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Concept of Solar Power Tree

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Abstract: Demand for energy is increasing with each period, to fulfill the required demand we must have to concentrate on utilizing non conventional sources of energy. Energy from the Sun is the best alternatives among the renewable energy sources. . It is free, inexhaustible, nonpolluting, eco-friendly and continuous source of energy. The paper detailed Solar Power Tree that generate large amount of energy by capturing very small land area throughout the year. Silicon-crystalline Photo-Voltaic (SPV) mounted on tall pole which direct convert solar energy in to electrical energy by means of the photo voltaic effect.

Keywords: Solar Energy, Silicon-crystalline Photo-Voltaic (SPV).

INTRODUCTION

Non-Conventional sources of energy which are being produced continuously in nature and are in exhaustible are called renewable sources of energy or non-conventional energy. There are various renewable sources which used for electric power generation, such as solar energy, wind energy, geothermal etc [1].

Wind energy
Winds are caused because of two factors. 1. The absorption of solar energy on the earth's surface and in the atmosphere. 2. The rotation of the earth about its axis and its motion around the Sun. A wind mill converts the kinetic energy of moving air into Mechanical energy that can be either used directly to run the Machine or to run the generator to produce electricity.

Tidal energy
Tides are generated primarily by the gravitational attraction between the earth and the Moon. They arise twice a day in Mid-Ocean. The tidal range is only a Meter. Basically in a tidal power station water at high tide is first trapped in a artificial basin and then allowed to escape at low tide. The escaping water is used to drive water turbines, which in turn drive electrical generators.

Solar energy
Solar energy is a clean and inexhaustible source of energy in everywhere of our world [2]. The Sun's energy comes from nuclear fusion reaction that takes place deep in the sun. Hydrogen nucleus fuse into helium nucleus. It has been identified as an alternative electricity source [3, 4] with respect to the increase in energy demand and cost [5].The applications for solar energy are increased, and that need to improve the materials and methods used to harness this power source [6]. The solar cell has an optimum operating point to be able to get the maximum power. To obtain maximum power from photovoltaic array, photovoltaic power system usually requires maximum power point tracking controller [7] and [8]. The sun is a large sphere of very hot gases. It's diameter is 1.39x106 KM. While that of the earth is 1.27x104 KM. The mean distance between the two is 1.5x108 KM. The beam radiation received from the sun on the earth is reflected in to space, another 15% is absorbed by the earth atmosphere and the rest is absorbed by the earth's surface. This absorbed radiation consists of light and infrared radiation without which the earth would be barren.

All life on the earth depends on solar energy. Green plants make food by means of photosynthesis. Light is essential from in this process to take place. This light usually comes from sun. Animal get their food from plants or by eating other animals that feed on plants. Plants and animals also need some heat to stay alive. Thus plants are store houses of solar energy. The solar energy that falls on India in one minute is enough to supply the energy needs of our country for one day. Man has made very little use of this enormous amount of solar energy that reaches the earth.

SOLAR PHOTO VOLTAICS (SPV)

The direct conversion of solar energy in to electrical energy by means of the photo voltaic effect, that is the conversion of light (or other electromagnetic radiation) in to electricity. The photo voltaic effect is defined as the generation of the electromotive force as a result of the absorption of ionizing radiation energy conversion devices which are used to convert sun light to electricity by the use of the photo voltaic effects are called solar cells.

A single converter cell is called a solar cell or more generally, a photo voltaic cell, and combination of such cells, designed to increase the electric power out put is called a solar module or solar array. Photo voltaic cells are made of semi conductors that generate electricity when they absorb light. As photons are received, free electrical changes are generated that can be collected on contacts applied to the surface of the semi conductors.

A solar tree is a decorative way of producing solar energy. It uses number of solar panels which forms the shape of a tree. The panels are arranged in a tree fashion in a tall pole. TREE represent T= Tree Generating R=Renewable E=Energy and E=Electricity. Solar Power is like a tree in structure and the panels are like leaves of the tree which produces energy.

