Renewable energies are energy sources that are continuously being replenished by natural processes that occur on human timescales. In contrast, fossil fuels (coal, natural gas, oil) require millions of years of geological processes to form. Our resources of fossil and nuclear fuels (e.g. uranium) are limited.
Regenerative energies, on the other hand, are virtually in exhaustible.
Wind energy is a form of solar energy. Solar PV Cells energy (or Solar power) describes the process by which wind is used to generate electricity. Solar PV Cells converts the Solar energy into electrical power.
DC to AC inverters are used to convert DC energy derived from PV Cells in AC energy or AC Power Supply.
Solar power, as an alternative to burning fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation, consumes no water, and uses little land. The net effects on the environment are far less problematic than those of non-renewable power sources.
Solar farms consist of many individual PV Cells, which are connected to the electric power transmission network.

Specifications

Panel-1

PV modules are fitted on 40X40mm Aluminum profile rack with tiltable, lockable frame. This frame can be moved from 0-90° in steps. PV modules can be of 100W/200W/500W.
500W halogen lamps to provide variable intensity (sun simulator)
PT100 Sensor for temperature sensing & FAN for cooling are provided.

Panel-2

Control panel is a 40X40mm Aluminum profile rack with sturdy table top flat panels
Nine ABS plastic panels with mimic diagram are mounted on the aluminum rack.

- Single phase MCB & Dimmer panel
  - 1 pole MCB of 220 V/4A
  - 1 phase 0 to 270V AC / 3A Variable transformer
- AC meter panel
  - 0-300V AC Voltmeter
  - 0-5A AC Ammeter
- DC meter panel
  - 0-50V DC Voltmeter
  - 0-2A DC Ammeter
- Single phase multifunction meter panel
  - Bidirectional Multifunction
  - 3 Phase ¾ wire, 415V, CT Input 5A
  - LCD/LED display, Aux supply 230V, 45-65 Hz, 5W - V, A, Hz, Pf, KVA, KW, KWH
- Temperature meter panel .
  - PT100 temperature Sensor to measure temperature

Note: Specifications are subject to change.

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- MPPT Charger Controller Panel.
  - Rated Voltage 12V, 40A.
  - Maximum PV Voltage 15V & Min PV Voltage 10V
  - Battery Lead acid type with 12V,100Ah current
- Solar Inverter Panel.
  - 500VA inverter system
  - Input DC voltage 10-15V DC.
  - Output Voltage 230V AC.
- Application Load panel.
  - 230V 1 numbers of 10W LED bulb with socket as a Load.
  - 230V AC Fan
  - On/OFF toggle should be provided for each bulb & fan.

All input & output are terminated in 4mm shrouded connector.

Accessories.

- LUX Meter, 4mm Shrouded patch chord, Power Chord & Manual.

Experiments

- Study of I-V Characteristics of Solar cell.
- Study of series combination of solar cells.
- Study of parallel combination of solar cells.
- Study of dependency of solar cell I-V characteristics on light intensity.
- Study of dependency of solar cell I-V characteristics on temperature.
- Study of shading effect on solar cell parameters.
- Study of battery charging & discharging characteristics.
- Study of the efficiency of battery.
- Study of finding MPP by varying the resistive load across the PV panel

Note: Specifications are subject to change.

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