

Off-Grid Solar Home Systems

Technical & Market Guide



Introduction

THE GLOBAL LEAP AWARDS' SHS TECHNICAL & MARKET GUIDE

Millions of solar home systems (SHSs) from dozens of manufacturers have been sold worldwide. Strong commercial markets for SHSs and the low-voltage DC appliances they power will continue to grow in the coming years. It's the mission of the Clean Energy Ministerial's Global Lighting and Energy Access Partnership (Global LEAP) to support these markets.

The purpose of the Global LEAP Awards' *Off-Grid Solar Home Systems Technical & Market Guide* is to (1) provide high-level technical and market information about currently available SHSs and (2) facilitate connections and business opportunities between SHS companies, DC appliance manufacturers, and other energy access professionals.

LIMITATIONS TO THE GUIDE AND NEXT STEPS

SHSs are technologically complex, and many companies offer a range of products. This guide presents the best available high-level technical and market information about *one (1) SHS product and/or configuration per company*. Please contact these companies with any questions about their products or product offerings.

Many companies were contacted for this guide but only those listed here provided the necessary information in time to be featured. A revision of this guide is planned for autumn 2013—if you would like your product to be included or would like to provide updated product information in a forthcoming version of this guide, please contact GlobalLEAP@hq.doe.gov.

ABOUT THE GLOBAL LEAP AWARDS

Global LEAP's mission is to encourage self-sustaining commercial markets that increase modern energy access worldwide. The Global LEAP Awards is an off-grid appliance competition that recognizes the highest quality, most energy-efficient low-voltage DC appliances, and then promotes those products to off-grid market stakeholders.

The Global LEAP Awards is funded by the U.S. Department of Energy and the ClimateWorks Foundation. CLASP serves as the Global LEAP Awards' Operating Agent. For more information, visit www.GlobalLEAPawards.org.

DISCLAIMER: This document is intended to provide a high-level overview of solar home system technology and market opportunities. The Clean Energy Ministerial, Global Lighting and Energy Access Partnership (Global LEAP) and the Global LEAP Awards do not in any way endorse the products or companies featured herein, nor do they make any claims about the quality of the products or services the companies featured.

