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GENERATION OF LIGHT FROM LIGHT

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Abstract:-In day to-day activities for industrial as well as household needs huge amount of electricity. Due to the fact that, the developing countries are facing the problem of load shedding for a few hours per day and hence we are diverting towards non-conventional energy sources as which would be utilized at any sort of minimum energy generated from such sources. By this project, a solar energy operated light can generate electricity at night time by facing the same solar panel in front of the same electrical lamp, which can be automatically done by using special type of automatic circuit arrangement. The energy obtain from such solar panel at night time is store into the battery so that the low voltage operated devices like lamps, road signals and indicators remain switched on 24 hours.

INTRODUCTION:

Now a day's most of the solar street lights are working on photo voltaic panel, the lamps are made of LED'S instate of Sodium Vapor Lamps, also the street lamps are controlled by automatic photo sensing switches. As soon as the solar energy incident on solar panels the panel generates electrical energy due to sun light and it is store in rechargeable batteries with switch geared panels fixed on the electrical poles. With this project the same solar

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panel radiate energy at night time with help of street lamp by making special type of design of the solar panel with self-adjusted design such that simultaneously the whole area of the solar panel can be radiated with the help of street lamp and hence the amount of electrical energy generated will be directly stored into the same rechargeable battery.

MAJOR SYSTEM COMPONENTS:

Solar PV system with attachment accessories fixed on pole facing towards Sun; Solar PV module converts sunlight into DC electricity.

Position of the panel on the pole

Solar charge controller,

Inverter,

Rechargeable battery

Sunlight (Day Time)LED Lamp(Night Time)Automatic Light Control. Panel Control

SOLAR PV SYSTEM:

High efficient solar panel use to operate LED light as a street lamp. Which is controlled with intelligent microcomputer controller, for day & night time which is energy saving and environment friendlySolar Panel is made up of poly crystalline silicon having white LED light rated at 10A 12V/auto, time control & light control, with over-charging and discharging protections etc.

POSITION OF THE PANEL:

The solar panel is allow to track for maximum solar radiation in daytime checked according installation place for Daytime & Night Time

SOLAR CAHRGE CONTROLLER:

Solar Charger cum Charge Controller (SCCC) use to limit rate at which the electric cuttent supplied to the battery or taken from battery. It also use to prevent the battery from over charging (OC) as well as deep charging of battery to protect battery life.

INVERTER:

It converts variable DC o/p in to 50Hz AC current , The heart of Inverter is Microcontroller which is programmed to perform the task of power management including AC to DC &DC to AC operations at maximum power point, In this case maximum power point is a continuous process which supplies continuous power even in Temperature, Shading , Spoilage, Cloud Cover Time of Day & Night with the help of storage battery,

STORAGE BATTERY (RECHAEGABLE):

Consist of electrochemical cells used for energy accumulation i. e. secondary including Lead Acid, Nikel-Cadmium (NI-Cd), Nickel Metal Hydride(NiMH)Lithium Ion(Li-ion)& Lithium-ion -polymer (Li-ion polymer).

During the charging process the positive material producing electrons & current is set up in the circuit, during the discharge power is withdrawn from the battery &again is recharges up to its highest capacity.

SUNLIGHT IN DAY TIME:

Irradiance is the power of electromagnetic radiations /unit area measured in W/m. 2During sunshine area receives average 1336Kwatt/ m² irradiance.

LED LAMP (As A Source At NIGHT TIME)

LED Light at night time illuminates solar panel to generate electrical power & stored in battery.

III. BLOCK DIAGRAM:

AutomaticLight & Panel control unit FIG. 1LED lampSolar PanelRechargeable batteryAs

shown in fig. 1 solar panel is operated by Sun Radiation and electricity is generated by Photoelectric Effect in the form of DC Voltage , the efficiency of the electricity generation depends upon construction, photovoltaic panel as well as the time at which the panel receives Sun Radiation for electricity generation. The electricity generated by the panel is stored into rechargeable battery, which is directly connected to the LED lamp as well as control unit . The control unit automatically operates ON and OFF position of the lamp at night and daytime respectively. Also the control unit automatically sets the Photovoltaic Panel in the form of inverted parabolic dish at night time, such that the lamp is perfectly adjusted at the focal point of inverted parabolic P-V dish, due to the fact that on the whole surface area of the P-V dish get radiated fully in presence of LED lamp; from which we are getting electrical energy which is directly stored to the battery

FIG: 2

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IV. WORKING DIAGRAM:

In presence of Sun Radiation (photons) generate electricity by photovoltaic effect. In these case silicon or cadmium telluride thin film based solar panel is used which is having the range from 100 to 320 watts DC power generation capability for the area 0.13935456m^2 and the efficiency of the panel is calculated by o/p to i/p. At the efficiency of 10% to 16% at about 25degree centi at the same time irradiance of 1000Wattm^2 with air mass 1.5 spectrum at clear day sunlight facing about 37° above the horizon.

V. DESIGN OF PROJECT:

The maximum power point is obtained by Short Circuit Current (Isc.)= 5. 6Amp and Open Circuited voltage of overall area is (Voc) 15. 65 Volt of whole panel. Solar charge controller sizing

PV module specification day Time (Temp. 25°C) $P_m = 40.60 \text{ Wp}$ $V_m = 11.6$

$V_{dclm} = 3.5 \text{ A}$ $V_{oc} = 15.65 \text{ V}$ $I_{sc} = 5.6 \text{ A}$ Solar charge controller rating = 31

A Therefore solar charge controller rating is about 40 A at 12

[illegible]

Module Specification Night Time at $32^{\circ}\text{Cp.m} = 10.88 \text{ WpVm} = 6.4 \text{ Vdclm} =$

1. 2 $A_{Voc} = 8.6$ $V_{Isc} = 3.3$ A Fill Factor at Night Time = = i. e. Fill Factor at

Night Time= FF= 1

VII. Battery sizing

Street Lamp used = (18 W x 9 hours)Fore battery voltaqr is 12V&

Autonomy3 days

Therefore Battery Capacity = (18 W x Hrs.) x 3

total 486Ahare required, hence battery rating is12 V500 Ah for 3 day autonomy.

VII. IRTER SIZING

Total Watt of all appliances = 18 + 3 W190W Inverter is required, which should be 25 to

30%bigger size

VIII. CONCLUSION

Compact designsMultipurpose utilityEnvironment friendly natureEasy installationLonger service lifeOnly efficiency is lessEasy maintenance.

IX. BENEFITS:

Use to Activate

LED'S, Signals, Indicators