बीएचईएल
BHEL

Electronics Division

The Power of the Sun for Everyone

An ISO 9001, ISO 14001 & OHSAS 18001 Unit

SOLAR PHOTOVOLTAIC POWER PLANTS FROM BHEL

INTRODUCTION

Solar Photovoltaics is the direct conversion of sunlight to electricity. It is an attractive alternative to conventional sources of electricity for many reasons.

- Silent, non-polluting and renewable
- Extremely reliable with minimal maintenance
- Modular and versatile
- Can be installed almost anywhere

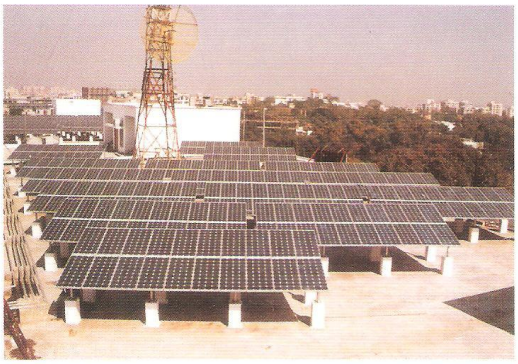
Since its commercialization, electricity has been supplied to residential and commercial customers by means of central station generation and a complex transmission and distribution system. All conventional power plants have inherent problems such as pollution, dependence on fuel supply, stability etc. In addition, centralized generation makes large number of people vulnerable to electrical blackouts. Photovoltaics eliminate many of these problems.

BHEL, is one of the pioneers in the field of Photovoltaics and certified for ISO 9001 and ISO 14001. The company offers solar power plants ranging from a few KW to hundreds of KW. BHEL PV Panels are also recognised internationally with certification from JRC, Ispra, Italy.

The following types of SPV power plants are available :

- Grid interactive systems & Roof top systems
- SPV-Hybrid Systems
  - PV-Mains
  - PV-Diesel
  - PV-Mains-Diesel
- Stand alone PV systems

GRID INTERACTIVE SPV SYSTEMS



100 KWp SPV Grid Interactive Power Plant at APTRANSCO, Hyderabad

Grid interactive PV systems are connected to the utility grid. These state-of-the-art systems operate during daytime for 5-6 hrs and power the loads directly. These systems provide high quality power, which is synchronized with the grid. During periods of low load usage by the connected load, excess power is exported to the grid. These systems are functionally used for Tail End Support, Demand Side Management (DSM) and Peak Load Shaving. These systems can be provided with short time battery backup to feed power to critical loads during grid outage.

These systems can be used in :

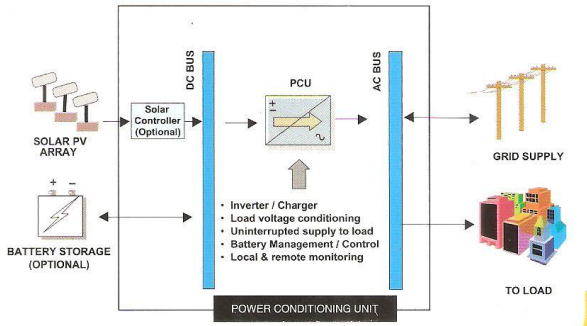
- Industries
- Farmhouses
- Schools
- Irrigation pump feeders

Available in various capacities ranging from 25 KWp onwards.

ROOF TOP SYSTEMS

Grid interactive power plants with similar features, tailored to the building load requirement & capacity from 2 KWp onwards, can be supplied for installation on roof tops of buildings. These can be used to supplement the local load requirements. Both single phase / three phase versions are available.

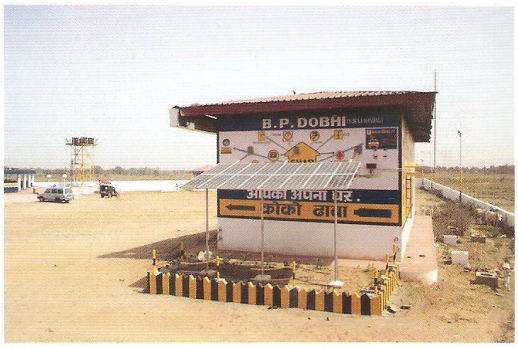
GRID INTERACTIVE SYSTEMS



SPV HYBRID SYSTEMS

The SPV-Hybrid systems are designed to operate with both grid & diesel generators in conjunction with battery system. The system can be used to supplement the load & can be configured as either a battery charger or inverter.