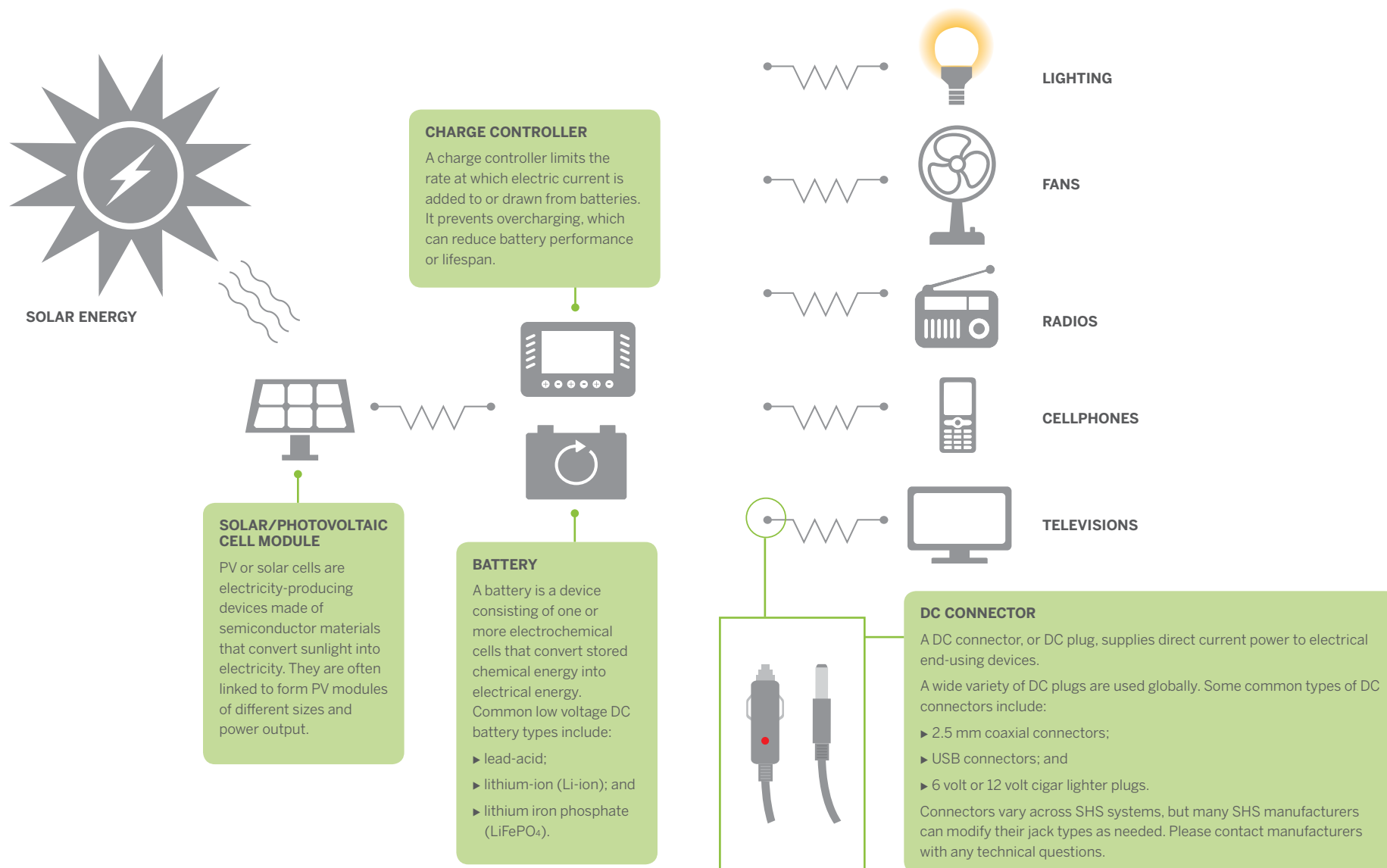
The authors of this document have done their best to ensure the accuracy and completeness of the information featured here; however, they make no warranties as to the information's accuracy nor are they liable for any action taken or decision made based on that information. Please contact individual solar home system companies for more information.

Glossary

WHAT IS AN OFF-GRID SOLAR HOME SYSTEM?

An SHS typically includes a photovoltaic (PV) module, a low-voltage direct current (DC) battery, a charge controller, wiring, and sockets. Off-grid appropriate SHSs often range between 5 and 120 Watts-peak (Wp), and are frequently sold with DC appliances.

SHSs are powerful tools in global development efforts as they can improve the lives of the 1.3 billion people throughout the developing world with no access to an electric grid. Clean, reliable electric light reduces the amount of kerosene an off-grid household needs and can greatly improve health outcomes, economic and educational productivity, and quality of life. Appliances like televisions, radios, and fans provide off-grid families and businesses valuable information, entertainment, and comfort.



bbox

www.bboxx.co.uk

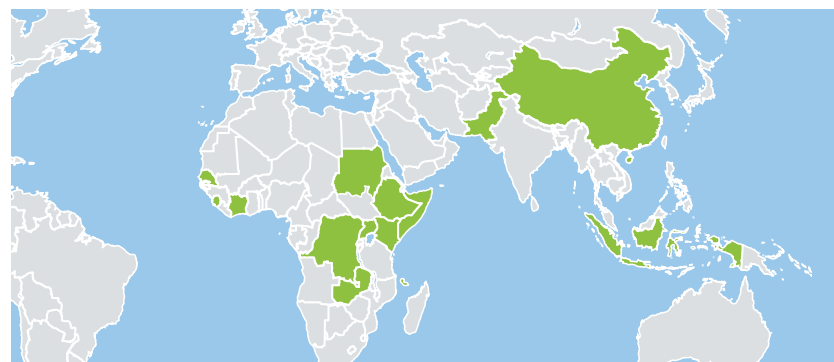
"Our slogan is "The Solar Revolution" and our aim is to electrify 20 million people by 2020. We hope to expand our franchise network in the developing world, become market leaders in our different markets and develop the necessary service, distribution and financing services to our end customers."

