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Fabrication of Multi-Purpose Solar Umbrella

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***Abstract:** Heat waves often occur during sunny days in tropical regions during in summer season, with temperatures sometimes reaching over 40 to 48 degrees Celsius. These heat waves can cause heatstroke for human beings who work outside, this umbrella prototype is designed to cut of sunshine and protect them. This umbrella prototype is designed, where the fan is provided for cooling effect for a person who work outside in Sun. The designed umbrella uses solar cell attached on the above surface of the umbrella to convert solar energy into electricity. This energy is used to run a fan, light and also to charge the battery. When intensity of the sun is low the battery acts an backup for the fan, lights and mobile charging port. The key component to used for the functions is an electronic control module which includes charging circuit & discharging circuit. The charging circuit increases output voltage from the solar cell to the desired voltage to charge the battery. The discharge circuit can control electricity from the battery to drive the DC motor fan, LED indicator & charging port.*
***Keywords:** Photo voltaic cell, Solar energy, OLED light, dc motor, battery, Umbrella.*

I. INTRODUCTION

This chapter says that the introduction of the solar powered beach umbrella is designed to power the outdoor use of direct current (“DC”) electronic devices where there are no electrical outlets available.

Solar umbrellas typically pull power through a small solar panel mounted to the top of the unit so it’s constantly exposed to the sun. The unit captures sunlight and turns it into electricity through what is called a “photovoltaic effect.” That power is then stored and accessed by flipping a switch on the umbrella pole that powers the light, fan, and USB port.

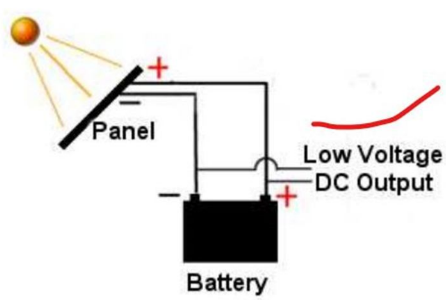

Fig: 1. Solar Power system.

II. LITERATURE REVIEW

1) *Hakim Khaula Nurul b et.al., [1]:* In tropical places, heat waves frequently happen on bright days during the summer, with temperatures occasionally exceeding 42 degrees Celsius. Umbrellas are typically used to block the sun to protect people who work outside from overheat waves, which can result in heatstroke. The prototype of an umbrella that can run a fan to provide cooling effects for those working outside in tropical climates is designed in the study. A comfortable umbrella has been designed in the paper, which contains an electronic control system , a fan motor, a battery and six solar cells . The umbrella can collect solar energy in sunny days and charge electricity into the battery which provides power to the fan motor in order to generate airflow for people outside in tropical regions. The next work is to optimize the prototype umbrella designed in the paper.
2) *Stephen Comello et.al., [2]:* Solar photovoltaic (PV) electricity has dramatically increased in deployment during the past ten years, along with sharp drops in system costs. The status of solar PV power in the electricity market today and how it will probably change in the near future are both examined in this article. We begin by utilising the levelized cost of electricity (LCOE) metric to evaluate the current cost competitiveness of solar PV in a few selected U.S. locales and industry sectors.

We can calculate how supportive government regulations, time-of-use pricing, and predicted future technological advancements affect the price of solar PV thanks to this approach.Over the past decade, solar PV installations have seen a dramaticrise in global deployment. Simultaneously, the price of such systems across all segments has fallen precipitously, with lower module costs driving the majority of these declines. This paper has examined how solar PV power is currently positioned in the electricity market place and how that position is likely to evolve in the foreseeable future.

