



***Solar Micro Grid Systems
for
Rural / Tribal Electrification
and
Disaster Hit Area***

Solar Solutions

- It's a herculean task to re-establish traditional infrastructure in Electrification and disaster hit area.
- Micro Grid Solar project can provide an effective alternative as long term solution for a reasonable cost
- The ease of installation can help speed up roll out of electrification The generation in disaster hit area.
- power is dependent on Solar energy which is available in abundance
- Under Micro Grid either the whole community (cluster solution) or individual homes can be electrified.
- For individual homes the solution is provided in the Solar Kit form
- For community it involves putting a Central Solar Off-Grid Plant

'**Solar PV DC-Micro Grid System**' is a uniquely designed project to meet the electricity needs of a disaster hit area and more importantly 'Empower' them with connectivity to the outer world through inclusive **Television , Radio Transistor** and optionally internet as per requirements. It also offers possibility to further add household gadgets like **refrigerator, deep freezer, etc.** using the same system **intelligent controller** while expanding the SPV panel and the battery capacity . Therefore it is a sustainable ,expandable and a complete SPV based **quality solution**, offered as a complete **SPV DC Micro grid kit** for a disaster hit area households.

System Objectives -

To provide access to electricity in a disaster hit area on a sustainable and equitable basis by deploying proven renewable state of art Solar technology and solutions

The system is designed on the DC micro-grid principle; allowing for the micro-grid to accommodate the growth of a full range of DC appliances. It has a full interface with data managed recording features for universal control. The system can operate AC appliance via individual specialized inverters.

Micro Grid Solution for Rural/ Tribal Area..

The Individual Kit consists of the following;

Solar Panel 75 watts to 180 Watts

Battery 50 Ah to 150 Ah, 12 Volts

4 LED bulbs, 1 Fan, 1 Charging point along with junction box, cabling etc.

The Cluster Solution (Village level) consists of

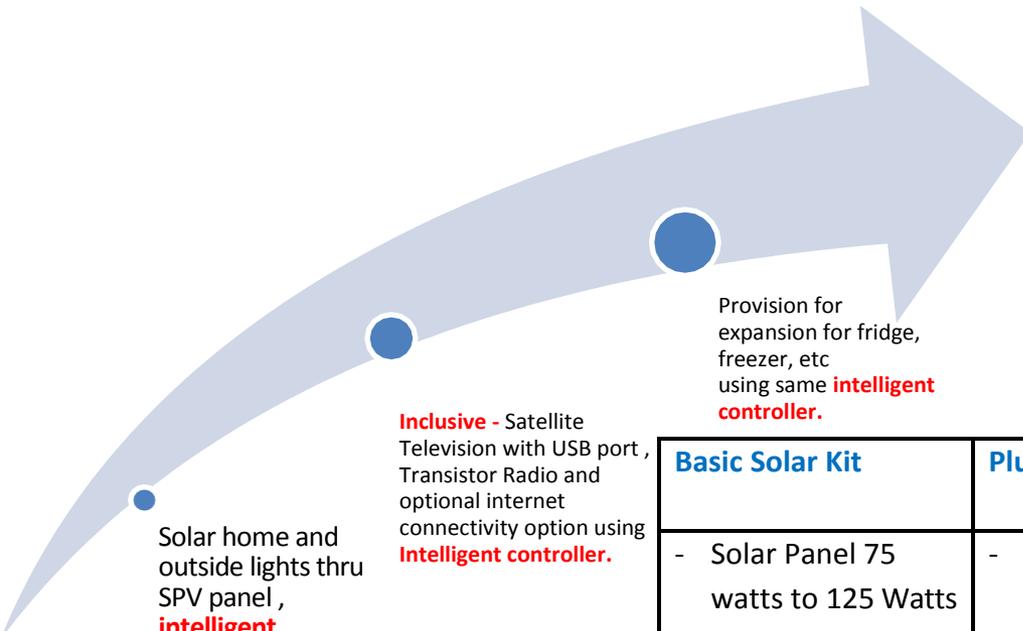
Elevated Structure for Solar Panels, Solar Panels 5 KW to 15KW

