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Solar Flower for Power Generation with Ability to Generate at Night

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Abstract: ***Today energy is the principle idea for socio-economic development. But because of incremental charge of environmental difficulty renewable strength offer a tremendous interest. This opportunity strength supply is constantly achieving more recognition because of non-stop discount in fossil fuels. It is the strength comes from solar, wind, rain etc. Among the non-conventional, renewable sources, sun power presents notable capability for conversion into electric power. Maximizing strength output from a sun is appropriate to growth efficiency. In order to maximize strength output, wishes to hold the panels aligned with the solar. This paper focuses with the generation capacity of solar energy during day time and as well as during night time. The proposed model guarantees the optimization of the conversion of sun energy into electrical energy via means of properly setting up the panel according with the input of artificial light source in night time and at the same time to that of the sun position during day time.***

An experimental prototype was built and results have proven the good performance. In future higher efficiencies of solar panels will prove a golden way in generation of solar power 4 times the input in the night time.

Keywords: Solar System, Solar Energy, Solar controllers Battery etc…..

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I. INTRODUCTION

Solar technologies are generally qualified as either passive or active betting on the means they catch, amendment over and distribute daylight. Active star proficiency use electrical phenomenon arrays, pumps, and fans to convert daylight into practicable outputs. Passive star techniques embody choosing materials with favorable thermal attributes, and citing the position of a building to the Sun. The standalone PV Systems are used for star street lighting, home lighting system, SPV water pumping system.

A hybrid system put in with a backup system of diesel generator are often utilized in remote military installations, health centers and toured bungalows. In grid connected system the most important a part of the load throughout the day is provided by the PV array then from the grid once the daylight isn't spare.

According to marketplace economy, the growing worldwide call for power, forces a non-stop upward push at the price of fossil combustibles. In fact, it's miles anticipated with inside the near future, that the call for power and energy will develop quicker than the locating out of recent to be had fossil resources [1]. This marketplace behaviour brings a effective assignment to the clinical network as extra finances are allotted for the studies and improvement of recent options to the regular important active sources (fossil combustibles). In this context we've got assisted, with inside the ultimate decades, to a focused awareness on renewable power studies. Among those renewable active sources, the global clinical network has committed intense efforts to wind, sun photovoltaic and biomass. Some investigations and hardware traits on wave power had been led with the aid of using Great Britain and Portugal [2].

Now a days photovoltaic power has a low performance ratio regarding the whole distribution chain from manufacturing to intake (ca. 12%). In optimized environments (materials, electric powered inverters, monitoring structures, etc) an enter of 1000W of sun incident power can deliver ca. 190W in power (performance of 19%). This low overall performance ratio implies huge Earth surface intake while it's miles meant to put in industrial photovoltaic gadgets with considerable manufacturing impact (50MW – 100MW). The extra applicable facet impact of the low performance of photovoltaic structures is its negative opposition associated to conventional combustibles in each low in cost and financial aspects.

It is pressing to enhance the manufacturing performance of power from the Sun as this active supply is the maximum effective in our planet, and it's miles anticipated that the Sun turns into the principle power manufacturing supply with the aid of using the 12 months 2100, in step with the take a look at supplied with the aid of using the German Advisory Council on Global Change [3]. This paper makes a speciality of the optimization of the electric powered power manufacturing with the aid of using photovoltaic cells via the improvement of a solar box.

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II. OVERVIEW

One of the significant worries in the power is the everyday expanding power request yet the inaccessibility of enough assets to satisfy the power need utilizing the ordinary fuel sources. Request has expanded for inexhaustible wellsprings of energy to be used alongside customary frameworks to fulfill the energy need. Sustainable sources like breeze energy and sun powered energy are the great fuel sources which are being used in such manner. The consistent utilization of non-renewable energy sources has caused the petroleum derivative store to be diminished and has radically influenced the climate draining the biosphere and aggregate adding to a dangerous atmospheric deviation.

Sun oriented energy is richly accessible that has made it conceivable to reap it and use it appropriately, Solar energy can be an independent creating unit or can be a lattice associated producing unit relying upon the accessibility of a framework close by. Consequently it tends to be utilized to control provincial regions where the accessibility of matrices is extremely low.

