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Load Evaluation Chart

Use the following chart to understand your total electrical use. Note which loads are AC and which are DC. This, along with the largest AC load number, will help you pick an inverter that will power your loads. Don't forget to include anticipated loads that you would like to use in the future like power tools or a washing machine.

Remember to move loads like clothes drying, cooking and water heating to other energy sources. Hang your clothes on the line, cook with a solar cooker, heat your water with a solar water heater. Propane gas is not solar but, if you have access to it, it can be far less expensive than electricity for these problematic loads.

This estimate does not have to be EXACTLY accurate. However, the closer you get, the better you will be able to design your solar system. And, of course, you can call us for free help. It makes it easier if you have done your homework and have these numbers to help us help you.

Appliance	AC	DC	Qty.		Wattage (V x A) Mult. * 1.5 for AC		Hours per Day		Days per Week	Divide By 7	"="	Avg. Watt Hrs. per Day
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		
				x		x		x		/7		

Largest AC Load in Watts:	Total AC Wattage Used At One Time:			Total Watt Hrs. Per Day:
Total Watt Hrs. Per Day:	÷	System Loss Factor: *	=	Actual Watt Hrs. Per Day:
	÷	.8	=	

* Use .8 as your system loss factor. There are inefficiencies and losses in solar systems and batteries.

STAND-ALONE PV SYSTEM
INVERTER SIZING WORKSHEET*

1	**Battery Bank DC Voltage**		**Required Inverter DC Input Voltage**	
2	**AC Load Voltage[1]**		**Required Inverter AC Output Voltage**	
3	**AC Load Frequency and Waveform**		**Required Inverter AC Load Frequency and Waveform**	
4	**Total Connected AC Load in Watts[2]**		**Chosen Inverter Output Size in Watts[3]**	

5	**Total Connected AC Load in Watts**	÷	**Chosen Inverter Wattage Rating**	=	**Number of Inverters Needed[4]**
		÷		=	
6	**Total Connected AC Load in Watts**	×	2.5	=	**Surge Capacity Needed[5]**
		×	2.5	=	
7	**Surge Capacity Needed**	÷	**Chosen Inverter Surge Capacity**	=	**Number of Inverters Needed[6]**
		÷		=	

Inverter Make: **Inverter Model:**

Inverter Efficiency:

Inverter AC Output Wattage Rating:

Inverter DC Input Voltage from Battery Bank:

Inverter AC Output Voltage:

Inverter Output Voltage Frequency:

Inverter Rated Surge Wattage:

Inverter Waveform Type:

Other Inverter Features:

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*Use this worksheet to size the inverter used in a stand-alone PV system.

[1] The AC load voltage could be 120 VAC, 240 VAC, or 120/240 VAC or a combination of these voltages. The inverter you choose must be able to supply the correct load voltage. It may be necessary to install two 120-volt inverters to get the 240 volts needed by some loads. Always check with the inverter manufacturer about whether the inverters can be interconnected.

[2] The total connected AC load in watts is found in the load analysis worksheet.

[3] If the chosen inverter output wattage size is less than the total connected AC load proceed to section 5. If the chosen inverter output size is equal to or greater than the total connected AC load proceed to section 6. *Note:* Oversizing the inverter allows for future system expansion but may result in a lower system efficiency and increases the initial cost of the stand-alone PV system.

[4] Make sure to verify that the inverter make and model you have chosen can be interconnected with other inverters. Not all inverters have this capability.

[5] The surge capacity needed is found either by doing an in-depth analysis of the actual surge amounts for all AC loads that will be used at the same time or by using the rule of thumb of multiplying the AC load watts by 2.5 to get the estimated surge watts needed. It is recommended that you multiply the AC load by 2.5 to get the surge capacity needed.

[6] The number of inverters needed in section 5 should match the number of inverters needed in section 7. If the number of inverters needed based on their surge capacity in section 7 is higher than the number of inverters needed based on their wattage ratings in section 5, you will need to increase the total number of inverters needed until their overall surge capacity meets the system's surge capacity requirement.

STAND-ALONE PV SYSTEM BATTERY BANK SIZING WORKSHEET*

1	AC Average Daily Load (watt-hrs per day) ÷ Inverter Efficiency (0.90)†			+	DC Average Daily Load (watt-hrs per day)	÷	DC System Voltage	=	Average Amp-Hours per Day		
				+		÷		=			
2	Average Amp-Hours per Day	×	Days of Autonomy	÷	Battery Discharge Limit	÷	Battery Amp-Hour Capacity	=	Batteries in Parallel		
		×		÷		÷		=			
3	DC System Voltage	÷	Nominal Battery Voltage	=	Batteries in Series	×	Batteries in Parallel	=	Total Number of Batteries in Bank		
		÷		=		×		=			

Battery Make:

Battery Model:

Nominal Battery Voltage:

Battery Rated Amp-Hour Capacity:

Battery Type:

Battery Bank Description:

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*Use this worksheet to size the battery bank used in a stand-alone PV system.

†The Inverter manufacturer's efficiency rating is usually higher than 90%. However, the 90% efficiency rating is used in this worksheet as a more conservative number and takes into account constantly changing AC load conditions. It is okay to use the manufacturer's peak efficiency rating, but it is recommended that you use 90%.