Battery back up distribution system

4 LED bulbs, 1 Fan, 1 Charging point for each house

Optional – Street Lighting

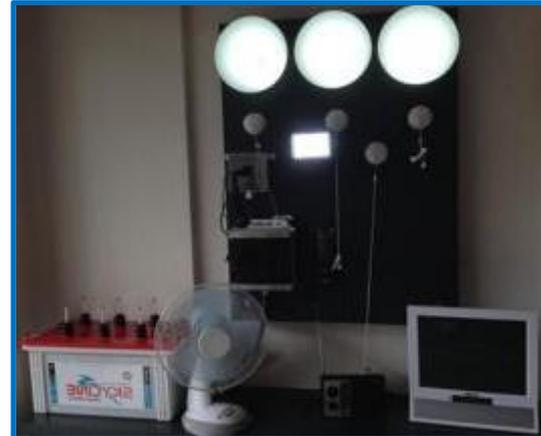
The Individual Home DC micro Grid kit



Solar home and outside lights thru SPV panel , **intelligent controller** and battery.

Inclusive - Satellite Television with USB port , Transistor Radio and optional internet connectivity option using **intelligent controller**.

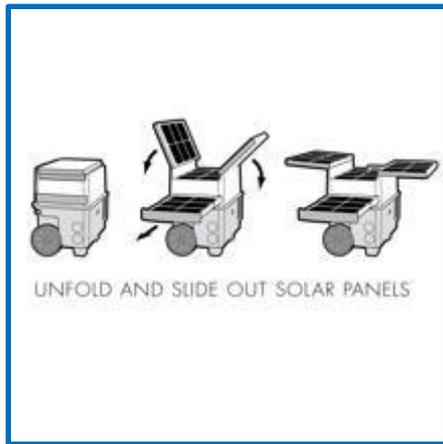
Provision for expansion for fridge, freezer, etc using same **intelligent controller**.



In 2015, the average annual electricity consumption for a U.S. residential utility customer was 10,812 **kilo-watt-hours** (kWh), an average of 901 kWh per month.

Basic Solar Kit	Plus Solar Kit	Pro Solar Kit	DC/Grid Solar kit
<ul style="list-style-type: none"> - Solar Panel 75 watts to 125 Watts - Battery 75 Ah to 100 Ah, 12 Volts - 4 LED bulbs, 1 Fan, 1 USB charging point along with junction box, fixtures and cabling. 	<ul style="list-style-type: none"> - Solar Panel 100 watts to 150 Watts - Battery 75 Ah to 100 Ah, 12 Volts - 4 LED bulbs, 1 Fan, 1 USB charging point along with junction box, fixtures and cabling. - TV and Radio 	<ul style="list-style-type: none"> - Solar Panel 250 watts to 300 Watts - Battery 200 Ah to 300 Ah, 12 Volts - 6 LED bulbs, 1 Fan, 1 USB charging point along with junction box, fixtures and cabling. - TV and Radio - Refrigerator or Freezer combo 	<p>All models can be provided with grid and battery option</p>

Other Solutions Offered



1.5 KVA Solar Generator



Flexible and Light Weight Solar Panels



Solar Lanterns with Mobile Charger



Temporary and Mobile Solar Plants – with Flexible Panels

Centralized Micro Grid Solution for disaster hit area

- Community can now have access to electricity by investing in their own off grid micro grid solar power plant.
- The size of a solar micro grid depends upon the number of households to be connected to micro grid. Based on which the number of solar panels and wattage comprising the solar array can be determined. Typical off-grid power plant size would be 25KW to 150KW serving 26 - 120 houses.



Figure 1. Four different community solar business models

A typical solar micro-grid ranges from 10 KW to 150 KW.



