

## Solar Power Plant

Solar Power pack is systems used to generate electricity that make use of benign Solar power. These systems are ideal for locations where grid is inaccessible or the access is prohibitively expensive. The Solar power pack can also be used in conjunction with existing grid to enhance the energy delivered at that particular location.



**Solar power pack consists of the following:**

- Solar array • Battery bank • Charge Controller • Inverter
- Necessary structure for Solar array • Hardware and accessories.

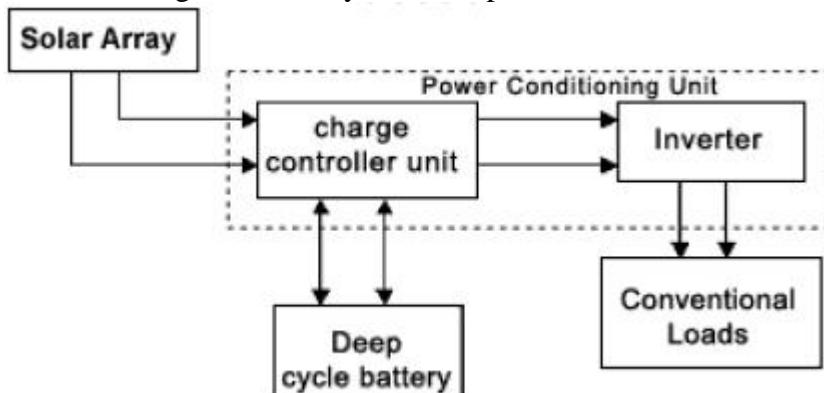
The electricity generated by the Solar array is stored in the Battery through Charge Controller. The loads are activated when required and is powered by the Battery through an Inverter. A change over switch is provided to transfer the load from Solar to grid and vice versa. In general, the backup period for the full load is 4 -5 hours per day.

### Description :

#### **Solar Array:**

The Solar array consists of a set of Solar modules connected in a predetermined fashion to get the desired voltage and current. These modules are mounted on a Solar module mounting structure and installed at an equal to latitude of the site and tilted towards the true South. The array is installed at a shadow free area and near to the battery to avoid cable losses.

The block diagram of the system is explained below:



The range of Solar array is from 0.5Wp to 5 kWp and can support load from 0.4W to 4kW for a maximum backup of 4-5 hours per day.

#### **Power Conditioning Unit (PCU):**

PCU consists of a Charge Controller Unit (CCU) and an Inverter. CCU will control the charging, discharging of the battery, Load connection and disconnection and Panel connection and disconnection. In other words the PCU is the heart of the system and ensures the life of the battery and optimum usage of the system.

Inverter will convert the DC energy into alternating energy to meet the conventional load demand for the predetermined period. It will also take care of the initial surge current required for inductive loads. The capacity of the Inverter will always be double the size of the load demand.



Indicators are available on the PCU for obtaining the system status at any given point of time.

- Green light indicates real charging of the battery from Solar array.
- Red light indicates that the battery is discharged and requires charging. Please note that the load is not active during the battery low condition.
- Yellow light indicates that the Inverter is ON and the output loads are active.
- Neon light indicates that the output is overloaded and disconnects the loads from Inverter. For restoration of the supply to loads reset button has to be pressed.
- Other indications like Input ON, Output ON etc. can be added and are optional.

### **Battery:**

Batteries used in the Power pack are Sealed Maintenance free lead acid batteries for longer life and un-interrupted operation of the system. The batteries will take in the energy from Solar array and release the energy to loads when desired through CCU. The battery will have an autonomy of 3 days i.e. the loads can be operated for three consecutive days even though the Solar energy is not available. The autonomy can be increased based on the Customer requirement.

### **Conventional loads:**

The loads like Fluorescent lamps, Incandescent lamps, Ceiling fans, Television set, Music system etc. can be connected to the Power pack and can be used for the predetermined period without any interruption. The duration of the usage can be increased proportionately if the load management principle is implemented.