3) *Ashim Gurung et.al., [3]:*.Today's R&D is motivated by energy for a sustainable future, enabling technologies such as smart consumer electronics, electric vehicles, and smart grids. These technologies demand the use of batteries. day of energy, can alleviate battery energy limits, while batteries can address photovoltaic intermittency. This viewpoint paper advances concepts in PV-battery system design while providing critical discussion, review, and prospect. There is discussion of reports on discrete and integrated PV-battery designs. Three key technical challenges, namely energy density, efficiency, and stability, toward further advancement of integrated PV-battery \systems are discussed. We present an outlook on opportunities and future directions, emphasizing key strategies.
4) *Abhishek Jaiswal et.al., [4]:* Small renewable energy solutions, such as solar home lighting systems (SHLS), provide dependable electricity supply to off-grid bottom-of-pyramid (BOP) households, improving their living standards. For energy storage, commercial SHLS uses polycrystalline silicon photovoltaic (PV) and flooded lead-acid battery technologies. and energy storage, respectively. Flooded lead-acid battery is a 150-year-old, mature and inexpensive energy storage technology but has a short lifetime. In SHLS, the flooded lead-acid battery must be replaced every 4-5 years and can account for up to 70% of the total cost over the system's 20- year lifespan. Using HOMER microgrid software, seven advanced lithium-ion battery chemistries were evaluated as a potential replacement for flooded lead-acid batteries. Seven lithium-ion battery chemistries – LMO, NCA, NMC, LFP,LMO/LTO, NMC/LTO and LFP/LTO – were looked as a potential replacement technology for flooded lead–acid battery in SHLS using HOMER microgrid software. The battery chemistries were evaluated on the basis of cost, cell voltage, cycle life, round trip efficiency, SoC range and safety and the resultant effect on the economic, system size and performance metrics of SHLS was studied. Compared to the commercial SHLS, lithium-ion battery based SHLS used smaller size of PV panel and showed higher battery capacity utilization and lower excess electricity. Three lithium-ion battery chemistries – NCA, LFP and LMO/LTO – showed significant promise with comparable autonomy and initial capital cost to that of the commercial SHLS but with significantly lower (~55%) TNPC over the system lifetime, as no/fewer battery replacements were required. From the perspective of BoP households ,SHLS with no/fewer number of battery replacement has a significant as typically rural banks and microcredit organizations do not support for the battery replacement cost. Moreover, it is suggested that a smaller lithium-ion battery based SHLS with a simple SoC meter can provide an equivalent user experience at a much system cost.
5) *Anna-Karin Carstensen& Jonte Bernhard et.al., [5]:* The results indicate that the theory of variation can be useful when designing new learning environments and improving existing ones. Variation theory states that the object of learning 'scritical features should be brought into the students' focal awareness, and that such critical feature scan be discerned through the use of systematic variation. However, the theory does not establish which features are critical and which features should be varied, and this is a question for empirical research that must be sensitive to the actual object of learning. The methodology for analysing the 'learning of a complex concept' is one possible methodology for finding critical features. In this study, we have shown that variation in itself is not sufficient, and through a fine-grained an alysiswe found variations, and the appropriate use of tools, that open up for learning of our intended object of learning. It was found to be critical to introduce tasks 1–3 in order to open up for learning of the whole complex concepts. In the field of electrical circuit theory as well as other technical disciplines, understanding time-dependent responses, such as transients, is crucial. Transient response, however, is thought to be challenging to understand since it necessitates acquaintance with complex mathematical techniques like Laplace transforms. Here, we review and analyse a book. Design of the learning environment, the lab for problem-solving, to teach transitory 8 response. Through the integrated use of resources including paper and pencil, simulations, and experiments, this design combines problem-solving classes and laboratories to enable students to engage in deep learning. The systematic application of variation in accordance with variation theory is a crucial component of this design. We outline key components for understanding transient response as well as strategies for helping students make connections between the "worlds" of theories, models, and actual objects and occurrences.
6) *Prabhjot Kaur Ashok Janjunwala et.al., [6]:* all villages in India have electricity as of April 2018, when the Leisang village in Mani obtained it. In India, when 10% of a village's dwellings have electricity, the village is deemed electrified.

Though over 41 million households still lack electricity, 84% of village dwellings now have access to it. This initiative of village electrification has been in place for a long time. Power demand was outpacing supply up until a few years ago, causing a severe shortfall that prevented or weakly encouraged efforts to connect the community to the grid .There was, however, a strong logic: the solar photovoltaic system produces dc power, storage (batteries) takes in and out only dc power, and most appliances and fixtures are dc powered. The ac-to-dc conversion, and vice versa, amounted to large losses, especially when the power levels used were small. The dc distribution at homes reduced the losses and, therefore, reduced the size of the solar panel and batteries used as well as the overall costs. The solar-dc system contributed significantly to getting electricity to every village in India by last April. While this met the immediate needs of low-income rural homes, it was not enough to provide quality power for rural homes or rural industry in the future. The power grid is nonexistent or highly unreliable in several places.

