

Rooftop Solar Photo-voltaic System



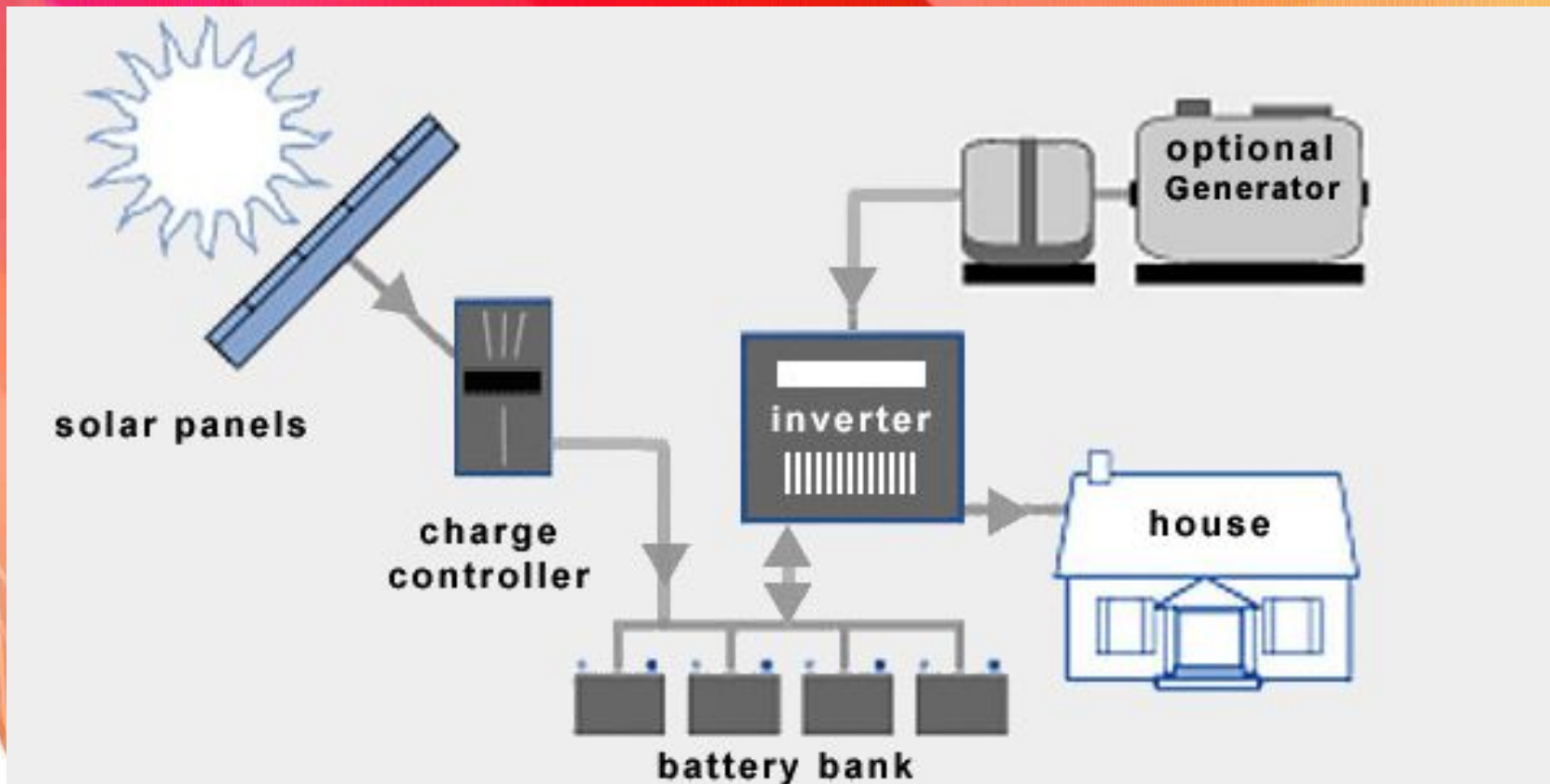
By
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ROOFTOP PV SYSTEM

- Rooftop Solar Systems are the best Energy Solution for either Urban or rural / Suburban electrification.
- It constitutes of PV solar panels, charge controller (optional), storage batteries (optional) and inverter systems. Generators could be installed optionally to maintain reliability.
- PV panels convert solar radiations to electricity, which is then stored in a battery. In order that most of the loads are in AC, stored charge is converted into AC through an inverter and provided to the load.

