, drill holes in the house, run conduit,

would be good to familiarize yourself with them beforehand.

Go to City Hall and meet with city staff early and often. Ask questions and verify your understanding of rebates and permitting issues. You'll need to fill out and sign a net metering agreement and, hopefully, a rebate application. After they approve your paperwork, they'll swap your old electric meter for a new, two-way meter and put a funny sign on your utility pole.

pull wires, add a circuit breaker to the breaker box, install fuses and switches, wire it all up, put up a wee safety sign, and generally do whatever else it takes to install your system and pass your final inspection.

## 10. ENJOY AND SPREAD THE WORD

Watch your meter run backwards. Keep track of what it tells you. Find ways to use less. Bask in the delight of producing your very own clean, renewable energy. Enjoy your newfound electrical freedom and independence.

Invite friends and neighbors over to check it out. Tell them how you did it and encourage them to do the same. Try to be cool and not act all smug about it.

## 6. DESIGN YOUR SYSTEM

Figure out exactly what equipment you're going to use and how it all fits together, both physically and electrically. Make sure that your wires are sized properly and everything meets National Electric Code. Your book on PV systems will be helpful.

## 7. SUBMIT PLANS; SECURE PERMITS

Prepare simple drawings with descriptions of your system, show calculations, and include equipment data sheets. An example is shown at left.

## 8. BUY YOUR SYSTEM

You may have skipped ahead and bought some of the equipment before you actually got all of your permits and paperwork together, but let's pretend that you didn't,

