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Sizing a Battery Powered System Design Guide

For most users of our Solectric™ Shed-Pak systems, the basic kit will work just fine. You can expect about 6 hours of light per day. For those who wish to use the system in more demanding situations, we have developed this guide to see if our basic kit will meet your needs; or how to configure a system that will. Remember we are always here to help you. If you need help configuring a custom system, please call us at (800) 601-0692.

What Size Battery Do I need?

To determine the best battery size, first you need to know how many lights you need and how many hours per day you plan on using them. Also, for maximum battery life, it is best to keep typical use to 50% of its rated capacity. That being said, a 7 Ah (Amp-hour) battery can support a 3.5 Ah load. For a 12 Volt system that equals 42 Wh (Watt-hours) ($V \times Ah = Wh$), ($12 \times 3.5 = 42$).

To find how long you can run your lights on this battery, simply add up the total wattage of your lights and divide it into the 42 Wh.

For example:

The Solectric™ Shed Pak 650, a single light system with one Solectric™ Eco-Light 650 (7 watts) and a 7 Ah battery would run for 6 hours. $42 \div 7 = 6$ hours.

A system with 2 Solectric™ Eco-Light 650 light fixtures will draw 14 watts of power and would run for 3 hours. $42 \div 14 = 3$ hours.

If you increase the battery to a 12 Ah battery (6 Ah or 50% of its rated capacity). You could run a 2 light system for 5.14 hours ($6 \times 12 = 72 Wh \div 14 = 5.14$) or a one light system for 10.3 hours ($6 \times 12 = 72 Wh \div 7 = 10.3$).

How many solar panels do I need?

The simple answer is “enough to fully charge the battery”. To maximize charging power, orient the panel on a south facing roof structure, angled about 30 degrees above horizontal (a 6/12 pitch roof) in an area with minimal shading throughout the entire day. A single panel system will fully charge the 42 Wh used in the above example in most of the US for most of the year.

The factors that reduce charging power are numerous: Northern US and Canada, in winter months, may only produce half of this amount. Mounting on an Eastern or Western roof face will also greatly reduce charging power, while winter months being the worst. To find out how much power you can expect from your particular situation, go to the PV Watts web site.

PV Watts:

<http://rredc.nrel.gov/solar/calculators/PVWATTS/version1/> ,

Once you are at the website, pick your state then pick the city nearest you. Enter 20 for a 20 watt panel, leave the derate factor at .77, enter your panel tilt (0 is flat, 26 for a 6/12 roof and 45 for a 12/12 roof) and finally enter the azimuth (180 = south, 90 = East and 270 = west). After you press “calculate” a page will show up showing what power you can expect for each typical month in Watt-hours (ignore the KWh label). Divide this number by 30 to get an expected daily power production. Make sure your expected use does not exceed these numbers for any month. If it does, add a second 20 Watt panel to double your power. To make sure your battery is fully charging, check that the middle indicator light on the charge controller is blinking green before using the lights; this indicates a full charge. Please call us for help in your specific situation.

When to increase battery size?

For uses in which you plan on using the lights for an extended period of time, and then allow several days for charging; this would require a larger battery, but not more panels. An example is a remote vacation or hunting cabin that uses several lights continuously over a weekend, but is then not used for a week or more. Also, if your charge controller middle indicator light turns yellow or red (really bad) during the summer months, add more battery capacity. If you need a battery larger than our 12 Ah size, we recommend that you buy one locally (due to cost of shipping heavy batteries). Look for deep cycle, RV & Marine, lead acid battery.

When to add more panels?

If your panel orientation is less than optimal, or if your winter use is higher than summer use then you may need more panels. Also, if your charge controller middle indicator light turns yellow or red (really bad) during the winter months (but not during summer) then add more panels.