

## Begin Sample Excerpt – Solar Power Course

### Design

Now we're ready to take a look at the design of your solar energy system. After you read this section you'll be able to begin with the actual planning and purchasing of your solar energy system.

This section, along with the previous section and the previous workbooks, gives you the knowledge you need to move forward and actually build your solar energy system. (The next workbook will be all about installing your solar energy system.)

You've actually already begun to design your solar energy system. You've already got the groundwork laid down. However, now you need to get very specific.

The design process can be easily broken down into four steps. These four steps are:

1. Beginning Estimates
2. Surveying the Site
3. Sizing the Solar Energy System
4. Selecting the Components

These four steps assume that you don't already have all the information beforehand. If you have all of the information or some of it then you might be able to complete these steps in a different order or you may be able to completely move past a step (because you already have the necessary information).

However, if you are starting from the beginning (and that's where most people begin) then you will want to begin with estimates.

#### Initial Estimates

This has already been discussed briefly. It is important that you know how much power you want to get from your solar energy system before you begin with the actual estimates.

Do you want it as only as small supplement or do you want your solar energy system to provide a major portion of your energy?

Do you want a battery? Will the solar energy system be tied into the grid?

These are questions that need to be considered. Most likely, after reading the first section of this workbook and the other workbooks, you've already put a decent amount of thought into each of these questions.

Once you know the answers then you can move forward and actually begin to design your system. However, as you consider these things – how much power you want/need and what you want the power for – you also want to consider your location (as we discussed in the previous section). If you don't receive a lot of sun and you are dealing with a limited amount of space for your system (as most people are) then you may be limited in the amount of power you can actually produce. So don't plan to power you entire home or even half of your home if your location and situation makes it is impossible to draw that much energy from the sun.

As part of your estimate, you need to consider load estimates. You need to figure out exactly how much power you are going to need. This goes beyond simply answering the above questions. You need to actually figure out how much load you need your solar energy system to produce.

First you need to think about how much power you want to get from your system. To keep things simple, let's use an example of wanting to provide lighting for three rooms in your home and to power the refrigerator. So you would need enough energy to provide power to three lights and one refrigerator.

You know that the refrigerator needs to be kept cold every single hour of every day. It's easy to find how much energy your refrigerator consumes every single day. You can just look in a manufacturers catalog and find the answer.

Figuring out the lighting isn't quite so easy. But it isn't overly difficult either.

What you want to do is figure out how long each light is lit during the day. If you have two adults and 4 children in your home then 3 lights may be lit 12-16 hours each and every day. However, if you live alone then you may very well be looking at all 3 lights being lit for only 8 hours a day (you might be gone to work for 8 hours and sleeping for 8 hours).

Of course, you need to think about your situation and figure the load accordingly. Then you need to decide how much energy is consumed by each of those lights or lamps. Finally, you want to convert that into how much energy is used during the day. So simply take the energy that's used in an hour and multiply that number by the amount of hours the light is used each day. Remember to take into account each and every light only if each light will be lit at the same time.

You may have other electrical needs in your house as well. This could be anything from a television to a dehumidifier to a clock radio. Whatever the object may be, simply figure out the load the same way you figured out the load for the lights. Figure out how often it is used, figure out the power it needs for one hour and then multiply the two together in order to get the Watt hour per day (Wh/day).

You also need to be aware of what is called "phantom load." Phantom load is the energy that is used by electrical products even when they are switched off. Televisions are a great example of this. They continue to consume a small amount of energy even when they aren't in use. To stop this you should unplug these products when they aren't in use. However, sometimes products need to be plugged in all the time. For these electrical products you need to make sure you figure in the phantom loads.

Once you have all this information, then you can plug actual numbers into your plan and see if it is indeed feasible. Do you have enough sun, enough space, and enough money to generate the type of power you want? If so, then you are ready to move on. If not, then you need to go back and plan to have less power with your solar energy system.

We will take a much closer look at how to plug in the numbers and figure out the loads and the power you can create when we look at "Sizing your System" in a few pages. We'll also answer the questions

about space and how large you need your solar energy system to be in the next two sections.

**End Sample Excerpt – Solar Power Course**