7) *Manpreet et.al., [7]:* A smart umbrella is essentially a solar-powered umbrella that may be used to charge phone batteries and power LED lights at night. Solar energy, which is created by the sun, is a non-depleting renewable energy source that is pollution-free. The amount of solar energy that enters the earth every hour is sufficient to supply all of the energy needed for a year.The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mentioning of the people whose constant guidance and encouragement made it possible.
8) *Ahmad Reza Malek pour Anil pehwa, et.al., [8]:* The operational plan for photovoltaic (PV) inverter reactive power control is presented in this study in order to accommodate increasing levels and maximise the penetration of rooftop PV in distribution networks. Depending on the weather and the voltage at the interconnection point, the scheme suggests three states of operation for the PV inverter and adjusts the reactive power control technique accordingly. Reactive power is modulated by the control in a steady state with slowly varying solar irradiation to cut down on power losses. In order to reduce voltage fluctuations in a state of variable solar irradiance caused by sporadic passing clouds, the control dynamically modifies the reactive power.Three states for operation of PV inverters are proposed using irradiance variation and voltage measurement at the PCC. In the normal state, the scheme is designed to provide loss reduction support while 9 continuing to support load demand when irradiance changes slowly. In the fluctuating state, reactive power is modulated in order to mitigate voltage fluctuations caused by transient cloud movement. Finally, the control offers reactive power support in order to mitigate voltage violation defined for the contingency state. A reactive power ramp rate limiter is introduced in order to prevent additional voltage fluctuations due to reactive power variation caused by switching between the states. A coordination strategy is proposed to switch control.
9) *Rong Zhong Rong lin Huang Zehn Chie et.al., [9]:* The organic light-emitting diodes (OLED) driver circuit is used in this research to introduce a single-stage single-ended primary inductor converter (SEPIC) converter circuit. The output Schottky diode from the original SEPIC is swapped out for a power switch in the circuit suggested in this study. The circuit runs in triangle current mode and deadtime is introduced to prevent the zero voltage switching (ZVS) on-state overlap of two switches. Maximum power point tracking and frequency modulation are digital control techniques that use a battery to power the converter and illuminate the OLED at night. Finally, a prototype is put into action to demonstrate the viability within the 10–40 V DC input voltage range. The output Schottky diode from the original SEPIC is replaced by a MOSFET. Deadtime is added to prevent the on-state overlapping of two switches, with zero voltage switching The circuit operates in TCM. The digital control methods used are maximum power tracking and frequency modulation using a battery to supply the converter and illuminate the OLED at night. Finally, a prototype was implemented to show the feasibility under a DC input voltage range of 10–40 V. The DC output is 12 V/1 A/12 W with a conversion efficiency of up to 96.3%.
10) *Ch Sri Lakshmi et.al., [10]:* The goal of this project is to create a solar-powered portable power bank for smartphones that may be utilised to power mobile devices during catastrophic events. It contains an inside solar panel that transforms solar energy into electrical energy. The charge is then transferred to a battery for storage before being used again. The battery has a microcontroller that shows the battery's level of charge. The battery is coupled to a charging circuit that outputs to the appropriate mobile phones via a USB connector. Solar power banks are affordable, environment friendly, cost – saving and reliable source of power supply for gadgets. The earth is already battling so many environmental hazards and global warming is the most glaring issue today. By using solar power, you will be conserving energy, thereby reducing the strain. This is because solar energy is pollution-free, it is clean, renewable energy. Its use doesn’t promote the emission of greenhouse gases, unlike regular electricity, instead, you are only tapping sunlight on mother earth. If you have a lot of electronic gadgets, the chances are that you normally pay high electricity bills.

    Well, that can changes when you go for a solar power bank. Since you will not be using the regular electricity as much, your utility bill will reduce. After all, you are not paying sunlight.

11) *J. R. McKay et.al., [11]:* Peak temperatures in uninsulated outdoor cabinets containing telephone equipment can rise significantly due to solar radiation. Solarphotovoltaic-powered dc mixing fans can be used to reduce 10 these peak temperatures by mixing the air inside the cabinet. Tests conducted at the Bellcore Thermal Test Facility demonstrated that a significant reduction in peak temperature could be obtained in cabinets with heat loads above 200 watts. Peak temperatures in uninsulated outdoor cabinets containing telephone equipment can rise significantly due to solar effects. In addition, the total temperature rise is affected by outdoor temperature excursions and internal heat loads. Tests and theoretical models have shown that the rise can be as much as 30'F from no sun to full sun for a &foot by +foot by 27-inch cabinet. The results shown here focus on the temperature at the top of the card mounting frame. Without fans, this temperature will normally be the highest in the cabinet, since heat tends to rise when natural convection conditions prevail. Figures 3 through 6 show results when the internal heat load is 680 watts. Temperature rise, the temperature at the top of the right-side mounting frame directly beneath the fan minus the outdoor ambient temperature, is plotted
12) *M. Lubliner et.al., [12]:* Research has shown that highly efficient solar powered ceiling fans improve thermal comfort and potentially provide health benefits when air conditioning or conventional ceiling fans are not available, such as during the 2003 summer heat waves in Europe, and in many undeveloped areas of the world. Ceiling fans can improve the spatial effectiveness of heating, ventilation and air conditioning (HVAC) systems. They can reduce air conditioning energy use if occupants increase thermostat set-points and reduce frequency of operation, and if waste heat from the fan motor is minimized. This paper introduces a solar powered ceiling fan that utilizes Gossamer Wind™ improved blade technology and an efficient direct current (DC) motor. The Florida Solar Energy Center compared airflow and air velocity of Gossamer Wind Solar Powered (GWSP) fans. Three- and four-blade configurations were tested. GSWP fans were also connected to solar panels and tested. The potential uses of GWSP fans in dwellings, schools, warehouses, agricultural and livestock applications are discussed. Little difference was observed in RPM and velocity between the threeand four-blade fans. The three-blade fan costs less, while the four-blade may be slightly quieter, and provide better air moving performance with smaller PV arrays. The maximum performance was achieved at 138 RPM and 1.81 m/s maximum velocity with the 24 volt power supply providing 12.9 watts. The lowest performance was 66 RPM and maximum air velocity of 0.84 m/s, resulting from the 9 volt power supply providing 1.69 watts (8.9 volts at 0.19 amps). The 25 watt PV panel at noon under sunny conditions provided 12.14 watts (22.9 volts at 0.53 amps) and ran the fan at 135 RPM and 1.77 m/s. As expected, the GSWP fan connected directly to PV panels increased airflow and velocity in concert with solar availability, providing both comfort and energy benefits, assuming that sunshine and outdoor and/or indoor temperature, are related.
13) *Yang Liub et.al., [13]:* The utilization of solar energy into the rechargeable battery, provides a solution to not only greatly enhance popularity of solar energy, but also directly achieve clean energy charging, especially the simplified solar-powered rechargeable batteries. This concept has been demonstrated via the employment of high-efficiency nanophotocatalysts for capturing solar energy into batteries. In this review, we give a brief 11 generalization on the conventional applications of solar energy, and systematically discuss the newtype applications for rechargeable batteries. Additionally, the challenge and outlook of solar-powered rechargeable batteries have been proposed. The development of solar-powered rechargeable batteries would greatly contribute to building resource-conserving society. he development of advanced solar energy storage in rechargeable batteries is one of the most critical challenges in clean-energy technology to lessen air pollution and the dependence on fossil fuels. In particular, the nanophotocatalysts play a pivotal role in the conversion from solar energy to storable chemical energy among various batteries. In this review, we primarily give a brief generalization on the characteristics of nanophotocatalysts and conventional applications of solar energy.