Another benefit of utilizing sunlight based energy is the versatile activity at whatever point any place fundamental. To handle the current energy emergency one needs to foster a productive way in which power must be separated from the approaching sun based radiation. The power change components have been incredibly diminished in size in the previous few years

The improvement in power gadgets and material science has assisted architects with coming up little however amazing frameworks to withstand the powerful interest. Be that as it may, the hindrance of these frameworks is the expanded force thickness. Pattern has set in for the utilization of multi-input converter units that can adequately deal with the voltage vacillations. In any case, because of high creation cost and the low proficiency of these frameworks they can barely contend in the serious business sectors as a superb force age source.

The steady expansion in the advancement of the sun based cells producing innovation would utilize these advances conceivable on a more extensive premise than what the situation is by and by. The utilization of the most up to date power control instruments called the Maximum Power Point Tracking (MPPT) calculations has prompted the increment in the productivity of activity of the sun oriented modules and hence is compelling in the field of use of inexhaustible sources of energy.

In general, there are 3 strategies to boom the performance of PV systems. The first approach is to boom the era performance of sun cells; the second is related to the electricity conversion machine blanketed most power factor monitoring (MPPT) manage algorithms; and the third method is to undertake sun monitoring machine to obtain most sun electricity enter from the sun.

III. MOTIVATION

Global warming and energy policies became a hot topic on the international agenda. All countries try to scale back their greenhouse emission emissions. once their installation they generate electricity from the star irradiation while not emitting greenhouse gases. that is around 25years, PV panels manufacture a lot of energy compare to alternative sources. With increase in demand for electrical energy, there's a desire to go looking for another supply of power generation because the standard sources of energy have began to use up.

The answer for this drawback is that the idea of renewable energy sources like star, tidal, wind etc. comes beneath renewable energy sources. The latter form of installations is understood as off- grid facilities and generally they're the foremost economical various to produce electricity in isolated areas. However, most of the PV power generation comes from grid-connected installations.

Solar power is utilized by all of the organisms, such as each plant life and animals. And humans aren't any exceptions. First of all, the sunlight hours delivered in with the aid of using the sunpower drives away the darkness and enables us end all of the chores easily. Solar power produces sufficient warmth to dry out the washed clothes. It maintains us heat with inside the winters.

Solar power additionally performs an essential position in diminishing the humidity and killing the dangerous germs. Morning day lights understood to reinforce our bones, enhance our immunity, and assist manipulate many pores and skin ailments. On a bigger level, sunpower has more than one different uses. For instance, focused sun energy lets in us to prepare food. By changing the daylight into gathered sunpower, we also can produce power and price our electric devices.

A. Advantages

1) Solar power conversion equipments have longer existence and want lesser preservation and therefore offer better power infrastructure security.
2) Low jogging costs & grid tie-up capital returns (Net Metering).
3) Unlike traditional thermal electricity technology from coal, they do now no longer reason for pollutants and generate smooth electricity.
4) Abundance of loose sunpower in nearly all components of country. No overhead wires- no transmission loss

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B. Challenges in Adoption

1) India's solar story is largely built over imported products.
2) India's domestic content requirement clause is facing legal challenge at WTO.
3) India is facing challenge to balance prioritizing domestic goals and WTO commitments.
4) The dumping of products is leading to profit erosion of local manufacturers.
5) Indian domestic manufacturers aren't technically and economically strong to compete with Chinese companies.
6) China's strong manufacturing base is giving stiff challenge to domestic manufacturer.
7) Land availability in India for solar plant is less due to high population density.
8) India's solar waste is estimated to be around 1.8 million by 2050 also needs to be tackled.

IV. APPLICATIONS

There are many shops, offices, houses, schools, and schools in which solar electricity is used to generate power. Solar electricity is obtained from the Sun, and this is why it taken into consideration renewable electricity. It is wit out dangerous gases, fly ash and chemicals, and this is why it's far taken into consideration pollutants-unfastened electricity. Photovoltaic Systems: The photovoltaic device makes use of diverse additives in its association to resume electricity.

The panel is a extremely good function of the device because it collects the sun electricity and turns it into the Direct Current. After that, the sun electricity converter transforms it right into a usable Alternating current. Many families and corporations have used this device all around the world. Concentrated Solar Power: Concentrated sun electricity makes use of reflective mirrors that listen the sun electricity right into a beam of light, and this is used to govern a electricity plant with turbines. This device is used to supply a massive quantity of power.