ROOFTOP PV SYSTEM



ROOFTOP PV SYSTEM

- Installed on rooftops of residential or commercial buildings
- Can cope up with substantial growth in peak electricity demand
- Can be with or without grid interaction.
- Create economic value for unutilized rooftops and are not faced with the issues of land availability

ROOFTOP PV SYSTEM

- Immediate replacement to the existing supply
- It can be implemented completely On Grid.
- It can be implemented completely Off grid i.e. No need of any supply from other electricity provider and state electricity
- All the appliances such as AC, TV, Refrigerator, Fan, Lamp, Computers etc can be powered
- No need of any change in existing wiring

OBJECTIVE OF INSTALLING ROOFTOP SOLAR PV SYSTEM

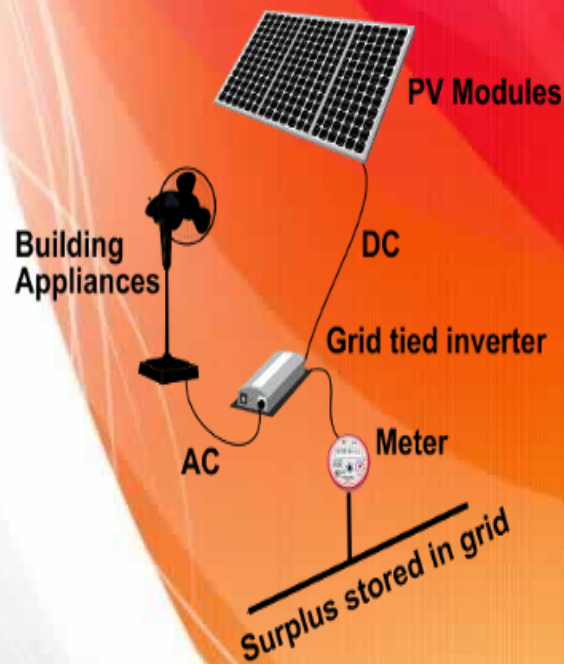
- On national level, reduces requirement of land for addition of solar capacities.
- It reduces the dependency of the consumer on grid power and mitigates the dependency on diesel generator.
- To provide access to electricity to all rural households especially where grid connectivity is not a cost effective solution. .

COMPONENTS REQUIRED FOR ROOF TOP SOLAR PV SYSTEM

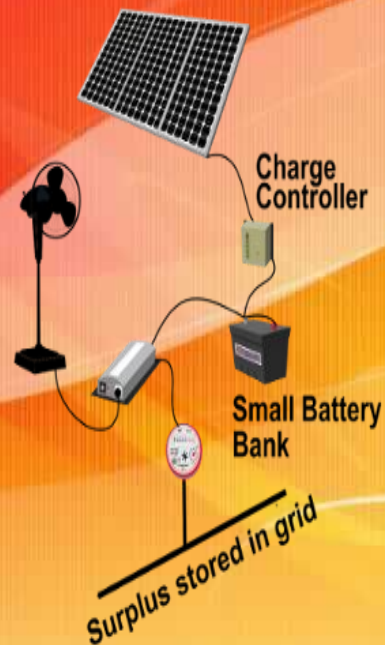
- Solar PV Modules
- Inverter
- Charge Controller
- Batteries
- Mounting Structures
- Power and Control Cables
- Meters and Monitors
- Junction Boxes and Combiner Boxes
- Protection Equipments

