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Designing and Implementation of Smart Umbrella

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ABSTRACT

The concept of smart umbrella is an innovative idea which helps in saving the energy consumption in cafe's, beaches etc like places. Smart umbrella is basically a solar charged umbrella which is used to produced electricity form solar in order to charge phone battery, light LED in night. The solar energy is produced by sun is non vanishing renewable source of energy which is free from any pollution.Every hour enough sunlight energy reaches the earth to meet the world's energy demand for a whole year. So,the concept of smart umbrella is an efficient way to save the electricity in restaurants.

Keywords : Renewable Energy, Solarpanel, Photovoltaiccell, Battery, LED, USB Cable.

I. INTRODUCTION

In 2010 the world daily oil consumption has reached an all time high record of 87.4 million barrels and despite the environmental problems related to energy use, this is expected to increase further in the next years. There are a number of factors which are significant in the estimation of the future level of the energy consumption and production. The main factors are related to the population growth, fuel prices, consumer tastes and technological developments. Furthermore, governmental policies concerning energy and developments in the world energy markets will be the key factors that will determine the future level and pattern of energy production and consumption. In the mid 1980's, 25% of the world population consumed 70% of the total energy supply, while the remaining 75% of the population were consuming the rest 30%. If the whole earth population has the same consumption per inhabitant, similar to the one that the Organization for Economic Co-operation and Development (OECD) member countries have on average, it would result in an increase from the mid 1980's world energy demand of 10 TW to about 30 TW. An expected increase in the population from 4.7 billion in mid 1980's to 8.2 billion in 2020 would even raise the figure to 50 TW or moreThrough this project we are enlightening the various ideas for generating the electricity with some of the smart actions.[1]

Umbrella which not only used for preventing us for the rainfall and sunlight we can even use this to produce the electricity by installing solar panel on it and hence known as SMART UMBRELLA.The electricity from this can be used in cafe's,on beaches, in charging mobile phones etc.

Beside these we have rain water harvesting system,biogassystem,tidalenergy,mechanicalenergy,soundenergy,wind energy etc. We can use all these to generate a electrical energy.Use of more and more renewable sources leads to the Sustainable development.

II. LITERATURE REVIEW

Govinda R. Timilsina et.al [2] explained that Solar energy has experienced phenomenal growth in recent years due to both technological improvements resulting in cost reductions and government policies supportive of renewable energy development and utilization. This study analyzes the technical, economic and policy aspects of solar energy development and deployment. While the cost of solar energy has declined rapidly in the recent past, it still remains much higher than the cost of conventional energy technologies. Like other renewable energy technologies, solar energy benefits from fiscal and regulatory incentives and mandates, including tax credits and exemptions, feed-in-tariff, preferential interest rates, renewable portfolio.

Ahmed Hossam Eldin et.al [3]described that energy from sun can be considered the main source of all types of energies. It can be used by various techniques such as making full use of sunlight to directly generate electricity or by using heat from the sun as a thermal energy. Using Photovoltaic (PV) cells is common in solar energy field. The major objective of this review study is to help anyone getting through solar energy field by introducing developments up to date in the field. One can be assisted and will save time of building a literature review about PV by this review that is considered part of a series compares the performance of PV technologies. In this paper, a comparison survey is included which investigates the three generations of PV cells with the latest characteristics.

R.S. Anand et al [4]explained that tapping the energy from the sun has always had great potential but large scale utilization has faced many bottlenecks. Amongst the many bottle necks are cost of technology, energy storage, distribution of solar power and daily/seasonal variability of solar resource. In the present initiative, we address these challenges under three broad research themes of solar energy capture, distribution and storage. We propose to initiate a solar energy research enclave with the following objectives: a) We will establish a technology demonstrator –1 MW (peak) solar power station in two phases. It will supplement electricity requirement of IITK campus during day time (8 hrs) and thus help in reducing dependence on grid power. This will also generate useful data for future implementation of such projects in the region. b) Modules in the solar power station will be used for research and as test platforms for large scale solar energy technologies. c) We will initiate new and augment the existing programs for long term research & development in solar power generation, storage, distribution, management and policy making in the institute. d) This initiative will provide practical input for graduate and undergraduate teaching programs. In addition, it will provide training and human resource development in the area of renewable energy e) Finally, it will increase the awareness of green technologies amongst the public.

III. METHODS AND MATERIAL

The basic idea behind the project is to implement the solar energy in restaurants for a smart system work. We can also apply this idea in beaches or where there is good amount of sunlight. It is basically the solar panel on the umbrella which (for example) is placed on the beache, we can smartly run a fan(motor),lights(LED) or phone charging instead of taking the electricity from other sources.