    Then, the significance and developments on new-type application of solar energy in rechargeable batteries have been emphatically discussed and summarized from the two distinctive sections including the external combination of PVs and internal integration of photoelectrodes into rechargeable batteries. Especially, the strategy of incorporating the photoelectrodes and rechargeable batteries into one device, not only realizes the simplification of the systems with the relatively high cost, but also exhibits the great potential for the supplement of considerable output power similar with that of the conventional rechargeable batteries. Simultaneously, these internally integrated devices have been gradually developed in the optimized direction involving the high conversion/storage efficiency of solar energy, large capacity with the high and stable working voltage, high energy and power density, long-term stability, cost effective and environmentally benign. Although the enormous efforts have been devoted to achieving the excellent performance, the research on the solar-powered rechargeable batteries is still an emerging field and there are many challenges and plenty room for improvement.

14) *S. Pingel et.al,. [14]:* The PV market is still expanding causing the situation in PV industry becoming more and more complex. Different cell types emerge on the market provided by a growing number of cell suppliers. Due to silicon shortage in the past solar cells were getting significantly thinner within the past few years. All these parameters have a potential impact on the mechanical stability of a solar panel. This paper focuses on the dependency of the mechanical stability of solar cells within a solar panel on different factors as cell thickness, cell interconnection technology and cell supplier. Test procedures concerning the mechanical stability of solar panels were carried out according to industry standards and beyond. For detailed evaluation of the panels suitable analysis methods as IV curves and electroluminescence images were utilized. Beside other observations discussed in this paper it has been found that the mechanical stability of solar cells within a solar panel is significantly reduced with decreasing cell thickness. Referring to this result the rapid thickness reduction on wafer level going on in PV industry needs to be investigated closely. Solar cell processes and the module manufacturing need to be adapted. Keywords: Stability, Degradation, PV Module, In the past years the PV industry worked hard on decreasing costs for solar cells and panels. Wafer costs account for a big part of the costs for the end product. Hence reducing the costs for the wafer is a good strategy for reducing the final costs. A common approach is the increase of the overall yield by reducing the wafer thickness. However 12 thickness reduction without consequent adapting of all process steps in subsequent processing leads to a lower breakage force on cell level and thereby to increasing breakage rates and decreasing mechanical stability of the solar panel. Wafer thickness reduction leads to higher sensitivity of the solar cell to mechanical loads. For further decreasing of wafer thickness all following process steps within the value chain have to be carefully adapted in the cell production as well as the panel production. As shown for cells made from 160µm wafers it is possible to build stable panels provided the internal stress is reduced on cell and panel level. Therefore all processes within the value chain need to be optimized concerning mechanical stability. On panel production side it was shown that the stress introduced by the soldering process can be significantly reduced by the usage.
15) *Mohamed Nfaoui et.al.,[15]:* The performance of solar systems to convert solar radiation depends on its inclination angle to the horizontal plane, independently from meteorological conditions. Sunlight should fall with steep angle to extract maximum power from solar panels. Therefore, optimum fixed tilt angles of solar panels should be changed monthly and seasonally. In our study, MATLAB program is used to estimate the total solar radiation on a tilted panel surface with any inclination. The implementation developed to allow us to extract the correct angle at which the maximum energy could be absorbed by the solar cells. We could determine the optimum tile angle for monthly, seasonal, and yearly solar radiation relative to the site of Khouribga city (latitude 32∘52′ North and longitude −6 ∘54′ West), and we used the same method to draw the table of solar gains depending on the optimum tilt angle of the solar panels to the main Moroccan cities. The design of solar systems requires knowledge of the useful solar radiation received on the surface of the installation, it is one of the essential parameters of the preliminary study. For a given energy need, more energy received means fewer panels to install and vice versa, so in order to study the solar field available on an inclined surface at Khouribga city, a series of insolation and irradiation data compute according to the inclination and orientation of the solar panel, and then we apply the same strategy of this work in 20 Moroccan cities.The tilt angles of solar panels should be adjusted monthly, seasonal or the yearly to extract the maximum energy from solar panels. In this study the optimum tilt angles for Khouribga and the 20 Moroccan cities, are calculated using the mathematical models programmed under MATLAB. The usual recommendation for the orientation to the equator, and tilt angle of latitude should not be understood as a requirement that has a very significant impact on the installation, especially in the cities studied.We call who are interested to construct the structures dedicated to solar installations or architectural modifications, to respect these recommendations. We have established a set of diagrams and tables, allowing to quickly determining the optimum tilt angle of different 20 Moroccan cities.