TECHNICAL INFORMATION

PV Module Wattage	50Wp
Battery Type	Sealed Lead Acid
Nominal Battery Voltage	12V
Voltage Swings/Range	11–14V
Battery Storage Capacity	17Ah
Type of Power Sockets/Ports/Jacks	2.5mm 12V DC sockets; USB 5V sockets
Length of Wiring from Panel to Battery	10m
State of Charge Display?	Yes, 0–100% broken up in quintiles

MARKET INFORMATION

Countries/Regions where products are sold	China, Ethiopia, Pakistan, RD Congo, Senegal, Sudan, Somalia, Kenya, Uganda, Sierra Leone, Ivory Coast, Comoros, Indonesia, Zambia
Contact	info@bboxx.co.uk



Impact Energies

www.impactenergies.com

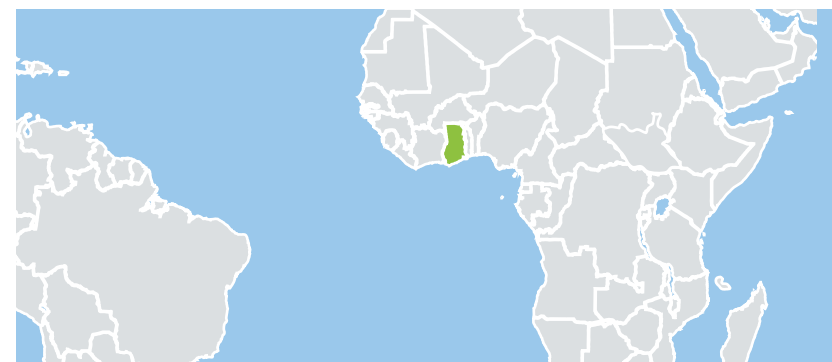
"Impact Energies is reinventing the way clean energy products reach the world's poorest consumers. IE is doing this by integrating the product supply chain from the factory to the village doorstep. Our Factory-to-Village (FTV) supply chain leverages the existing infrastructure of microfinance institutions, which reach millions of borrowers, to distribute energy products with end-user financing to high-density urban, peri-urban and rural communities."

TECHNICAL INFORMATION

PV Module Wattage	15Wp
Battery Type	Sealed Lead Acid AGM
Nominal Battery Voltage	12V
Voltage Swings/Range	11–14V
Battery Storage Capacity	17Ah
Type of Power Sockets/Ports/Jacks	2.5mm DC jacks
Length of Wiring from Panel to Battery	6m
State of Charge Display?	Yes, LED display on charge controller

MARKET INFORMATION

Countries/Regions where products are sold	Ghana
Contact	Nate Heller nheller@impactenergies.com



Kirchner Solar Group

www.kirchner-solar-group.de

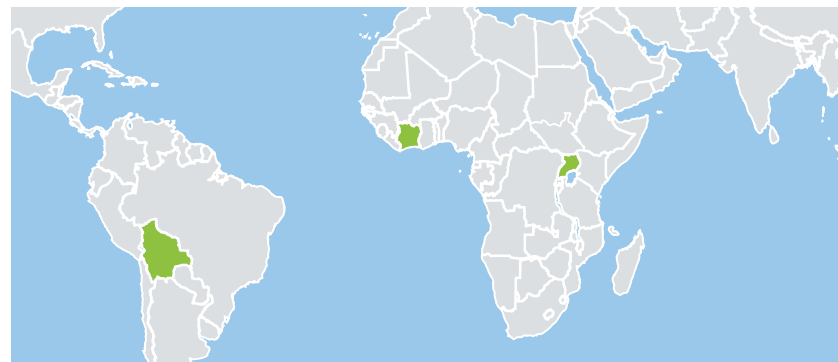
"Solar energy is environmentally friendly, cost-effective and can be used anywhere. Kirchner Solar Group has developed solar systems for off-grid conditions with a broad variety of performance classes."