Solar Water Heating: Solar water heating is a device that has been round for ages. In this, sun warmness transformers are used to acquire sun electricity. Uses of Solar Energy in Ancient Era: Even the historical humans knew thoroughly the makes use of of sun electricity, and Ancient Egyptians applied sun electricity a lot. They based their domestic in a manner that it was warmer in the course of the evening, and the house had a cooler temperature inner on heat days. Native Americans and Romans each used sun electricity to heat their homes.

V. SYSTEM DESCRIPTION

Solar Flower is a structure that resembles an actual flower when open and look likes a box when closed with its leaves replaced with the solar panels. AC input source is used at the center of the box for generation at night time.

Our model is able to produce electricity 24 hrs a day. Since output of polycrystalline panel is less than of other higher efficiency panels even then it is able to produce small amount of power at the night time.

The rest process remains same like output from solar panels is controlled by solar controller and controller sends controlled amount of electricity to battery to charge it.

Our concepts of solar generation are same but the way to generate the solar power from the solar is different.

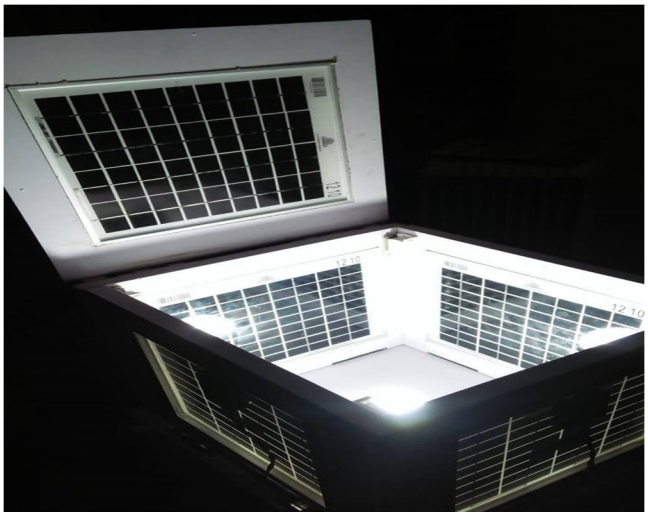


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A. Features of Solar Panel

10W Solar Panel with wire technology polycrystalline, performance built with highest quality toughened glass and solar cells, polycrystalline gives higher performance in high temperature, highest tensile strength for frame, performance Warranty of 25 years as per atmospheric conditions 5 year on manufacturing defects connecting wire with standard connector.

B. Specifications

Type	Solar Panel and Module
Model no.:-	10W-SPV
Material	Steel
Color	Blue
Panel wattage	10W



Fig:……..

C. Features of Battery

Brand	LUMINOUS
Model number	12V-7.2Ah Sealed Maintenance Free
Type	Offline/Standby
Form Factor	Tower model
Overload Protection	Yes
Input Voltage	12V
Input Frequency	12V
Output Voltage	14.4V
Output Frequency	14.1-14.4V
Output Power(W)	86.4W
Efficiency	N/A
Output waveform	DC
Transfer Time	1ms
No. of Outlet plugs	2
Digital display	No
Width	15cm
Height	9cm
Depth	6cm
Weight	2.2Kg

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D. Features Of Controller

Brand	LUMINOUS
Model number	SCC1206NM
Type	PWM
Nominal Battery Voltage	12V
Maximum Output Current	6
Maximum Input Power	125W
Charge Stage	3
Adjustable Regulation Voltage	Yes
Load Control	Yes
Additional Features	USB Charging ;rating of 6A;Electronic ad software controlled Protection; option of SMF and Lead Acid Battery Selection
Width	12cm
Height	5cm
Depth	5.5cm
Weight	0.4Kg

Since there are some drawbacks of solar energy till now so we have focussed to solve these drawbacks with our new concept.

E. Drawbacks of Solar Energy

1) You can use sunpower hand stat some stage in the sunlight hours due to the fact it's far generated from the Sun.
2) It is steeply-priced to generate sun power because the prices to installation sun panels, and sun cells are pretty high.
3) Solar electricity grid produces much less power in comparison to the cutting-edge electricity grid.
4) To set up a plant for sunpower, a huge land is needed. Despite the drawbacks, sunpower proves to be beneficial power, and it need to be utilized in families and companies to preserve nature.