16) *E. FRIIS-CHRISTENSEN et.al., [16]:* It has recently been suggested that the solar irradiance has varied in phase with the 80- to 90-year period represented by the envelope of the 11-year sunspot cycle and that this variation is causing a significant part of the changes in the global temperature. This interpretation has been 13 criticized for statistical reasons and because there are no observations that indicate significant changes in the solar irradiance. A set of data that supports the suggestion of a direct influence of solar activity on global climate is the variation ofthe solar cycle length. This record closely matches the long-term variations of the Northern Hemisphere land air temperature during the past 130 years. Much Scientific effort has been exercised in order to understand the effects on climate of the release of increased quantities of CO_2 into the atmosphere. Because realistic experiments on a global scale are not possible, verification of physical theories have relied on model simulations or observations. Model simulations are limited by the necessary assumptions, and observations suffer from the lack of sufficiently long time series of fundamental quantities.

One of the most fundamental quantities in relation to the terrestrial climate is the sun's radiation. This is one of the parameters of which we have the least exact knowledge. Eddy (1) pointed out that apparent long-term relations between solar activity and certain indicators of the global climate might be caused by changes in the solar irradiance. Only recently, however, during the satellite era, have reliable measurements of the variability of the sun's irradiance been obtained (2), but these measurements are for a time scale shorter than a solar cycle.

17) *Núria Sánchez-Pantojaa et.al., [17]:* The presence of solar energy systems has increased significantly in recent years both in rural areas –in the form of solar farms–, and in urban areas as part of building installations. This transformation of the landscape, in spite of the good social acceptance of solar energy, causes an aesthetic impact whose interest has been growing in literature in recent years. This study aimed to review prior literature in order to establish the objective factors, aesthetic perception and methods that are most relevant when assessing the aesthetic impact. As a result of the lack of consensus, a new qualitative methodological framework is proposed that can serve as a basis for future research in the field of the integration of solar energy and its aesthetic impact. The framework comprises three sub-impacts: land use, solar system energy and glare. The results are discussed for future research and innovation in building photovoltaic integration and for SES site location and its environmental impact assessments. 1.

   Introduction Solar energy has been promoted in recent decades as an alternative to fight against climate change, and its use has increased significantly. Photovoltaic and solar thermal energy systems (SES) have therefore been in a continuous process of improvement and the energy sector continues to strive to implement them as efficiently as possible. Nowadays, more and more, we find SES in the form of solar farms in rural landscapes, but also SES integrated into the envelope of buildings as part of the urban landscape. The installation of solar thermal systems is more limited in form and design since, for efficiency reasons, they are accompanied by the water facility they serve. However, in the case of photovoltaic systems, the features of their components allow greater freedom in design, being used in the field of architecture where the formal aspect is of great importance. Thus, the photovoltaic installations in buildings are classified in BIPV (building-integrated photovoltaics) when the system is fully integrated into the building envelope as an additional building material, or BAPV (buildingapplied photovoltaics) when the system is simply located on the roof with a metallic support structure. In this 14 article, a theoretical review of the objective factors, methods and analyses performed in the field of aesthetic impact assessment of the SES integration has been carried out. On the one hand, a clear lack of consensus has been detected in the application of objective factors and methodologies. On the other hand, bearing in mind the importance of relating objective factors with the subjective assessment of the observer, no one has ever established a clear relationship between both issues when evaluating the aesthetic impact of solar installations. Objective factors have been classified in two groups: one with the simple and independent ones, and other with the complex and dependent ones. Our main contribution is the establishment of the most influential objective factors based on the revised literature that, coinciding with the more complex ones, are visibility (or size) and degree of integration. As a result, a methodological qualitative framework is proposed with the intention of offering a working basis for future research. In the methodological framework the aesthetic impact is broken down into three levels or sub-impacts: Land use, which depends on the size; SES, which depends on visibility and degree of integration and Glare, which depends on visibility.

