

Karnataka Law Society's
GOGTE INSTITUTE OF TECHNOLOGY
Udyambag Belagavi – 590008
Karnataka, India.



OBA-1

Renewable Energy Sources

Subject Code: 18EEOE561

Submitted By:

NAME	USN
Aiyan Faras	2GI19CS013
Siddarth Desai	2GI19CS144
Siddhant Hittalkeri	2GI19CS145
Soham Managaonkar	2GI19EC152

Under the guidance of
Prof. Rahul Suryavanshi
Dept. of EEE, KLS GIT
Academic Year 2021-2022 (ODD Semester)

KLS Gogte Institute of Technology, Belagavi
Department of Electrical & Electronics Engineering
Academic Year: 2020-21(ODD SEM)

Program: B. E

Semester: 5th

OBT - I

Course Title: Renewable Energy Sources

Code: 18EEOE561

Max. Marks: 10 marks

Duration: 1 week

Date: 16/12/2020

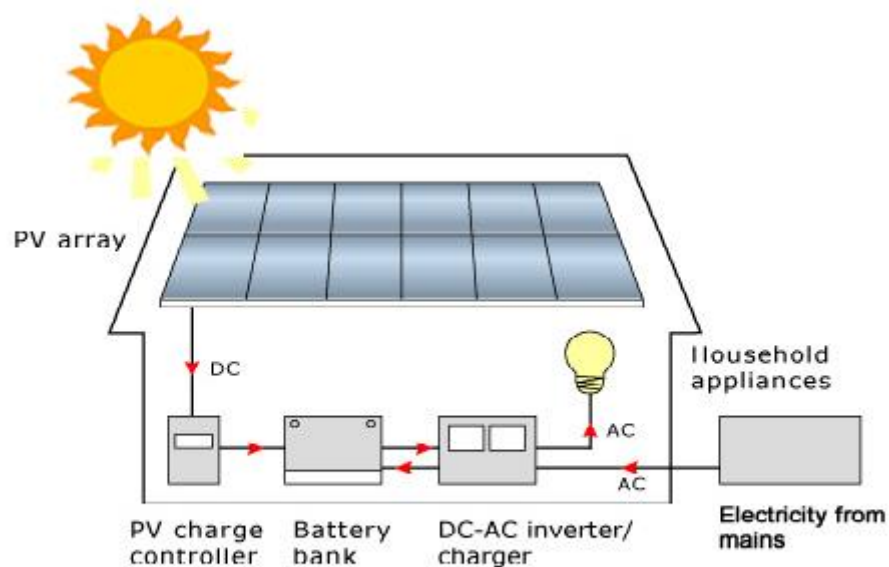
1. Discuss in detail, any one case study of a rooftop solar PV plant

Introduction:

Solar energy is the energy that is used by ever spinning systems to radiate heat and energy from the sun. Solar photovoltaic, solar architecture comparable to solar heating. Fossil fuels such as oil, natural gas, and coal have historically met the world's electrical needs [1-2]. However, these energy sources have two major negative impacts:

- They play a larger role in global warming and acid rain runoff, which has a negative effect on the atmosphere for many animals, plants and human beings.
- Few countries have complete access to fossil-fuel energy supplies, contributing to global political and economic uncertainty.

Design Details:



Typical Rooftop PV System

Objectives:

- In this project we are installing a 2KW solar power plant so we can put our consumer load on it.
- This project provides independency of electrical supply, site and eco-friendly feature.
- Sun is the unlimited source of solar energy.
- No emission of greenhouse gases so pollution free.
- Once the structure of solar panel installed after that the cost is nil.
- Capital cost will reduce.
- Maintenance free.

Specifications:

1. No of panels required for 2 Kw Solar PV system:

If one solar panel rates about 325 Watts, then No. of panels required for 2kw,
 $= 2 * 1000/325 = 6.153$, approx. 6 solar PV panels.

2. Area: Area requirement for 1 Kw power generation by solar PV system = 100 Sq ft (shadow free area)

Area required for 2 Kw power generation by solar PV system = $100 * 2 = 200$ sq ft (shadow free area).

3. Number of units generated by 1kw solar PV system assuming 5 Hrs of bright sun in a day,

(Energy = Power * time = Kw*Hr) = $1\text{Kw} * 5\text{hrs} = 5\text{Kwh}$

$= 5$ Units/day for 2kw solar PV system,

$= 2\text{kw} * 5\text{hrs} = 10 \text{ Kwh} = 10$ Units/day

4. Amount of electricity bill saved using 2 kw solar PV system

Assuming cost of 1 unit electricity = 7 Rs Electricity bill saved/day = units generated in a day * cost of 1 kwh (unit) = $10 \text{ kwh} * 7 \text{ Rs} = 70 \text{ Rs}$ Monthly electricity bills saved, $= 70 \text{ Rs} * 30\text{days} = 2100 \text{ Rs}$ Yearly electricity bill saved, $= 2100 \text{ Rs} * 12\text{months} = 25,200 \text{ Rs}$.

5. Return of investment of solar panel/Payback calculations

If cost required for 1Kw of Solar PV system installation is 62000 Rs, then cost required for 2 Kw of Solar PV system installation = $62000 * 2\text{Kw} = 1,24,000 \text{ Rs}$.

As per consumer, 30% subsidy is allowed on solar PV system installation After 30% subsidy, the total cost of 2Kw solar PV system installation comes to: $= 30/100 * 124000 \text{ Rs} = 37,200 \text{ Rs}$ (subsidy discount)

Net initial cost of The System = $1,24,000 - 37,200 = 86,800 \text{ Rs}$

6. Payback period = net cost of the system / yearly savings

$= 86,800/25,200 \text{ Rs}$

$= 3.44$ (3 yrs. & 4 months) – **RECOVERY PERIOD**

Application:

Solar panel can be used in domestic as well as in commercial places to provide clean, ecofriendly, cheap, renewable source of energy. Solar energy is used to provide supply to the department all appliances like fan, tube light, exhaust fan, projector, etc. As the solar panel life is 25+ years, but the cleaning of the panel is needed it will around after 15 days. so we can also add automatic wiper to clean the panels regularly for better performance. The solar panel detect the radiation of solar at a particular angle so we can also make the panels rotating with respect to the sun radiations so we can get the maximum solar energy. To make more efficient power supply we can also use the natural life for lights also. Automation by using efficient wiring with AI.

Conclusion:

Solar energy has the capability to provide all of the energy we need for our work. We have to spend more money on the development of solar energy and it's a onetime investment. Once the solar power plant installed the maintenance is nil and the life of panels are also 25+ years. In this project we,

- Calculated the load by auditing to analysis the total load of the level.
- Installed the 2KW solar plant so we can connect our load to the solar panel and utilize the energy of sun. And also reduce the demand from grid which is more costly.
- Replaced the tube lights from LEDs and used efficient wiring.
- This is a step towards renewable energy which help to reduce cost, and make environment pollution free.

References:

- 1) Fred C. Treble, A. A. M Sayig, "Generating Electricity from the Sun" in, Oxford: Pergamon Press, 1991.
- 2) Roger Messenger, Jerry Venter, "Photovoltaic Systems Engineering" in, Florida: CRC Press, 2000.
- 3) Hagler Bailey, "Overview Malaysian Energy Efficiency and Renewable Energy".
- 4) "IEEE Guide for Preparation of a Formatted Technical Work for the Power Engineering Society" in IEEE Power Engineering Society Publication Guide, New Jersey.