TECHNICAL INFORMATION

PV Module Wattage	60Wp
Battery Type	Sealed Lead Acid
Nominal Battery Voltage	12V
Voltage Swings/Range	11.2V–12.5V
Battery Storage Capacity	33Ah
Type of Power Sockets/Ports/Jacks	Cigar lighter
Length of Wiring from Panel to Battery	Contact Kirchner for more information
State of Charge Display?	Yes, LCD displays remaining percentage

MARKET INFORMATION

Countries/Regions where products are sold	Bolivia, Uganda, Cote d'Ivoire
Contact	Eduardo Rocha Moreno Eduardo.Rocha@kirchner-solar-group.de



Komaes Solar

www.komaes-solar.com

"Komaes integrates design, development, manufacture, distribution and export business. Our main products are solar modules, solar systems, and solar lights. We are now exporting the products to more than 20 countries and regions such as Europe, USA, Australia, Africa and Southeast Asia."

TECHNICAL INFORMATION

PV Module Wattage	40Wp
Battery Type	Sealed Lead Acid
Nominal Battery Voltage	12V
Voltage Swings/Range	11–14V
Battery Storage Capacity	55Ah
Type of Power Sockets/Ports/Jacks	Contact Komaes for more information
Length of Wiring from Panel to Battery	6m
State of Charge Display?	Contact Komaes for more information

MARKET INFORMATION

Countries/Regions where products are sold	Australia, USA
Contact	Sara Peng cat@komaes.com



New Vision Renewable Energy

www.nvre.org

"New Vision Renewable Energy is a nonprofit Christian community development organization that uses renewable energy solutions and training as a catalyst for reenergizing under-resourced communities. We believe every person deserves to have clean light, water and power and we are committed to the research, development and supply of affordable and effective renewable energy solutions and products."

TECHNICAL INFORMATION

PV Module Wattage	10Wp
Battery Type	Li-Polymer
Nominal Battery Voltage	12V
Voltage Swings/Range	11–14V
Battery Storage Capacity	9.8Ah
Type of Power Sockets/Ports/Jacks	USB; 1.8mm 12V
Length of Wiring from Panel to Battery	3m
State of Charge Display?	No

MARKET INFORMATION

Countries/Regions where products are sold	Kenya, Uganda, Haiti, Ecuador, Burkina Faso, Mexico, Peru, El Salvador, and Nicaragua
Contact	Pamela O'Brien pobrien@nvre.org

Off.Grid.Electric

www.offgrid-electric.com

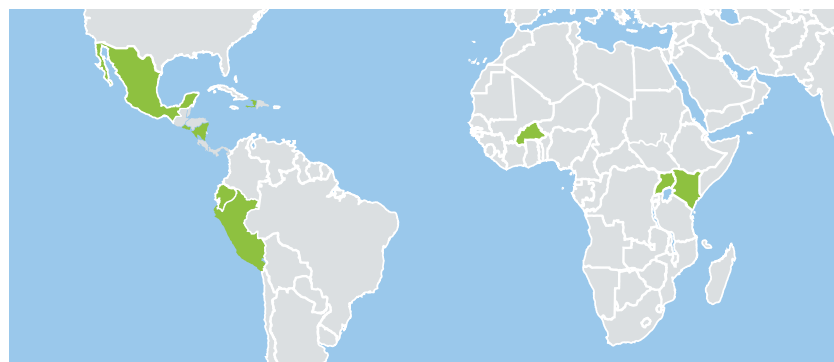
"Off.Grid.Electric's mission is to light 10 million homes in the next decade. Our solar as a service business model and leading edge technology eliminates customer risk of adoption and brings bright, modern light and energy services directly to the customer's home. We provide this at a price that anyone making \$1 a day or more can afford, risk free and guaranteed."

