"REVIEW ON SOLAR TREE: AN EPIC SOURCE OF ENERGY"

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ABSTRACT: *Since last decade, the growth of renewable energy resources in India has been significant to cater a gigantic energy demands due to huge population. The solar technology is the impeccable option for generating power by avoiding any pollution. Solar trees are anticipated to bring visibility to solar technology and to broaden consciousness in a commercial or public environment. The solar power tree is the innovation which produces energy efficiently and provides better alternative to flat mounting of PV systems as it required less space. For residential lighting and different applications, utilization of Solar Tree is increasingly pertinent when PV framework is to be utilized. This paper presents results from study of implementation of Solar Tree project in urban part of City or village area [1].*

Sun daily radiates a massive amount of energy to Earth, and yet, that energy is still not accurately exploited in the World. There are numerous reasons for this. One of the fundamental reasons is the least awareness about the advantages of sun powered energy and its usages. There is no encouragement for use of solar panels. Building the sun powered tree can be helpful for bringing awareness about solar energy, its benefits and methods of utilization. This paper explains the chance of building a solar tree, covering specialized, social and monetary viewpoints. Advantages and potential disadvantages are explained, while unique emphasis is given essentially to its usage because of the requirement of land and comparing number of bright hours/days out of every year [4].

Key Words: **PV system, Solar Tree, Solar panel, Solar Technology, Renewable Energy**

1. INTRODUCTION

Solar Tree or Solar Photovoltaic Trees are a kind of construction that looks similar to trees. They may be framed from small scale to big scale. It is an artwork which is a combination of creative and technological effort. This exceptionally new concept is conceived in an effort to utilize new technology relating to harvesting and use of sun energy [1].

The solar tree produces additional power than a conventional flat display of solar cells. It requires most effectively 1% land in comparison to the conventional flat arrangement. The panels of flat mounting for homes are ineffective, as the approach of sun's rays is not constant, particularly for the period of the changes in seasons. Some residential solar systems are intended to track the sun but these systems raise the cost of solar energy because they are costly and require maintenance. These solar trees have been intended to give different means of power to various urban and built environments. These ranges from controlling portable phones, electric cars, buildings, road lighting, street lightening and covering huge and little scale region. Solar trees are really a practical resolution for metropolitan street lighting. There is a rapid boost in the use of PV systems in India due to continuous decrease in prices of solar cells and its accessories. But there are a few obstacles for selection of this innovation in rural and remote areas due to the security of the framework and its components from robbery. Most of the provincial road lighting PV framework introduced by the government is not in working and need of upkeep. Subsequently directly PV frame works exhibit to be suited basically for urban & corporate utilize. Still, there is less response for use of PV system for domestic applications due to high preliminary cost and area required for installation of such systems. In this perspective use of PV technology for the domestic requirement in the form of the solar tree is the excellent alternative as compared to conventional flat or rooftop mounting. Solar trees can be installed near, opposite to the house or on a terrace, where there is no shading during a day [1].

This paper exhibits a brief on design and growth of Solar Tree models for domestic application considering the average prerequisite of small Indian home. Solar technologies are mainly characterized in two types as passive or active solar. That includes the

way they confine, convert and share out solar energy. Photovoltaic panels and solar thermal collectors are being used to harness the energy as an active solar technique. Orientation of building to the Sun, assortment of materials with appropriate thermal mass or light dissolving properties, and designing spaces that naturally create circulation of air are part of the Passive solar techniques. The general terminology of sunlight converted into electrical energy, either straightforwardly by photovoltaic (PV), or indirectly using intense alternative energy of solar power (CSP) is "Solar power". CSP systems make use of lenses or mirrors and tracking systems to focus a huge area of sunlight into a small beam. PV transforms light into electric current using the photoelectric effect. A photovoltaic cell (PV), occasionally named solar cell, is a tool that converts light into electric current using the photoelectric effect. The "Solar Tree" is a combination of creative and technological attempt which exists as a form of solar artwork. Within the past few years, artistically inclined inventors have strived to envisage new methods to get utility from solar cell technology. This relatively new model was conceived in an effort to merge new technology, connecting to the absorption and use of solar power[1][2][3].

2. LITERATURE SUVEY

The discovery of fundamental principles of generation of power was taken place within 1820s and early 1830s by Michael Faraday. His method of generation of electric power by the movement of loop wire or a disc between the poles of magnet is still being used today. Later on production of electric power by mechanical means started the second industrial revolution and made possible several scientific inventions using electricity. Before that the method of electricity produced by using battery cells. Later on, the technology that produced DC current by steam engine driving a dynamo was quickly adopted by many cities around the world after 1882. Coal and water used in the first power plant and today different types of energy resources are available such as nuclear, natural gas, wind as well as solar energy and tidal power. Over the period of time the evolution also taken place in the methods of electricity generation. The key methods of generation of electricity include Generators, Electrochemistry and Photovoltaic effect. The source report of World electricity generation in 2017 shows that only 2% electricity was generated by solar. Currently, Utility scale production is achieved by rotating electric generators or by photovoltaic systems [6].