The supply from solar panels is given to the LEDs,fans which is controlled by the switches.In day time solar panel will get enough energy to fed LEDs and fans during night time in café's and during day time in beaches to charge the cell phones.

This project is just focused on saving the electric energy with Smart Umbrella.

Fig 1 : Umbrella with Solar panels.

A 12 volt solar panel is used to charge the battery during day time. The battery is connected to the input line through the NO and Common contacts of the relay. Diodes D1 and D2 drops 1.4 volts and charge indicator LED uses 1.8 volts. Relay also drops some voltage so that around 8 volts will be available for charging the battery. The high value (4700uF) Capacitor C1 act as a "buffer" for the clean switching of the relay and also prevents "relay clicking" when the input voltage reduces momentarily. During day time, the solar panel generates 12 volt DC which makes the relay active and the NO (Normally Open) contact makes connection with the common contact. This completes the current path to the battery. Two 1 Watt power LEDs are connected to the NC (Normally Connected) contacts of the relay. When the relay energize, the NC contact breaks and LEDs do not get power. Resistor R2 (18 Ohms 1 Watt) drops the LED current to 330 mA. The LEDs are rated 350 mA at 3.6 volts. With 3 volts and 250 mA current, these LEDs can give adequate brightness.[5]

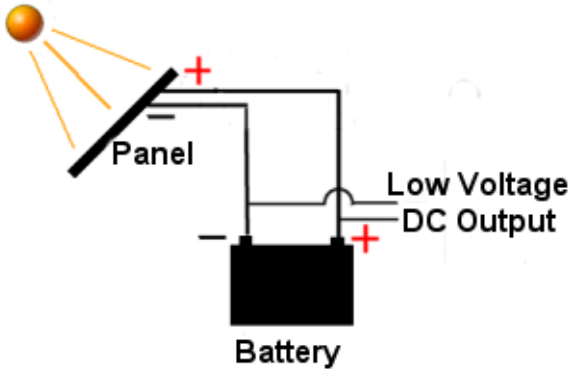

Fig 2. Circuit diagram for solar connection

Solar cells produce Direct Current (DC) electricity from light, which can be used to power equipment or to recharge a battery. Cells require protection from the environment and are usually packaged tightly behind a glass sheet. When more power is required than a single cell can deliver, cells are electrically connected together to form photovoltaic modules, or solar panels. A photovoltaic module is a packaged, interconnected assembly of photovoltaic cells, which converts sunlight into electrical power. The cells are hermitically sealed between glass and back cover (Tedlar) to protect them from harsh environments.The Direct Current (DC) from modules will be converted into Alternating Current (AC) by Inverters. The inverter outputs are given to a Low Voltage (LT) panels installed inside the School premises[6-7].

IV. RESULTS AND DISCUSSION

Once the PV solar plant has been built, it needs to be efficiently operated and carefully maintained. Compared to other power generating technologies, solar PV power plants have low maintenance and servicing requirements.Indeed, while solar energy does require almost no maintenance at all as compared to the other generation sources, PV solar plants are investments that are likely to last for 20–25 years or more, and that's why in order to arrive at an accurate ROI figure, one needs to address the operation and maintenance issues.

V. FUTURE SCOPE

The Future of Solar Energy considers only the two widely recognized classes of technologies for converting solar energy into electricity — photovoltaics (PV) and concentrated solar power (CSP), sometimes called solar thermal) — in their current and plausible future forms. Because energy supply facilities typically last several decades, technologies in these classes will dominate solar-powered generation between now and 2050, and we do not attempt to look beyond that date. In contrast to some earlier Future of studies, we also present no forecasts — for two reasons. First, expanding the solar industry dramatically from its relatively tiny current scale may produce changes we do not pretend to be able to foresee today. Second, we recognize that future solar deployment will depend heavily on uncertain future market conditions and public policies — including but not limited to policies aimed at mitigating global climate change.As in other studies in this series, our primary aim is to inform decision-makers in the developed world, particularly the United States. We concentrate on the use of grid-connected solar-powered generators to replace conventional sources of electricity. For the more than one billion people in the developing world who lack access to a reliable electric grid, the cost of small-scale PV generation is often out weighed by the very high value of access to electricity for lighting and charging mobile telephone and radio batteries. In addition, in some developing nations it may be economic to use solar generation to reduce reliance on imported oil, particularly if that oil must be moved by truck to remote generator sites. A companion working paper discusses both these valuable roles for solar energy in the developing world.

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