- The average U.S. home uses about [900 kWh](#) per month, so that's 30 kWh per day or 1.25 kWh per hour therefore, for a community of 100 homes, a micro grid producing 4 KWh is required.
- Every solar PV panel connected in the array generates electricity by converting solar radiation into electrical energy. **It is green energy.**
- Our panel and connections are plug and play and therefore quick to assemble at sight and made ready to generate power rapidly.
- All PV panels are connected in a particular order of parallel and series combinations to provide the required voltage.
- The electricity generated from the array of panels is transmitted to a central controller called the Power Conditioning Unit (PCU), which is, in simple terms, a large power inverter. The PCU is connected to the Distribution Box (DB) on one hand and the battery bank on the other.
- The PCU controls, regulates and directs the electrical energy transmitted from the array, and supplies electricity directly to homes, shops, offices, street lights etc.
- During the day if the power generated is not used or surplus power is generated, the PCU directs this to the battery bank which stores power. This power can then be used at night (after the sunsets).
The micro grid and battery bank are connected to a computer for local power usage monitoring. With the addition of a modem, this information can be accessed from a remote location, eliminating the need for local manpower to monitor the system.
- Power plant can be made ready for commissioning in 30 to 60 days.

Training and Employment Generation

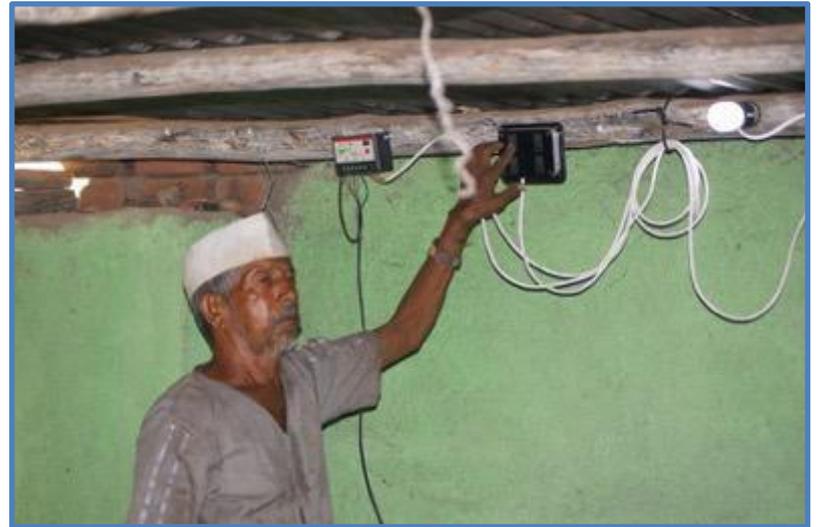
DESIGN OF TRAIN-THE-TRAINER DC MICRO-GRID COURSE (FOR INSTALLERS)

- It can be designed in each community model to offer training based on off-the-shelf training-for-trainer course materials.
- This should be offered for the training of local installation crews.
- The training will have practical and theoretical modules which can be procured as an additional or embedded scope of services for the trainer, who will be trained on the hardware, software, installation planning and rollout, troubleshooting, upgrade and social cultural engagement with clients.
- This will create self sustenance of the System for the community for any Maintenance or new installations as well as create employments as the appointed person can earn fixed amounts as Maintenance charges per month.

Commercial

- The cost of Individual Kits will range from \$500 to \$900 FOB India.
- The cost of 1.5 KVA Solar Generator range from \$1000 to \$1200 FOB India.
- The cost of 10 KW micro-grid will range from \$10,000 FOB India.
- The solar panels last up to 25 years and the batteries which are maintenance free will need to be replaced every five years
- All the consumables will be made available in the community or service center in the locality for maintenance.
- Training will be given to people in community to make them self sufficient and also generate employment.

Project at Village Rule, Maharashtra



Project Tribal Area Schools, Maharashtra



Project in !Kheis Municipality, Northern Cape Province, Republic of South Africa, By our JV Partner Peer Africa WCC

A collage of images showing various solar-powered utility formations and community members. The top row includes a yellow building, a red brick building, and a helicopter. The bottom row includes a woman in a white dress, a man in a pink shirt, a group of people, and a solar panel on a roof. A central text box is overlaid on the collage.

SOLAR POWERED UTILITY FORMATION – OBJECTIVES ACHIEVED

- Sustainable and social enterprise models for solar electrification.
- Initiating of voluntary commercial services with training dynamics and standardization.
- Identifying the costs of community electrification and constitutional social responsibility as opposed to business-minded financial returns.
- Implementation of practical adaptive operations to run highly efficient energy systems.