The system utilises a bi-directional inverter to regulate voltage supply to the load and functions as an on-line UPS. The inverter operates in parallel with either the grid supply or the diesel generator with active power to the load. Built-in intelligent software ensures optimum loading of DG set leading to better Specific Fuel Consumption (SFC). Alternatively, these systems can be configured as Solar PV-Mains Hybrid systems also.

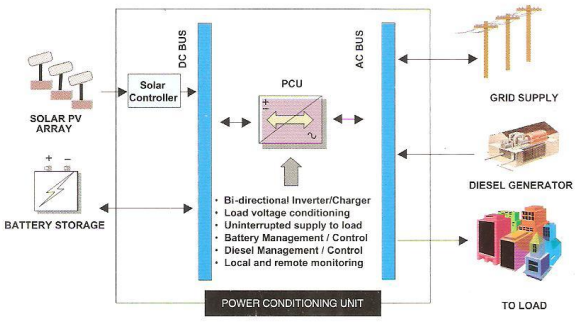


1200 Wp SPV Mains - Diesel - PV Hybrid Power supply for Fuel dispensing system at BPCL outlet, Dhobi, Bihar

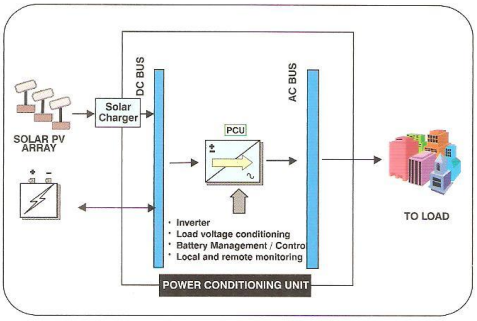
Advantages :

- Provides clean & reliable power to load inspite of variations in Solar irradiation
- Reduces the fuel consumption of DG set by operating at optimum efficiency with load management
- Reduces pollution levels
- Enables trade-off of capital & operating costs - providing more optimal solutions
- The system minimizes the capacity requirement of PV array & storage batteries
- Provides fully automatic uninterrupted power output & full protection from power cuts.

SPV-HYBRID SYSTEMS



STAND ALONE SPV SYSTEMS



105 KWp PV Power Plant at Mousini Island, Sunderbans, West Bengal

Stand Alone Solar PV power plants are those which are not connected to the utility grid. These power plants are primarily meant to cater to the needs of rural electrification in remote areas.

Systems ranging from 1 KWp onwards with suitable battery banks can be designed & supplied.

SYSTEM COMPONENTS

The components for all types of systems described are as follows :

PHOTOVOLTAIC ARRAY

- PV array consisting of 70Wp/75 Wp modules
- PV modules conforming to National/International Standards
- System voltage : 300 V (Typical) or site specific

POWER CONDITIONING UNIT (PCU)

- Single phase / Three phase PWM controlled inverter for Grid interactive, Hybrid & Stand alone operation
- IGBT based power circuit
- Protected against overload, short circuit & islanding conditions
- Harmonic distortion < 5%
- Conversion efficiency > 92%
- Incorporates Maximum Power Point Tracking (MPPT) to maximize PV array output
- SCADA for remote monitoring
- Remote start/stop control for Diesel Generator for optimum load management
- Multiple operation of all energy sources
- Inverter parameters monitoring like :
  - DC energy generated
  - Energy exported
  - Voltage, Current & Power factor of inverter output
  - Event logging facility at remote point
  - System set points alteration facility from a remote point

BATTERIES, STRUCTURES, CABLES & OTHER ACCESSORIES

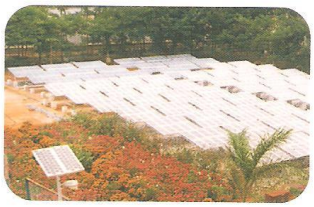
- Suitable design to meet system requirements
- Employs state-of-art technology to ensure reliability

SERVICES OFFERED

Site Survey | System Design | Feasibility Report Preparation | Manufacture & Supply | Installation | After Sales Service

50KWp PV Power Plant at
Neil Island, Andaman & Nicobar

100 KWp SPV power plant at
Kiltan Island, Lakshadweep



30 KWp grid interactive system
ESD, BHEL, Bangalore