TECHNICAL INFORMATION

PV Module Wattage	20–25Wp
Battery Type	LiFePO ₄
Nominal Battery Voltage	12V
Voltage Swings/Range	10.5–13.5V
Battery Storage Capacity	8.33Ah
Type of Power Sockets/Ports/Jacks	USB
Length of Wiring from Panel to Battery	6m
State of Charge Display?	Yes, LED and LCD display

MARKET INFORMATION

Countries/Regions where products are sold	Indonesia, Tanzania
Contact	Joshua Pierce Joshua@OffGrid-Electric.com



Omnivoltaic Power

website forthcoming

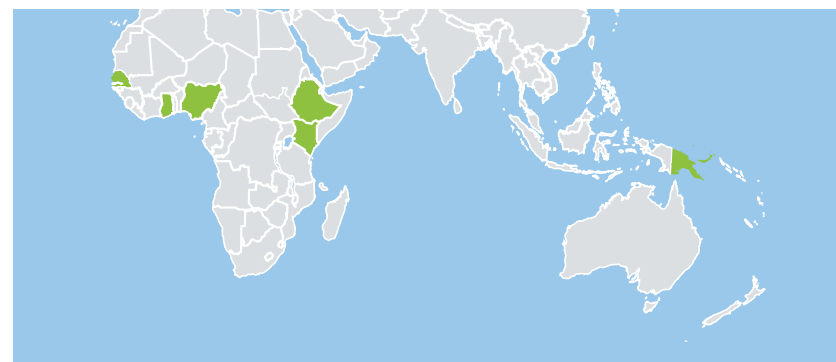
"Omnivoltaic Power specializes in off-grid solar power. At Omnivoltaic we invest most of our efforts in understanding what makes an off-grid product fit to the needs of its user, and we design the product to be not only useful but also delightful."

TECHNICAL INFORMATION

PV Module Wattage	15Wp
Battery Type	LiFePO ₄
Nominal Battery Voltage	12V
Voltage Swings/Range	11–15V
Battery Storage Capacity	12Ah
Type of Power Sockets/Ports/Jacks	Coaxial DC jack (positive outside 4mm, negative pin inside 1.7mm)
Length of Wiring from Panel to Battery	5m cable (can be customized)
State of Charge Display?	Yes, LED display for remaining percentage, remaining hours at current use rate, and remaining charge time from current solar input

MARKET INFORMATION

Countries/Regions where products are sold	Kenya, Senegal, Nigeria, Ghana, Ethiopia, Papua New Guinea
Contact	Huashan Wang hswang@omnivoltaic.com



Orb Energy

www.orbenergy.com

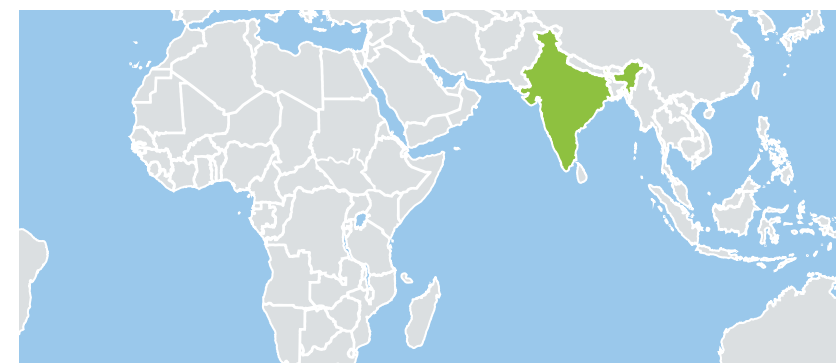
"Orb's mission is to make solar energy accessible, affordable, and hassle-free to the millions of people in India looking for a better alternative"