DIFFERENT TYPES OF ROOFTOP SOLAR PV SYSTEMS

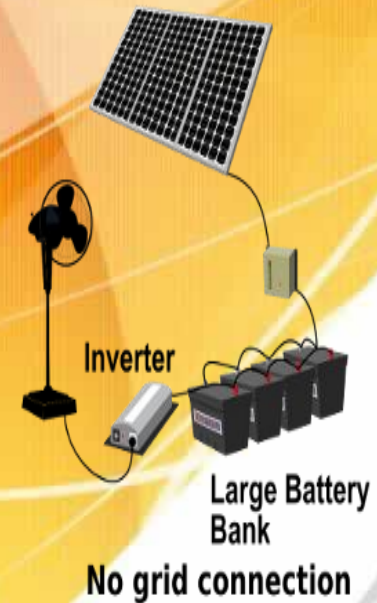
GRID-CONNECTED SYSTEM SYSTEM



HYBRID SYSTEM



OFF-GRID



APPROACH AND METHODOLOGY TO DEVELOP A ROOFTOP PV PLANT

1. SITE SURVEY
2. LOAD SURVEY
3. SHADING ANALYSIS
4. SOLAR RADIATION RESOURCE ASSESSMENT
5. PRELIMINARY DESIGN
6. DETAILED DESIGN
7. SYSTEM OUTPUT
8. BILL OF MATERIALS
9. PROCUREMENT
10. IMPLEMENTATION OF THE PROJECT
11. OPERATIONS AND MAINTENANCE
12. PRICING OF SOLAR SYSTEM

Determining the load



- List all the electrical requirements of the load which are to be used in a day.
- For example: If you have a 15 watt bulb and you use it for 4 hours a day, then list down the particular Watt-Hour, i.e. in this case $15 \text{ Watts} \times 4 \text{ hours} = 60 \text{ Watt-hours (Wh)}$.
- Sum all the Wh at the end and the resulting total will be the required system capacity to be built.

Selecting Panels



- PV panels are rated in Watts.
- So say a PV panel of 100 Watt receiving sunlight for 4 hours would generate 400 Wh.
- The total load required which was calculated in previous step, say 2000 Wh would require 5 PV panels if it receives 4 hours of sunlight.

Selecting Battery



- Batteries are rated in Ampere-Hours (Ah).
- Now convert the Wh into Ah by dividing it the battery voltage i.e. 12V.
- So in our case $2000\text{Wh} / 12\text{V}$, will be 166.67 Ah.
- Concerning conversion losses and battery safety parameters select rating of battery above 166.67 Ah i.e. say 250 Ah.

Selecting Inverter



- Earlier we calculated the connected load for selecting the battery and PV panels, but in the case of inverter we should consider maximum demand, i.e. the amount of load which are simultaneously ON.
- This would be lesser than the connected load, since all the connected load are unlikely to be simultaneously ON at a same time.