This paper is based on simple concept of generation electricity from solar energy. We have completed the hardware i.e. solar panels, solar controller, battery and electrical appliance for output all connections are completed.

Since innovation is necessary to bring the change in this world to make the life more comfortable for the present and for upcoming generation so our project is also based upon saving energy four times than that we are using earlier by making the solar panels work during the night time also.

VI. FLOW DIAGRAM

AC SUPPLY AND SUNLIGHT



SOLAR PANELS



SOLAR CONTROLLER



SOLAR BATTERY



ELECTRICAL APPLIANCES (OUTPUT)

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VII. METHODOLOGY

So why do we need AC supply. So we all know that solar can easily generate electricity during day time easily in the presence of sunlight. so the household appliances in any building uses that energy so electricity bill reduces. But what about night, if solar can generate during night also? Since solar panels need only light to generate electricity as they work on photovoltaic effect,, means there are photovoltaic cells made of semiconductor materials most often of silicon. We have used a AC light source in the center of the box. All panels closes at night time so which are nearly having same wattage as that of input light source. In morning we have to open the box which looks like solar flower and all panels receive the sunlight and gives output as usual. But from evening nearly 6:00 p.m. to 6:00 a.m. generation is very less so we close the box switch on the power supply. Now all panels receive light energy from the light source continuously and are able to produce 4 times the given input. So at night time the structure of our project is like a box so this box closes or we can close this box at night and there is a bulb at the bottom to provide the light energy for solar panels so that they can conduct at night also. The energy from these panels as usual controlled by the solar controller and then battery is going to be charge from the output of controller.

VIII. RESULTS

So one more question arises that if we are giving input of ac supply so what and where the advantage of ouir project is.

After doing experiment and calculated results we obtained the following results—

1) We used a 10W led bulb as input in night
2) Our one solar panel is of 10W and of 12 Volts.
3) So at night if we closes the box so in our solar box there are five panels hence it becomes 50W 12v.
4) From 10W we get 12v – 17v output as measured from multi-meter.
5) So from AC supply 10W and output is 50W.
6) So 50-10 = 40 Watts we get at night time also which is nearly 4 times of input supply.
So from this calculation we easily understand this project.
7) Output is nearly 4 time more.
8) Easy to fold the flaps.
9) Not extra equipments needed.
10) Can be installed on any roof and even woks if kept in a closed room.

IX. APPLICATIONS

It can have many applications since solar energy is most important for our future.

A. We can use solar in houses, buildings etc.
B. In big buildings also we can use but only thing is that it has high initial cost.
C. For small houses, buildings this is like one time investment and for a middle class this model can be very useful and beneficial also.

Appliances	Places of use	Rating
1 Fan	Drawing room	75W
1 Fan	Bedroom	72W
1 TV	Bedroom	35W
1 LED	Hall	12W
1 LED	Outdoor	7W
1 LED	Storeroom	12W
1 LED	Drawing room	7W
1 LED	stairs	9W
1 LED	guestroom	9W
1 LED	Bedroom	7W
	TOTAL	245W

For 5 minutes purely runs on Solar panel Capacity = 300W
INPUT AC SUPPLY= 200W (at direction 1.5m from panels)

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X. CALCULATIONS

A. Present Conditions

Input	Load	Panel Capacity	Load (12hr/day) in 1 month	Cost of input in Rs.	Cost of load output in Rs.	Loss for month in Rs.
200W	245w	300W	72000W-hr	504	154	349.65

B. Estimation

Input	Load	Panel Capacity	Load (12hr/day) in 1 month	Cost of input in Rs.	Cost of load output in Rs.	Profit for month in Rs.
200W	245W	300W	72000W-hr	504	617.4	113.4

XI. FUTURE ESTIMATIONS

A. In a Box Shape

Input	Load	Quantity of Panel (100W)	Load (12hr/day) in 1 month	Cost of Input in Rs.	Cost of Load Output in Rs.	Profit for month in Rs.
200W	408W	5	72000W-Hr	504	1028.16	524.16(Profit)

B. For 1 KW Load (estimation for a normal house electricity consumption)

Input	Load	Quantity of Panel (250 W)	Load (12hr/day) in 1 month	Cost of Input in Rs.	Cost of Load Output in Rs.	Profit for month in Rs.
300W	1250W	5	54000W-Hr	756	3150	2394(Profit)

