



SOLAR STIK™

A SYNOPSIS OF THE SOLAR STIK™

The Solar Stik™ System is only designed for one purpose: Generating Usable Power!

It can be used anywhere a low to medium duty portable power generator is required, but may not be a viable or desired option.

The purpose of this document is to provide a detailed synopsis about how the Solar Stik™ works, and a short overview of how it compares to a traditional solar power array.

OPERATING FACTORS OF A SOLAR PANEL (HOW A SOLAR PANEL WORKS)

There are three factors that affect a solar panel's ability to generate power:

1. Direct sunlight
2. Cool operating temperatures (air circulation around the panels)
3. MPPT Charge Controls

It is a universal reality about ALL solar panels, be it amorphous silicon, CIGS (thin film), Mono/Multi(Poly) crystalline or others not listed, that they ALL will operate at their rated capacity ONLY in direct sunlight.

Sunlight has photons, and these photons are the key ingredient to making electrons flow from the positive field of a solar panel (P-type layer) to the negative

field (N-type layer). The flow of electrons is also known as "Amperage" or "Current". Photons can be reflected away if the panel surface is not perpendicular to their direction of flow. It is preferable to have these photons pass THROUGH the panel and into the cell structure. This achieves its maximum when the sun's rays hit the panels at a 90 degree angle. The amount of photons passing through a solar panel is directly linked to the solar panel's output current.

By maintaining the panels at a perpendicular angle close to 90 degrees, the amount of photons passing through a solar panel is maximized. The Solar Stik's™ triple axis movement allows it to work at 100% of rated output in direct sunlight and for longer daily periods than a fixed or single-pitch system, with little seasonal effect (output loss due to indirect overhead passing of the sun).

During the course of a calendar year, the sun rarely passes directly overhead during the day. This means that most solar panels mounted in a fixed, flat position will operate at a reduced capacity even during the noon hour. The problem with most single-pitch solar systems is that they can only rotate around a single axis, so the ability to truly follow the sun is greatly diminished, especially if the system is used in the northern or southern latitudes where the sun rarely passes overhead at a 90 degree angle to the surface of a fixed or single-axis solar system.

The Solar Stik™ is a solar power generator that is as effective as a fixed-mounted panel system two to three times its size. To achieve such effectiveness, a triple-axis mounting system is employed on the Solar Stik™. As little as three panel adjustments will enable the Solar Stik™ to produce 100% of its rated power output all day long. This 200% to 300% increase in power output also depends the time of year (the location of the sun and the length of the day). Taking advantage of basic principles of physics, the Solar Stik™ enhances the performance of its solar panel system.

Another factor in a solar panel's ability to produce power is its temperature; a panel that is cool will generate more electrical power than a hot panel.

The Solar Stik™ system employs its solar panels on a mechanical lifting arm, which suspends the panel in a favorable position for air circulation, cooling the panel and allowing it to run at maximum power output.

A REAL LIFE EXAMPLE

Let's examine a typical day in Florida during the month of March and the sun's effect on a "fixed" 300 Watt solar panel system. The March sun will never pass directly overhead during the course of a day. Therefore, the user may only see a maximum output of around 70% to 80% rated power during peak sunlight periods. Additionally, the heat generated in/under a solar panel in a flat-mounted system

will degrade the panel's power production since these are usually mounted on or close to another surface.

This 300 Watt fixed system may yield only about 90 Amp-hours, or a little more depending on whether the system has the ability to pitch or tilt. This often means that the user must install a "larger than necessary" fixed solar system to compensate for these issues and produce the desired amount of power.

As the sun is more directly overhead in the summer months, the performance gap between the fixed system and the Solar Stik™ output narrows. However, the 100 Watt Solar Stik™ system can compete with larger wattage fixed-mount systems based on it's ability to aim the panels at the sun from sunrise to sunset as well as the cooling effect of air circulation around the Solar Stik's™ solar panels.

ADDITIONAL FACTORS

Blue Sky Energy Solar Boost™ MPPT (Maximum Power Point Tracking) charge controls play a key role in the Solar Stik™ System. These charge controls can be "optimized" for a particular battery bank, enhancing the Solar Stik™ rated output. All Solar Stik™ Power Paks use MPPT charge controls.

A Solar Panel's amperage is determined by a function of its wattage divided by voltage, and when Blue Sky Energy's Solar Boost™ controls are used, the result is 100% of the solar panel power output being supplied to the batteries. The Solar Boost™ charge control will allow the Solar Stik™ solar panels to operate at their rated voltage instead of the battery's voltage and results in about a 25% increase in power to the battery bank. For additional information on MPPT technology please see the Blue Sky Energy Inc. website.

UNLIKE ANY OTHER SOLAR GENERATOR

The Solar Stik™ is designed to be the primary power generator for nearly any mobile application. It was designed from the start as a truly man-portable system, not requiring a forklift or trailer to move it into operation. Unlike a conventional solar setup of equal effective power output, the Solar Stik's™ ability to support other equipment/purposes (such as surveillance equipment, radar, or wind generators) add to its value and usefulness. It is extremely adaptable, and can even used in conjunction with other traditional power sources. It's modular "Plug & Play" design allows it to be expanded should power-demand or other conditions warrant.

The Solar Stik™ is sold as a complete system, ready for immediate operation, requiring no additional purchases or engineering for the basic installation or operation.

SOLAR STIK™ - THE APPLICATIONS

The Solar Stik™ functions in a wide spectrum of applications including Military, Emergency Response, Disaster Relief, Recreational, (RV, camping), Marine, Research and Energy sectors, Construction Industry, Border Patrol, Agriculture, Remote Location Power, and more.

Battery-based DC (12 Volt) electrical systems are becoming more prevalent as our society is increasingly "mobile" (cars, RVs, boats), and many manufacturers today are producing versions of their popular appliances that operate on DC power. Additionally, a focus on making household AC appliances more efficient in their power consumption has enhanced the potential to operate such appliances from a DC power source.

Methods for recharging a DC system's batteries range from fossil-fuel generators to wind/water turbines. Almost all DC recharging sources are limited in some respect, but solar power production relies on a source that is infinitely reliable: the Sun. Additionally, as solar panel technology continues to improve, solar panels will continue to become more efficient, further enhancing their ability to produce power.

EDUCATIONAL MATERIALS AVAILABLE FOR DOWNLOAD FROM
WWW.SOLARSTIK.COM:

SOLAR SCHOOL – the basics of a DC electrical system

BATTERY SCHOOL – all about lead-acid batteries

INVERTER SCHOOL – all about DC to AC inverters

FREQUENTLY ASKED QUESTIONS – all about the system & how it operates