LUMIONUS GREEN SOLAR SYSTEM SIZING CALCULATION IN 20 STEPS

by solarexpert and makrolab experience

Solar System Sizing Calculation Equation

1	ACEQW x h/Wk=Wh/Wk	Calculate AC equipment loads in Watt hours per week
2	Wh/Wk x 1.2=ACWh/WkCr	Multiply by 1.2 for inverter loss
3	Wh/WkCr / InV = AC Amph/Wk	Divide Wh/Wk corrected by inverter input voltage (typically 12V) to get Amp hours per week load
4	DCEQW x h/Wk=DCWh/Wk	Calculate DC equipment loads in Watt hours per week
5	DCWh/Wk / DCV = DCAmph/Wk	Divide DCWh/Wk by DC system voltage (12,24,48 or whatever it is) to get Amp hours per week load
6	AC Amph/Wk + DC Amph/Wk = TOTAL Amph/Wk	Add line 3 + line 5 to get total Amp hours per week load
7	TOTAL Amph/Wk / 7 = TOTAL Amph/Day	Divide by 7 to get amp hours per day
8	Amph/Day x Days of Storage needed = TOTAL System Amph	Multiply Amph/Day with the days of storage needed to get total system Amph storage needed
9	TOTAL System Amph / DISCHARGE LIMIT OF BATTERIES = TOTAL System Amph Corrected	Divide Total system Amp hours needed with the discharge limit of batteries (0.5 for 50%, it can be from 0.2 to 0.8, depending on the batteries used)
10	TOTAL System Amph Corrected x Winter Temperature multiplier = TOTAL System Amph Winter Corrected Battery Capacity	Multiply the TOTAL System Amph Corrected with the **winter** multiplier 26.7deg C = 1.0 21.2deg C = 1.04 15.6deg C = 1.11 10.0deg C = 1.19 4.4deg C = 1.30 -1.1deg C = 1.40 -6.7deg C = 1.59

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td>11</td><td>TOTAL System Amph Winter Corrected Battery Capacity / Amp hours battery rating = NUMBER OF BATTERIES IN PARALLEL NEEDED</td><td>Divide the total system amperage needed with the amp hours rating of your batteries to get number of batteries needed to be connected in parallel</td></tr>
<tr><td>12</td><td>System Voltage (per example 12,24,48) / Battery Voltage = number of batteries wired in series</td><td>Divide system voltage with batteries voltage to get number of batteries wired in series needed</td></tr>
<tr><td>13</td><td>NUMBER OF BATTERIES IN PARALLEL NEEDED x NUMBER OF BATERIES WIRED IN SERIES NEEDED = TOTAL NUMBER OF BATTERIES NEEDED</td><td>Multiply baterries parallel and batteries in series to get total number of batteries needed</td></tr>
<tr><td>14</td><td>TOTAL Amph/Day (line 7) x 1.2 = TOTAL Amph/Day Battery loss corrected</td><td>Correct the TOTAL Amph/Day needed for battery loss, factor 1.2</td></tr>
<tr><td>15</td><td>TOTAL Amph/Day Battery loss corrected / Average Sun Hours per day = Total Solar panel array Amps needed</td><td>Calculate the total solar panel array amps needed for your system</td></tr>
<tr><td>16</td><td>Total Solar panel array Amps / Peak amps by module = Total Number of Modules needed if wired in parallel (round off to the highest whole number)</td><td>Divide your total solar array Amps with the Peak amps produced by each module to get the total parallel number of modules needed. You calculate your Peak amps if you divide the module Wattage with the peak power point voltage – you get this in the specs of your modules</td></tr>
<tr><td>17</td><td>Determine the number of modules in each series string needed to supply necessary DC battery Voltage</td><td><table><tr><td>DC Battery voltage</td><td>Number of modules in each series string</td></tr><tr><td>12</td><td>1</td></tr><tr><td>24</td><td>2</td></tr><tr><td>48</td><td>4</td></tr></table></td></tr>
<tr><td>18</td><td>Total Number of Modules needed if wired in parallel X number of modules in each series string = Total number of modules needed</td><td>Multiply the total number of modules if wired in parallel by the multiplyer from the chart above according to battery voltage</td></tr>
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19	Peak amps by module x Total number of modules needed = Amp rating of solar charger	Multiply the peak amps by module by the number of modules to get the MINIMUM Amp rating for the charger
20	(ACEQW simultaneous loads + Electric motor surges) x 1.2 = INVERTER POWER RATING	Calculate your inverter power rating by multiplying your AC simultaneous loads and possible surges from electric motors and multiply by 1.2 for inverter loss to get total inverter power rating.

ACEQW = AC equipment watts
DCEQW = DC equipment watts
h/Wk = hours of operation per week
Wh = watt hours
Wk = week
ACWh/WkCr = AC watt hour per week corrected
DCWh/Wk = DC watt hours per week
InV = inverter input voltage
ACAmpH/Wk = AC amp hours per week load