

### How to Size your Solar System

We have provided you with an easy-to-follow guide for sizing your photovoltaic (PV) system. Follow these steps to determine your requirements and which size system you will need.

#### 1. Determine Your Power Consumption Demands

Make a list of the appliances and/or loads you are going to run from your solar system. Find out how much power each item consumes while operating. Most appliances have a label on the back which lists the wattage. Specification sheets, local appliance dealers, and the product manufacturers are other sources of information. The links below are useful for finding this load information. Once you have the wattage ratings, fill out the load sizing worksheet.

Department of Energy Appliance Information:

[http://www.eere.energy.gov/consumer/your\\_home/appliances/index.cfm/mytopic=10040](http://www.eere.energy.gov/consumer/your_home/appliances/index.cfm/mytopic=10040)

Energy Star Appliances:

<http://www.energystar.gov>

#### Load Sizing Worksheet

List all of your electrical appliances below but separate AC and DC loads and enter them in the appropriate table. Record the operating wattage of each item. Specify the number of hours per day each item will be used. Multiply the first three columns to determine the watt-hour usage per day. Enter the number of days per week you will be using each item to determine the total watt-hours per week each appliance will require.

	DC Appliance Watts X Qty X Hrs/Day =	Wh/Day X Days/Wk =	Wh/Wk
A.	_____	_____	_____
B.	_____	_____	_____
C.	_____	_____	_____
D.	_____	_____	_____
E.	_____	_____	_____
F.	_____	_____	_____
G.	_____	_____	_____
H.	_____	_____	_____
I.	_____	_____	_____
J.	_____	_____	_____

Total the numbers in the last column. This is your DC power requirement.

Total DC WH/WK \_\_\_\_\_

	AC Appliance Watts X Qty X Hrs/Day =	Wh/Day X Days/Wk =	Wh/Wk
A.	_____	_____	_____
B.	_____	_____	_____
C.	_____	_____	_____
D.	_____	_____	_____
E.	_____	_____	_____
F.	_____	_____	_____

G. \_\_\_\_\_

H. \_\_\_\_\_

I. \_\_\_\_\_

J. \_\_\_\_\_

1. Total the numbers in the last column. This is your AC power requirement. Total AC WH/WK \_\_\_\_\_
2. Divide Total AC WH/WK by 0.85 for inverter loss: WH/WK \_\_\_\_\_
3. Add WH/WK from AC loads and WH/WK from DC loads together.  
This is your total power requirement per week. Total \_\_\_\_\_ WH/WK
4. Divide Total \_\_\_\_\_ WH/WK by 7. This is your average power requirement per day.

Total: \_\_\_\_\_ Average WH/DAY

## 2. Select a Solar System

Based on the average Watt-hr per day load requirements you have determined above, select one of our Solar Cabin Systems <http://www.solarelectricsupply.com/systems/remote-cabin/index.html> or our Solar Remote Home Systems that meets your demand. If you select a system that produces less, you will need a generator and inverter/battery charger to supply the additional power.

## 3. Select your DC to AC inverter or Power Panel

Add up the wattage of the AC loads that may be on at the same time. Use the induction motor load chart below to determine the additional loads such as motors will have on your inverter. Add up the starting wattage of those loads that will be on at the same time and adjust or add to the loads on your list. This peak wattage will determine the continuous rating of your inverter. It's important in remote homes to minimize the number of loads on at the same time to reduce your peak inverter demand. Select one of our Solar Cabin Inverter or Remote Home inverter power panels that meet your continuous wattage demand.

## 4. Select a Battery Bank

Based on your average Watt-hr/day, select a battery bank that has 3 to 5 times that amount of power in storage. This will allow you to run your system at night and during cloudy/rainy periods.  
Select from one of these: Solar Cabin Battery Banks - Remote Home Battery Banks

## 5. Optimize Your Power System Demands

At this point, it is important to examine your power consumption and reduce your power needs as much as possible. This is true for any system but it is especially important for home and cabin systems because the cost savings can be substantial.

First identify large and/or variable loads (such as water pumps, outdoor lights, electric lights, electric ranges, AC refrigerators, clothes washers, etc.) and try to eliminate them or examine alternatives such as propane or replace them with energy efficient models. Replace incandescent fixture with fluorescent lights wherever possible. Fluorescent lamps provide the same level of illumination at lower wattage levels.

### Note on Phantom Loads:

Energy is used by some small household appliances and electronics even when they are turned off! Typically, devices with remote controls or standby settings will cause these "phantom loads" and will consume energy just by being plugged in. 75% of the electricity consumed by electronics and small appliances is consumed while the devices are not being used.

Electronics and small appliances make up 10-20% of overall household electricity use. 8-15% of household electricity use is by appliances or electronics that are not actively being used (computer, microwave, stereo, TV, DVD, heat trace tape, etc.)

Using a power strip can minimize the amount of energy your household consumes by plugging into the power strip and then turning the power strip **off** when nothing is being used. A desktop computer consumes a large amount of electricity when it is turned on, so it should be turned off when not being used. Laptop computers use a lot less power.

**Buy Energy Efficient Appliances:**

Replace older appliances with the most energy efficient appliance you can find using the Energy Star Ratings. They are given in kWhr/Year. You can divide by 365 to get average daily use. The higher cost of these appliances will be more than made up for in the cost of the solar system.

<b>Household Appliances that use Induction Motors</b>					
	<b>Running</b>	<b>Starting</b>		<b>Running</b>	<b>Starting</b>
<b>Well Pumps</b>	<b>Watts</b>	<b>Watts</b>	<b>Air Conditioner</b>	<b>Watts</b>	<b>Watts</b>
1/3 Horsepower	750	1400-3000	5,000 BTU	1250	1750-3400
1/2 Horsepower	1000	2100-4000	10,000 BTU	2400	3000-4750
3/4 Horsepower	1850	2800-5000	20,000 BTU	3250	4000-6800
1.0 Horsepower	2250	3500-6500	24,000 BTU ( 2 Ton )	3750	4950-8500
1.5 Horsepower	2750	3800-8000	30,000 BTU (2.5 Ton)	4250	6000-11,000
<b>Sump Pumps</b>			36,000 BTU ( 3 Ton )	4900	9000-16,000
1/3 Horsepower	800	1300-2900	48,000 BTU ( 4 Ton )	6850	12,800-20,000
1/2 Horsepower	1050	2150-4100	60,000 BTU ( 5 Ton )	8000	15,800-28,000
<b>Submersible Pump</b>			90,000 BTU (7.5 Ton)	12500	25,000-50,000
400 GPH	200	400-600			
<b>Heat Pump</b>					
3,000 Sq. Ft. Home	4000-5000	10,000-12,500			
<b>Notes:</b>					
1. To Select a DC to AC inverter that has enough power, add the Starting Watts for items you may want to run at the same time.					
2. Use the highest total or peak wattage as your minimum continuous power rating for your inverter					
3. Other appliances and tools with induction motors may require 3 to 7 times the above listed wattage when starting. Add those to your peak.					

Call us toll-free: (877) 297-0014, fax: (831) 462-8246 or email us: [contact@solarelectricsupply.com](mailto:contact@solarelectricsupply.com)