Installation

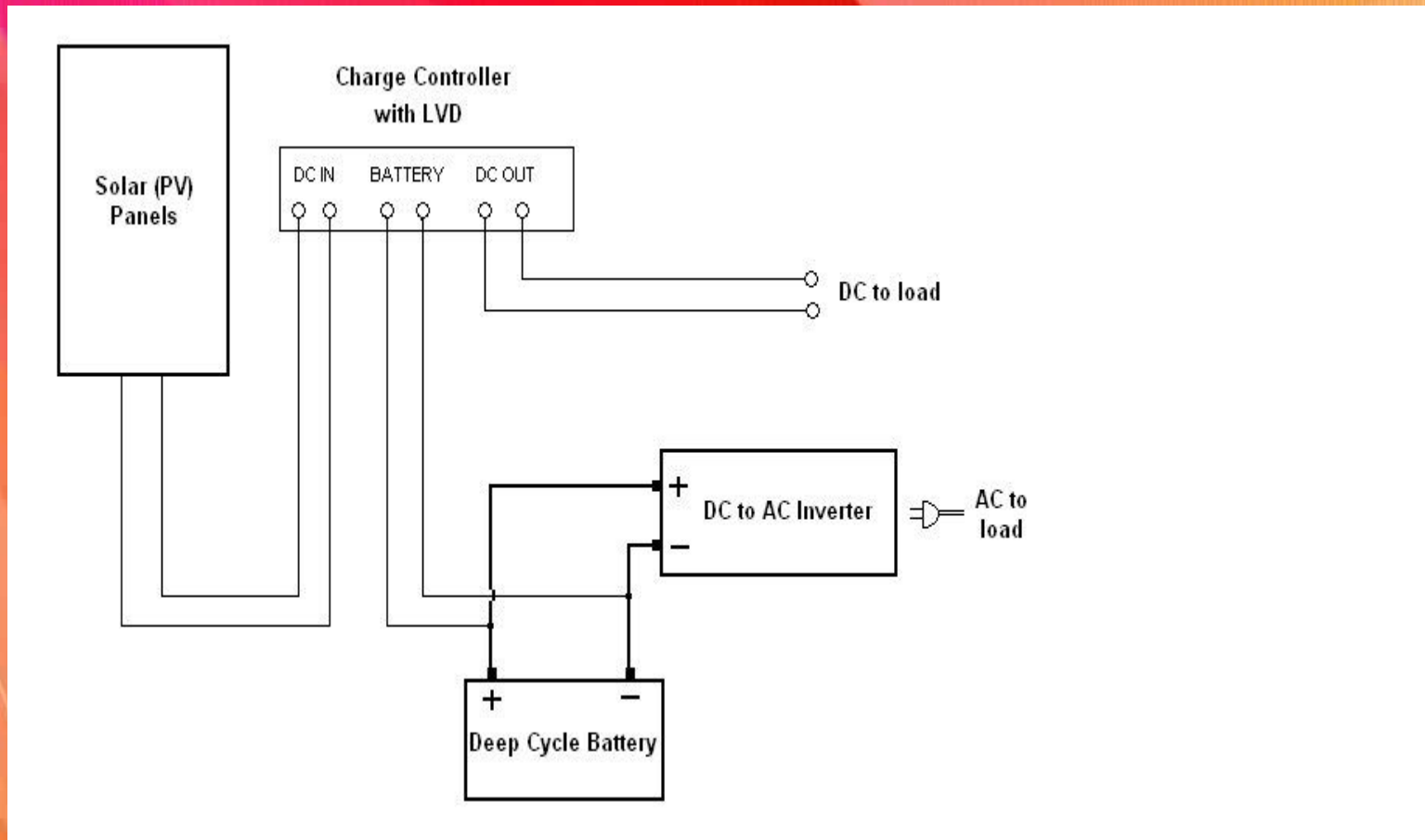
- Mounting Solar panels
- Wiring

Mounting Solar panels

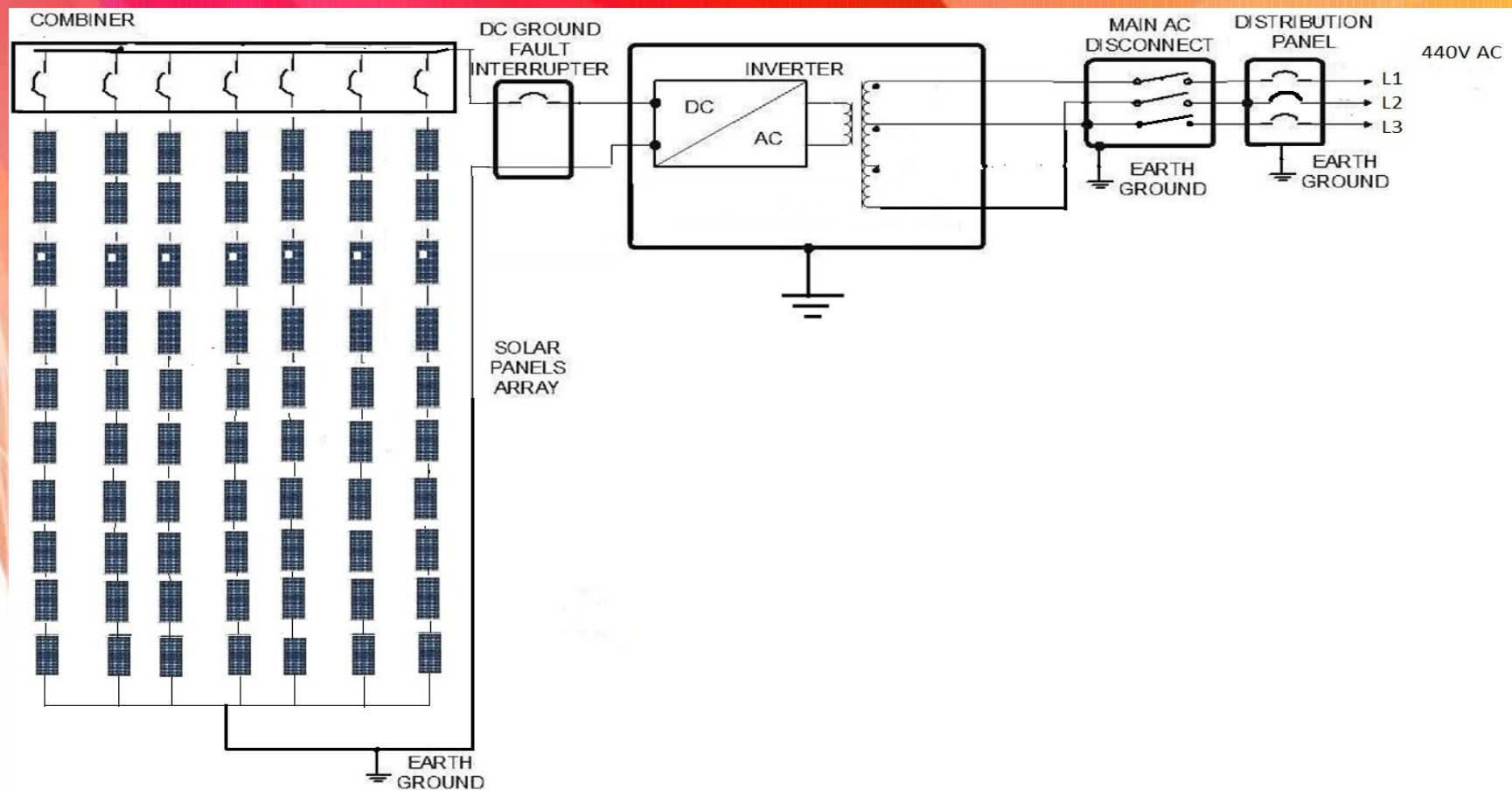


- It must be based on the geographical conditions i.e. based on the latitude of the site.
- While mounting solar panels; shadows of trees, nearby by buildings must be avoided.