TECHNICAL INFORMATION

PV Module Wattage	40Wp
Battery Type	Deep cycle tubular flooded lead acid
Nominal Battery Voltage	12V
Voltage Swings/Range	11.5–13.8V (utilizes 5A charge controller)
Battery Storage Capacity	60 Ah
Type of Power Sockets/Ports/Jacks	Terminal block—screw type
Length of Wiring from Panel to Battery	15m
State of Charge Display?	Yes, LED display

MARKET INFORMATION

Countries/Regions where products are sold	India
Contact	Damien Miller info@orbenergy.com



Prakruthi Power

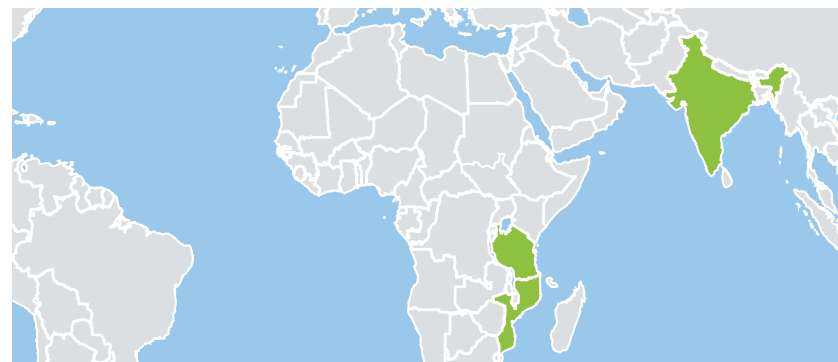
www.prakruthipower.com

TECHNICAL INFORMATION

PV Module Wattage	≤ 150Wp
Battery Type	Sealed Lead Acid
Nominal Battery Voltage	12V
Voltage Swings/Range	10.8 – 14.2V
Battery Storage Capacity	40 ≤ 80Ah
Type of Power Sockets/Ports/Jacks	5.5/2.5mm 12V DC; USB
Length of Wiring from Panel to Battery	≤ 10m
State of Charge Display?	Yes, LED display indicating 25%, 50%, 75% and 95% charge

MARKET INFORMATION

Countries/Regions where products are sold	India, Mozambique, Tanzania
Contact	Challapalli Venkateswara Rao prakruthipower@gmail.com



Rural Services Foundation (Rahimafrooz)

www.rsf-bd.org

"Rural Services Foundation, a non-profit organisation of Rahimafrooz Group, working since 2006 to make renewable energy and energy-efficient technologies accessible to remote rural communities, received the Climate Champion in Green Operation award as the fully-Bangladeshi-owned company for promoting renewable energy and adopting in-house environment management practice in its zonal offices across the country."

TECHNICAL INFORMATION

PV Module Wattage	45Wp
Battery Type	Deep Cycle Lead Acid
Nominal Battery Voltage	12V
Voltage Swings/Range	11.6 – 14.4V
Battery Storage Capacity	30Ah
Type of Power Sockets/Ports/Jacks	Contact Rural Services Foundation for more details
Length of Wiring from Panel to Battery	10m
State of Charge Display?	Yes, LED display of battery status

MARKET INFORMATION

Countries/Regions where products are sold	Bangladesh, Nepal
Contact	Utpal Bhattacharjee utpal.bhattacharjee@rahimafrooz.com



SELCO Solar Pvt. Ltd

www.selco-india.com

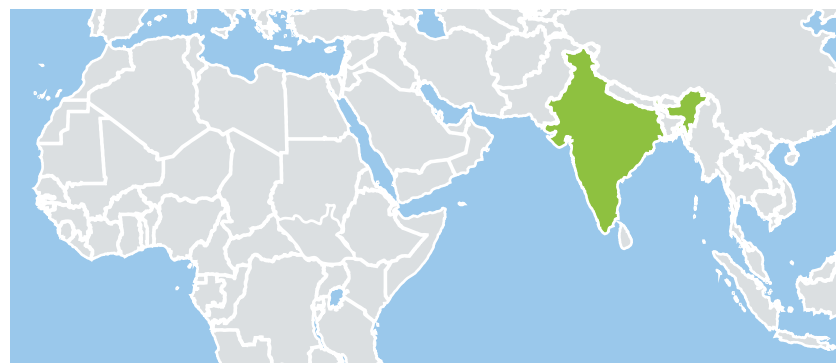
"SELCO India is a social enterprise whose mission is to enhance the quality of life of underserved households and livelihoods through sustainable energy solutions and services."