18) *Tarujyoti Buragohain et.al., [18]:* Around 25,000 villages are located in remote and inaccessible areas and hence could not be electrified through conventional grid extension in India. The Ministry of New and Renewable Energy (MNRE) is implementing the 'Remote Village Electrification Programme' (RVEP) to electrify such remote villages by installing solar photovoltaic (PV) home lighting systems in all the states. An evaluation study was carried out by National Council of Applied Economic Research (NCAER) in six states, viz. Assam, Meghalaya, Jharkhand, Odisha, Madhya Pradesh, and Chhattisgarh. The functionality of the system varies across the states and across the seasons.

   During rainy season on an average one luminaire works 2 to 3 hours. During winter and summer on an average one luminaire works 4 to 5 hours. However, performance declines over the years. Use of kerosene is reducing in rural areas. Nearly 53 to 69 per cent reported that there is significant improvement in their children's education, and 37 to 78 per cent reported that there is improvement in the standard of living after the installation of solar lighting. Beneficiaries now spend more time on income generating activities. Crime rate has also declined due to availability of solar street lights in the village. Index Terms— Development, energy, odisha, solar. I. INTRODUCTION Rural electrification was not considered as a basic human need like water and food in the past. A number of recent studies provide insight into how rural electrification helps in the betterment of rural society in various ways.

A study the World Bank for 11 countries reveals that rural electrification results great benefits such as improvements of health facilities, better health from cleaner air as household reduce use of polluting fuels for cooking, lighting and heating, improved knowledge through increase access to television and better nutrition from improved knowledge and storage facilities from refrigerator. The present study shows that solar home-lighting system in the remote village can influence the life of people very significantly for the better. Substantial reduction in expenditure on kerosene has been found in the households of all income groups due to solar home-lighting system. This scheme is mostly benefiting women and children. Women find it easy to do household activities whereas children get enough light to study at night. Crime rate has International Journal of Environmental 15 Science and Development, Vol. 3, No. 4, August 2012 337 also been declining due to availability of light in the village. Most of the beneficiaries of solar home-lighting system are very happy with the functionality of the system. The impact of the solar home lighting system is also significant in the case of performance of school going children. A large number of beneficiaries have reported that there is significant improvement in their children's education.

19) *G. Dennler S et.al.,[19]:* As an answer to the increasing energy demand of mobile battery-powered electronic devices, we propose a new approach offering an autonomous power source. Comprising a thin film organic or hybrid solar cell connected to a Lithium-polymer (Li-polymer) battery, the so-called EURO-PSB device possesses attractive characteristics like low weight. During the last decade, an impressive development of novel battery-powered autonomous devices has been observed. The market for products like mobile phones, CD and MP3 players, digital cameras, laptops, pocket games and medical health care assistants have grown steadily all over the world. Wireless connected computer keyboards, headsets for mobile phones, PDAs, electronic tags or smart cards are now part of our daily life. In order to reduce energy consumption and improve their mobility, these electronic devices have to constantly reduce their size. The integration of a selfrechargeable battery into small planar and mobile objects (cellular phones, smart cards, remote controls, tags, etc.) could revolutionize their use. This could be achieved by coupling batteries to small independent electrical energy sources like solar cells. he feasibility of a polymer solar battery has been proven. Prototypes of conjugated polymer solar cells connected to polymer-Li batteries via smart interconnection have been realized. These products show low thickness mechanical flexibility and light weight hanks to high gas barrier encapsulation, extended lifetimes for the organic solar cells have been achieved. The performance could be increased by choosing different photoactive materials as well as controlling the heat transfer between that.
20) *Florent Boico et.al.,[20]:* This paper proposes new solar battery chargers for NiMH batteries. First, it is shown that existing charge-control methods can fail when charging by solar arrays in changing environmental conditions. This article discusses the reasons for the failure and introduces new voltage and temperature-based chargecontrol techniques. To increase charge speed, a maximum power point tracker is also implemented within the micro-controller of the proposed charger. Index Terms—Battery charger, maximum power point, solar. Recent technological developments in thin-film photovoltaics (PVs), such as amorphous silicon and hybrid dye sensitized/PV cells, are leading to new generations of consumer portable solar arrays. These new arrays are lightweight, durable, flexible, and have been reported to achieve power efficiencies of up to 10% . Already, commercial-off the-shelf arrays exist that have panels embedded in fabric that can be folded to dimensions of less than 12", yet are able to produce up to 50 W of power at 12 V.