Wiring



ARRANGEMENT 18kWp System

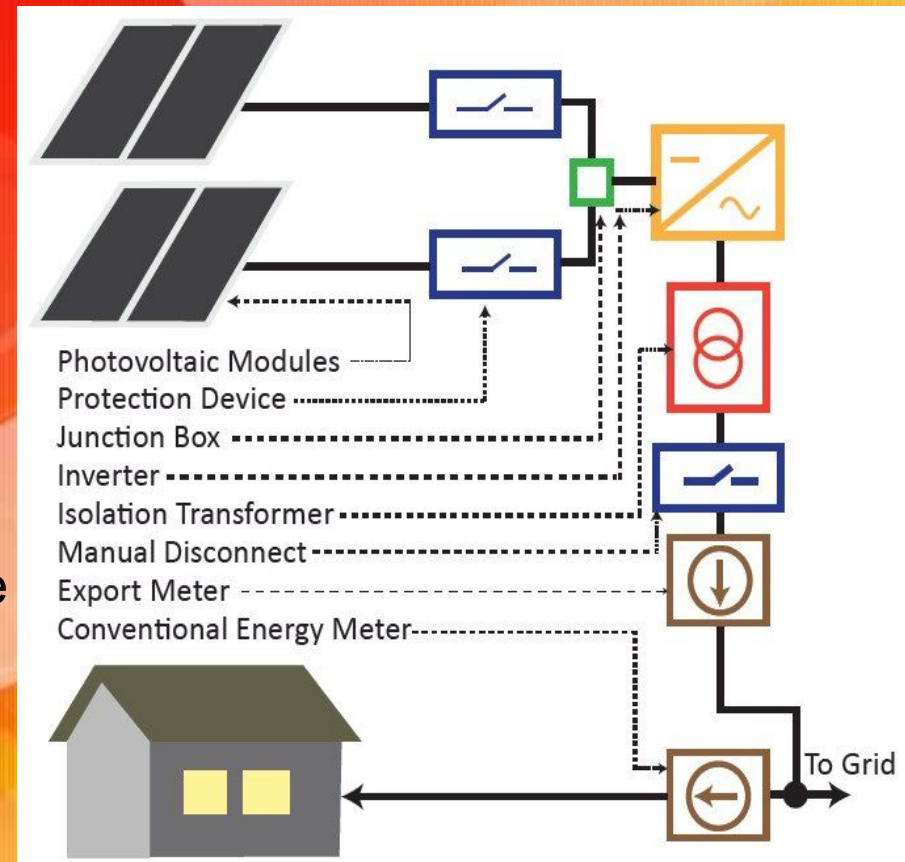


INTEGRATION OF PV POWER WITH GRID

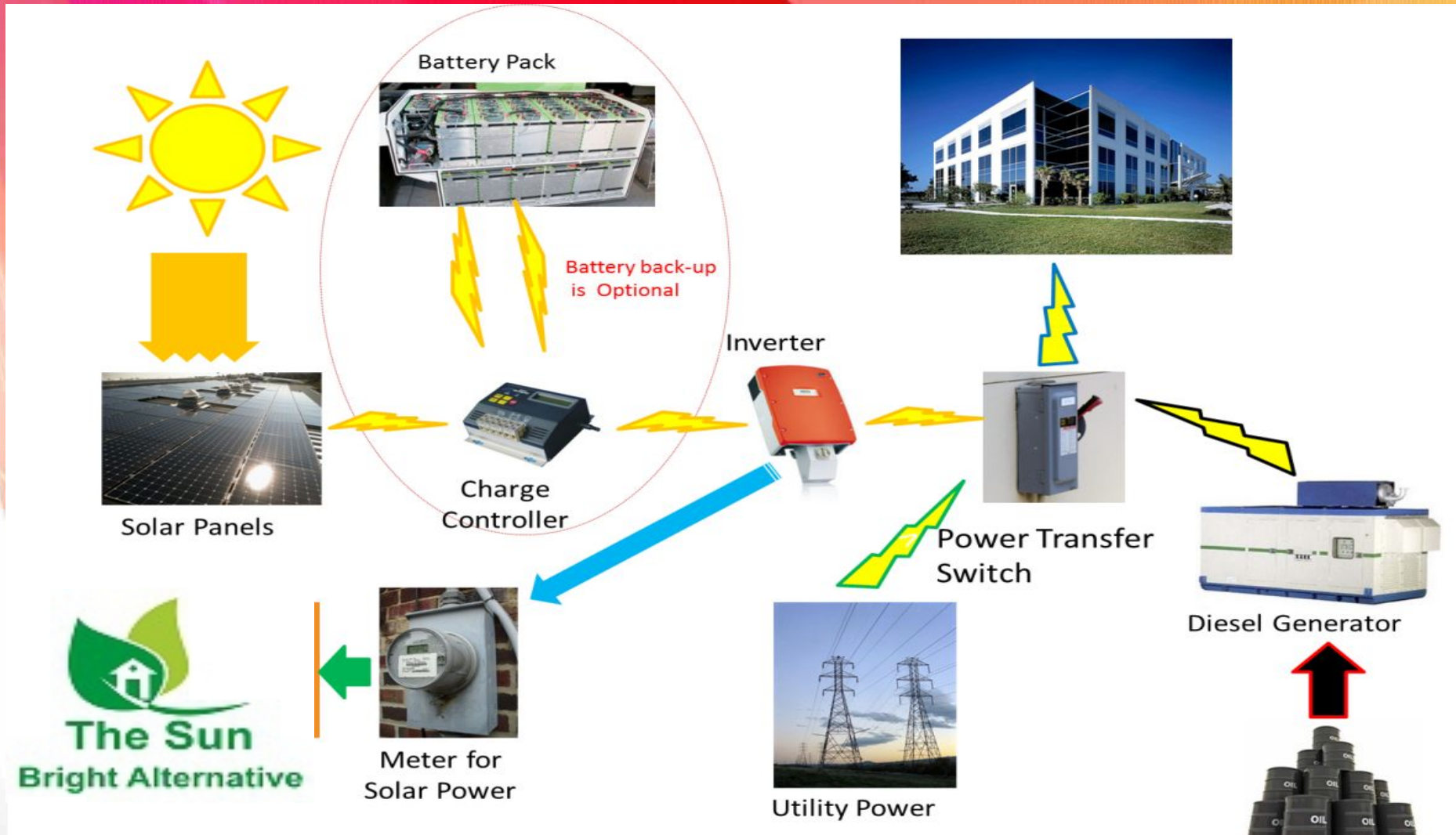
- The output power from SPV would be fed to the inverter
- In case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid.
- The out put power from inverter would be fed to the panel of DG set with changeover switch.
- On the week end and other holidays (When no electrcity load is connected), almost the entire energy from the SPV module would be fed into the grid.

METERING SCHEME

- An Import/Export meter will be installed for metering for billing purpose
- Would also serve the purpose of registering the net export and import to the grid.
- A meter would also be installed at the output side of the inverter to register the energy output from the SPV power plant.



IMPLEMENTATION OF WORK



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Thank You



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