Learn to size a basic solar system.

The following is a sizing sheet that can be used to approximate the size of a solar system. Atlantic Solar uses computer programs to determine the final size of the solar system needed to meet a specific load requirement. For an estimate of a solar system size this process will work just fine.

It is suggested that you print this page and fill in the blanks step by step.

Please note all mathematical operations are listed as follows: (X) is multiplication, (/) is division and (=) is the result.

Step #1

Daily DC Load Calculation					
Name of Load	Qty.(X)	Current(X)	Hours/Day(X)	Days/Week(=)	Average AH/Week
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
				Total AH/Week (=)	.

Total AH/Week(/)	7 Days/Week(=)	Average AH/Day, DC Loads
.	7 Days/Week	.

Step #2

Appliance power ratings can be found on the back of almost every appliance. The rating is found on a label that states the power consumption of the unit in wattage. Motors need additional power to start, this is referred to as the surge of the appliance. The surge rating is located on the same label as the power rating.

Daily AC Load Calculation						
Name of Load	Qty.(X)	Power(X)	Hours/Day(x)	Days/Week(=)	WH/Week	Surge
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
				Total WH/Week	.	
Max. Continuous Load	.	(Add each load only once)				
				Max. Surge (Add worst surge to continuous loads)		.

Total WH/Week(/)	7 Days/Week(=)	Average WH/Day, AC Loads
.	7 Days/Week	.

Make Inverter Choice

Inverter Specifications.

Inverter Choice = _____

Continuous Load Capacity	= _____	Watts (MUST be greater than Max. Continuous Load)
Surge Capacity	= _____	Watts (MUST be greater than Max. Surge)
Input DC Voltage	= _____	Volts(Should match DC Load Voltage)

Account for Inverter Efficiency		
Average WH/Day, AC Loads(/)	.88 Average Inverter Efficiency(=)	Adjusted DC WH/Day
.	.88	.

Convert AC Load WH/Day to AH/Day		
Adjusted DC WH/Day(/)	Inverter Input Voltage(=)	Total AH/Day
.	.	.

Step #3

Total Average AH for AC and DC Loads (only if both are the same nominal voltage)		
Total AH/Day, DC Loads(+)	Total AH/Day, AC Loads(=)	Total AH/Day
.	.	.

Step #4

Find your site's location on the insolation maps.	
City, State, Country of Site	Worst Case Hours of Insolation
.	.

Step #5

Size the PV Array			
AH/Day(/)	Loss/Recharge Factor(/)	Site Insolation(=)	Min. Size of PV Needed in Amps
.	.75	.	.

Determine the Number of Parallel Modules Solar Module Specifications.		
Needed PV Amps(/)	Module Amps @ Peak Power(=)	Round Up to Whole Number, Total Parallel Modules Needed
.	.	.

_____Solar module model number that was used in above calculation.

Determine the Number of Series Modules		
Nominal System Voltage(/)	Nominal Module Voltage, Typically 12V(=)	Total Series Modules Needed

.	.	.

Determine the Total Number of Solar Modules		
Total Series Modules(X)	Total Parallel Modules(=)	Total Modules
.	.	.

Step #6

Size the Battery Bank				
Total AH/Day(X)	Days Autonomy(/)	Max. DOD(/)	Temp. Correction Factor(=)	Battery Size Needed in AH
.	5	.8	.	.

Temperature Correction Factors Lowest 24 Hour Temperature	
Temperature Range in Degrees C	Correction Factor
10+	.95
10 to 1	.9
0 to -9	.83
-10 to -19	.75
-20 to -30	.65

When determining the number of parallel batteries needed for your system, use the largest single battery possible. This is to keep the total number of parallel cells to a minimum. The more batteries in parallel the greater system losses.

Determine the Number of Parallel Batteries Battery Specifications.		
Needed Battery AH(/)	Battery AH @ 100HR Rate(=)	Round Up to Whole Number, Total Parallel Batteries Needed
.	.	.

Determine the Number of Series Batteries		
Nominal System Voltage(/)	Nominal Battery Voltage(=)	Total Series Batteries Needed
.	.	.

Determine the Total Number of Batteries		
Total Series Batteries(X)	Total Parallel Batteries(=)	Total Batteries
.	.	.