These new products make solar power available to hikers, campers, soldiers-on-the move, etc., since the arrays can now be easily carried in backpacks. Thus, the marketplace for portable solar power is beginning to broaden beyond its conventional (original) boating and recreational vehicle (RV) market. In this paper, that existing NiMH charge control 16 algorithms fail in changing environmental conditions.

This paper proposes new charge-control algorithms to overcome this problem. The new algorithms are more robust to variations in current and temperature (although false detection cannot be completely ruled out). Because more data is required to perform the analysis, this technique is likely to be more expensive. It should be noted, however, that the overall charger size is still small (2 3 inches, without MPPT) despite the fact that no specialized IC is used. The increase in complexity of the charger is a direct consequence of the charging process taking place in a much more perturbed environment. The increase in the cost resulting from the use of a microcontroller vs. a dedicated IC can be compensated to some extent by the addition of extra features such as MPPT control at no extra cost. By adding a Maximum Power Point Tracker within the controller, higher charging current can often be achieved. This quickens charging time and adds flexibility to the overall system because it becomes able to efficiently charge batteries with wide terminal voltage. Although the proposed chargers are designed for NiMH batteries, they can be directly used for NiCD batteries.

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III. METHODOLOGY

This chapter says about the methodology of circuit system One of the most challenging tasks of in this system is to design and implement of an electronic system.in this circuit, the power would be came from two ways one from solar panel and another from battery. The electricity from the solar panel provide power to the switch board & and also charge the battery Then The circuit distribute the power Continuously to the fan, USB port, and LED indicator. also provide switch from battery to switch board cause of to control over flow of power i.e safety purpose as shown in figure.

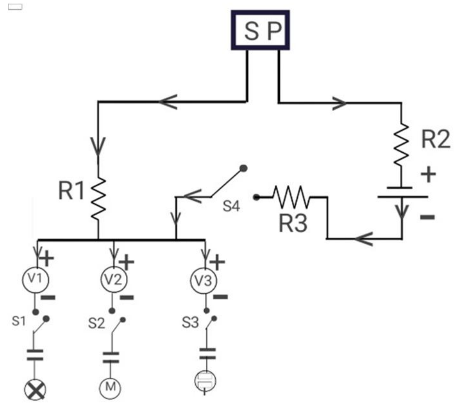


Fig: 2. Circuit diagram.

IV. FABRICATION

A solar umbrella fan is an umbrella that is equipped with photovoltaic panels and a fan to provide cooling. The photovoltaic panels generate electricity through the process of solar photovoltaics, which is then used to power the fan. Solar umbrella fans are designed for outdoor use and are often used in public spaces, parks, and other outdoor areas where there is a need for shade and a source of cooling. Solar umbrella fans typically have a framework within the canopy that holds the photovoltaic panels and the fan. The panels can also be connected to a battery, which stores the generated electricity for later use. The fan is typically located at the top of the umbrella and can be adjusted to direct the airflow where it is needed. Solar umbrella fans are a sustainable and environmentally friendly alternative to traditional umbrella fans that run on non-renewable energy sources. They can provide a source of power and cooling in areas where electricity may not be readily available, and they can help to reduce dependence on non-renewable energy sources and contribute to a cleaner, greener environment. To collect the solar energy with the help of PV panel, and it stored in the battery then finally to distribute the power then run the fan, USB charging port, and LED indicator. No need of electricity so safe to environment. Less investment and low maintenance. Suitable for all types of weather conditions.

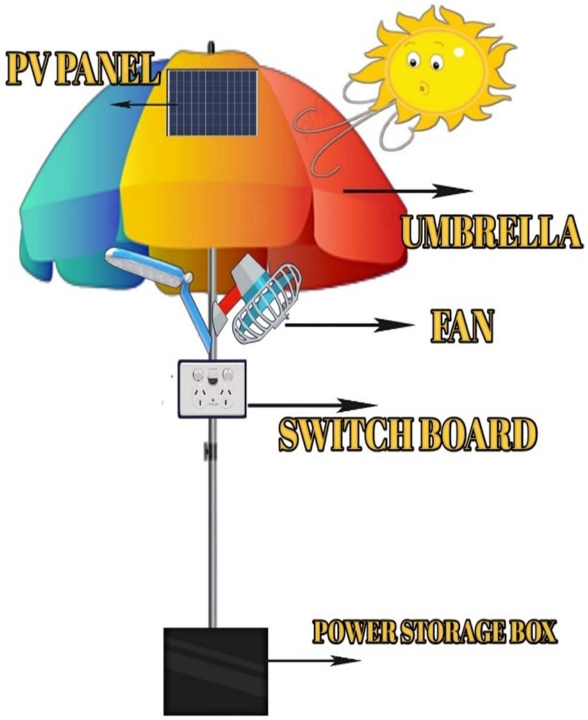
1) *Components:*
   a) Solar panel
   b) Battery
   c) Circuit
   d) DC Motor Fan
   e) OLED Indicator