TECHNICAL INFORMATION

PV Module Wattage	100Wp
Battery Type	Low Maintenance Lead Acid (LMLA)
Nominal Battery Voltage	12V
Voltage Swings/Range	10.5–14.5V
Battery Storage Capacity	110Ah
Type of Power Sockets/Ports/Jacks	3 pin plug with unique design for lights (optional)
Length of Wiring from Panel to Battery	≤ 8m
State of Charge Display?	No

MARKET INFORMATION

Countries/Regions where products are sold	India
Contact	Vikshut Mundkur vikshut@selco-india.com



Solar Nexus International

www.solarnexusinternational.com

"Solar Nexus International is a value-adding distributor and manufacturer of appropriate scale renewable energy systems. Our mission is to design, deliver and manage renewable energy solutions that are easy to install, maintain and secure, and will return the highest value to our customers through use of local energy resources."

TECHNICAL INFORMATION

PV Module Wattage	≥ 90Wp
Battery Type	Sealed Lead Acid AGM
Nominal Battery Voltage	12V
Voltage Swings/Range	12.0 V–14.6V (10A PWM charge controller)
Battery Storage Capacity	≥ 80Ah
Type of Power Sockets/Ports/Jacks	Cigar lighter & Insulated bus bar wiring terminals (for hardwiring)
Length of Wiring from Panel to Battery	10m
State of Charge Display?	Yes, LED indicator of % capacity remaining

MARKET INFORMATION

Countries/Regions where products are sold	Tanzania, Kenya, Mexico, Costa Rica, Uganda
Contact	Eric Youngren ericyoungren@gmail.com



SolarTec Global Limited

www.SolarTecGlobal.com

"With service and quality as critical pillars of our operations, SolarTec Global Limited specializes in supplying globally proven solar technologies that provide community and commercial solutions to underserved markets."

TECHNICAL INFORMATION

PV Module Wattage	5Wp
Battery Type	Li-ion
Nominal Battery Voltage	11.1V
Voltage Swings/Range	8.5V to 12.6V (± 0.2)
Battery Storage Capacity	1.35Ah
Type of Power Sockets/Ports/Jacks	2.5mm 12V DC Jack
Length of Wiring from Panel to Battery	5m
State of Charge Display?	No

MARKET INFORMATION

Countries/Regions where products are sold	India, Philippines, Papua New Guinea
Contact	Business inquiries: Zha Agabe-Granfar zha@solartecglobal.com Technical inquiries: info@solartecglobal.com

Sunvis Solar

www.sunvis-solarlighting.com

"Established in 2003, Sunvis Solar specializes in manufacturing solar products and energy-saving lights such as solar home power systems, solar lighting kits, solar street lights, solar controllers, solar inverters, solar lanterns, solar flashlights, DC LED lights and DC CFLs for the solar systems."

TECHNICAL INFORMATION

PV Module Wattage	30Wp
Battery Type	Deep Cycle Lead Acid
Nominal Battery Voltage	12V
Voltage Swings/Range	10.8–13.7V
Battery Storage Capacity	20Ah
Type of Power Sockets/Ports/Jacks	5.5mm/2.1mm 12V DC socket
Length of Wiring from Panel to Battery	5m
State of Charge Display?	Yes, LED display

MARKET INFORMATION

Countries/Regions where products are sold	<i>Please contact Sunvis Solar for more information</i>
Contact	jeffrey@sunvis-solar.com





THE GLOBAL LEAP AWARDS



www.GlobalLEAPawards.org



@GlobalLEAPaward



GlobalLEAP@hq.doe.gov