XII. CONCLUSIONS

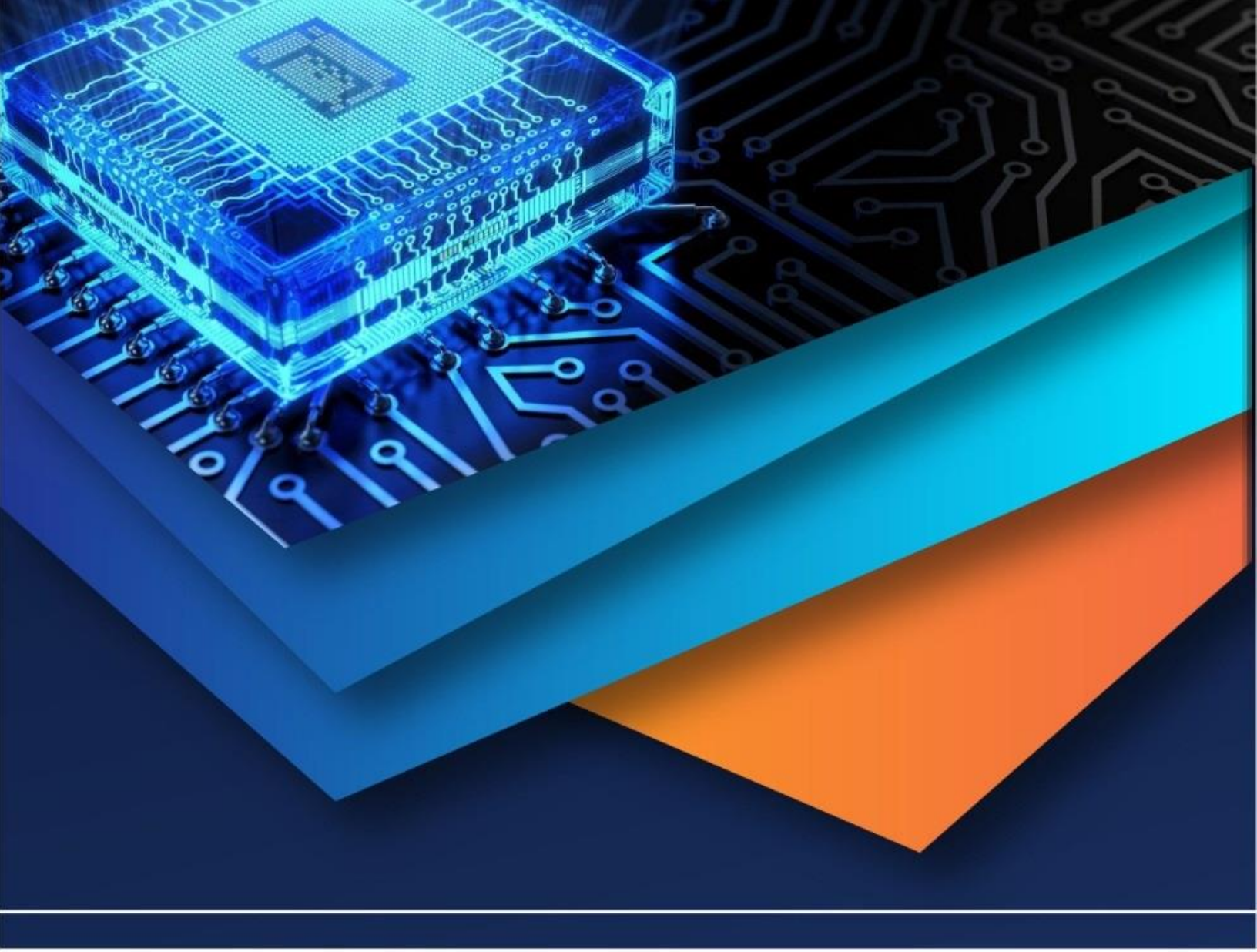
The developed solar box worked very well. The increase in power generation, in relation to other PV-systems, this will generate and save electricity at the night time also.

However, this system has a relative advantage that it is portable and can be put in a closed place also. In future higher efficient solar panel can surely generate output 4 times that of given input with minimum loses.

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