2) *Explanation:* A solar umbrella is a type of umbrella that has photovoltaic panels integrated into its canopy to generate electricity. The method for designing and creating a solar umbrella typically involves several key steps: Determine the power requirements: The first step is to determine how much power the umbrella needs to generate, as this will determine the size of the photovoltaic panels required. Select photovoltaic panels: Based on the power requirements, select the photovoltaic panels that will be used in the umbrella. The panels should be durable and waterproof to withstand outdoor conditions. Design the canopy: The next step is to design the canopy of the umbrella. It should be made from a 19 material that will provide adequate shade while also being transparent enough to allow light to reach the photovoltaic panels. Integrate the panels: Once the canopy has been designed, the photovoltaic panels need to be integrated into it. This may involve attaching the panels to a framework within the canopy, or embedding the panels into the fabric of the canopy. Connect to a battery: The generated electricity needs to be stored, so a battery should be connected to the photovoltaic panels. The battery should be appropriately sized based on the power . requirements of the umbrella.

Add other components: Additional components such as an inverter, charge controller, and LED lights may also be added to the umbrella to provide additional functionality. A solar umbrella is a type of outdoor umbrella that is designed to generate and store energy from the sun. It typically consists of a regular outdoor umbrella that is equipped with solar panels, a rechargeable battery, and an LED light system. The solar panels on the umbrella capture sunlight and convert it into electricity, which is stored in the battery. This energy can be used to power an LED light system on the umbrella, allowing it to be used as an outdoor lighting source at night. Some solar umbrellas also feature USB ports or other charging ports, which can be used to charge electronic devices such as phones, tablets, or laptops. This can be particularly useful for outdoor events, where power sources may be limited. Overall, a solar umbrella is a sustainable and eco-friendly option for outdoor lighting and power. By harnessing the power of the sun, it eliminates the need for traditional power sources and reduces your carbon footprint.

The electricity generated from the solar panels can be stored in a rechargeable battery and used to power an LED lighting system, allowing the umbrella to function as an outdoor lighting source. Some solar umbrellas also feature USB ports or other charging ports, which can be used to charge electronic devices. This type of umbrella is a sustainable and eco-friendly option for outdoor lighting and power, as it harnesses the power of the sun to eliminate the need for traditional power sources.

Finally, the completed solar umbrella should be tested to ensure that it is functioning properly as shown in fig.



Fi:3. Fabrication of Multi Purpose Solar Umbrella

V. CONCLUSIONS

This chapter describes that amount of power that can distribute to run small appliances, such as fan, light, and socket, depends on several factors, including the capacity of the battery and the power requirements of the appliances. A 20-watt solar panel generates 20 watts of power, which can be stored in a battery.

If the battery is rated at 12 volts, its capacity in amp-hours can be determined by dividing the power generated by the solar panel (20 watts) by the voltage of the battery (12 volts), which gives a capacity of 1.67 amp-hours. However, the actual capacity of the battery will depend on several factors, including its age, temperature, and discharge rate. In general, it is recommended to use a battery with a capacity that is at least two to three times greater than the power generated by the solar panel to ensure that the battery can supply power for a reasonable length of time. The power requirements of a fan, light, and socket will vary depending on the specific appliances. A small fan might require 15 watts, while a compact fluorescent light might require 5 watts and a socket might require 10 watts. If these appliances are all used simultaneously, they could require a total of 30 watts, which would drain the battery in about 1 hour if the battery has a capacity of 1.67 amp-hours.

Fig:4. A Multi-purpose solar umbrella

In conclusion, a solar umbrella is a smart and sustainable solution for outdoor lighting, Fan. By harnessing the power of the sun, these umbrellas provide a convenient and eco-friendly way to light up your outdoor spaces in the evening. With the ability to convert sunlight into electrical energy and store it in a rechargeable battery, solar umbrellas are a practical and innovative way to enjoy your outdoor living areas after dark. They are easy to use, low maintenance, and come in a variety of styles and designs, making them a great addition to any patio, deck, or backyard. Overall, solar umbrellas provide a cost-effective, energyefficient, and stylish solution for outdoor lighting.

Finally, the completed solar umbrella should be tested to ensure that it is functioning properly and meets all necessary safety and performance standards. Any necessary modifications or refinements should be made before the product is put into production.

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