The 21st century is going to be the age of sun (Solar Energy) as the 19th and 20th century was of coal and oil respectively. In the world oil is being finish out and it is projected that 80% of the world's supply will be utilized at our lifetimes. Coal storage appears to be very massive but this stock will be gone if rapidly uses. Thus, the solar power tree is very effective to capture huge amount of solar energy by utilizing a little surface area of precious land. They require only 45q. feet area for a single tree it means they can be installed on road side. The village roads and the boundary walls of the paddy fields will be the perfect area for the installation of solar tree as they can provide sufficient space. They can contribute sufficient power for electrification of villages and irrigation activities. Another biggest source for planting the solar tree is the State and National Highways. One generic calculation depicts that if solar trees are installed on a National Highway of length of 300Km; it would generate 110MW of power [4].

Demand for energy is rising continuously with each period and to meet the specified demand we must focus on utilization of non-conventional sources of energy. Energy of the Sun is the best alternative amongst the renewable energy sources. The solar energy source is completely free of cost, unlimited, nonpolluting, ecological and permanent source of energy. Solar Power Tree is the one which can produce huge amount of energy by acquiring very small land area throughout the year. Silicon-crystalline Photo-Voltaic (SPV) mounted on tall pole which straight away converts solar energy into electrical power by means of the photo voltaic effect. Thus it can be said that the unconventional energy resources like geothermal, ocean tides, wind and sun is greatest alternatives to meet future energy necessities. In major countries, the biggest crisis is the required area as most of the part is cultivable land because it is the only resource for farmers. Thus, use of cultivable land rather than farming will be unpredictable loss to the society. Therefore Solar Power Tree is an impeccable option for generation of electricity [5].

India as the 2nd largest country of the world which is in the growing demand of the energy and trying to search alternative ways from which resourceful and abundant source of energy cab be available. The new innovative idea of a solar tree design in Nano wire photovoltaic cell is also presented. Nano wires acquire high physical light absorption qualities which

can be enhanced enormously. Hence we can say that it is a marvelous and revolutionary urban lighting model. That's why these technologies lead to the development and expansion of high efficiency solar energy. To meet the growing energy demand of the people, saving of land, the solar tree concept is extremely successful which should be implemented in India that will suffice electricity requirement without the any issues of power cut and the additional energy can be supplied to the grid. Another nonconventional source of energy is a solar botanic tree having many benefits of generating electricity as compared to the other sources. That becomes the responsibility on the shoulders of the youngsters of the earth to assume and work smartly and take the correct decision. To make the life constructive and favorable, everyone should contribute to co- operate with the government [5].

3. SOLAR TREE

It is a mixture of innovative and scientific efforts which exists as a frame of artwork. As we already know that the angles of the sun rays don't seem to be fixed mainly when the climate changes then the flat plate roof tops are ineffective because they cannot trap the utmost sunlight (solar rays) as they are permanent. Some solar system based residential are planned with the highest power tracking and monitoring system. It means that the solar scheme or the solar panels are integrated with such a stirring system that will rotate with relation to the sun or in other words we can say that it should must be rotated from east to west facing its panels towards south (India) after specific intervals of your time, which successively increases the price of the solar system. It also requires a bigger maintenance. So we proposed a design of a solar power tree using arrays of solar panels instead of leaves in the natural trees. Solar power tree or solar photo-voltaic trees are the structures looking like original natural trees. These trees may be framed from a little scale like bonsai tree to an oversized scale sort of a wind turbine. This is often relatively an innovative idea which is conceived to use new technologies regarding use and harvest the alternative solar energy. The panels are prearranged in a tall steel pole in a form of tree [4].

We proposed the idea to design the stems (Rectangular/Circular) of the tree steel pipes which support the panels. Then these panels are coupled to the inverter by the charge controller through the wires and therefore the power is fed to the electrical grid. Also we will install batteries that remain hidden inside the bottom base which will store the electrical energy. Mechanical damage and chemical effects wont' be affected to battery performance as the battery is guarded with suitable material by shielding. With the use of Spiraling Phyllotaxy kind of technique, maximum power from the sun is achieved. The panels are organized in such a way the branches are found within the trees. It means that this method will assist the lower panels from the shadow of the upper ones and also the face of the panels must be directed towards the direction of the sun [4].

4. CONCLUSION

India is the second largest country in the world according to energy requirement and that can be easily reduced up to some requirements by this project. Due to global warming, the temperature is always on a higher range usually than assumption range so that can be used and generate electricity in large quantity. As this is the efficient way to produce electricity without any maintenance or other activities. Just a onetime installation and gives us a continuous output for long time. So these energy requirements can be solved by the innovative ideas by our youth generations and everyone should start such individual project to support government and make environment healthy for human life.

5. REFERENCES

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