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SOLAR POWER TREE: WORKING

One of the big challenges in the solar industry is to maximize solar electricity output while keeping down the installation cost. Solar photovoltaic (PV), which uses photovoltaic cells to convert the sun's rays directly into electricity. Photo Voltaic is now very popular. During the period of 2000-2011, PV constituted the fastest growing renewable energy source.

Solar energy emits far less emissions than do fossil fuel energy sources. Solar cells create electricity by converting photons of light into electrons. Solar cell producing direct current, this DC current is converted to alternating current, by using inverter.

Solar PV modules will be fixed throughout the tall pole having a pattern of spiralling phyllotaxy with the adjustment of load distribution over the pillar for its balancing. At the sametime the pattern is so adjusted that the top panels wouldn't hinder the bottom panel from getting the maximum sun light in a day time. The panels will be facing towards the sun at an angle as required so that they can get maximum solar energy for whole day.

The Solar Power Tree [9] as shown in figure 1 consists of mainly five component. Solar panels, Long Pole, LDEs, Batteries and Stems for connecting the panels. Solar Trackor mounts mechanically move the PV panels over the course of a day so that they directly face the sun at all times.

Solar tracking systems are utilized to continually orient photovoltaic panels to the sun and can help make best use of the investment in Solar Power Tree. Solar trackers generate more electricity than their stationary counterparts due to an increased direct exposure to solar rays. Solar trackers are highly efficient installations.

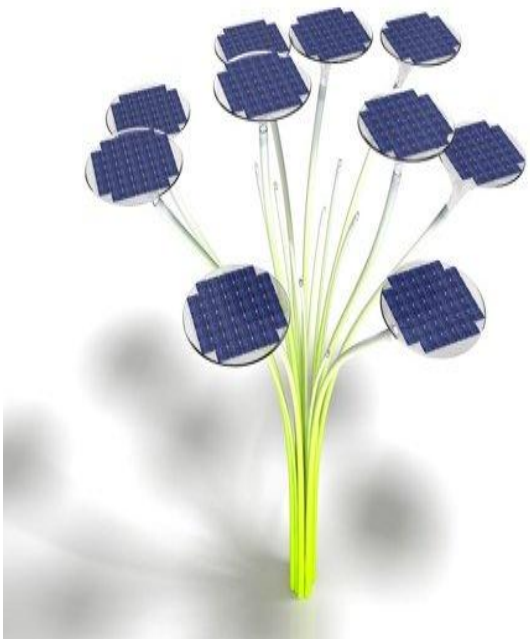

Figure 1

Figure 2

Solar Power Tree: Application

The solar power tree resembles a real tree, but the branch is changed for solar panels, that produce energy from the sun. It does not provide just solar energy. It also provides station to charge your smart-phones and tablets, cold water drinking fountain, a charged computer monitor, decorative night lightning, shed to park vehicles. The solar power trees can be planted on the road sides, service roads as it required very small land area as shown in the figure 2. Solar energy emits very less emissions as compare to other fossil fuel energy sources: apart from emissions released during the construction and installation, solar power is a carbon-neutral energy source.

There are many factors responsible to believe that solar energy will take a leading role in addressing the climate crisis and future aspects. At the same time, solar energy is becoming more economical and required less maintenances. The structure is also built with a rechargeable battery that stores power for cloudy days and lights up LEDs at night. Solar power Tree harnesses solar power to charge mobile devices, cool water, and provide free WiFi for communities.

CONCLUSION

In the world, oil is running out and it is estimated that 80% of the world's supply will be consumed in our lifetimes. Coal supplies appear to be very large but this stock is also stock out if rapidly uses. Nuclear power having a dangerous aspect. Thus unconventional energy sources such as geothermal, ocean tides, wind and sun is best option to meet future energy requirements. Cultivable land is the greatest crisis of the earth rather it is already a burning crisis in major countries, the cultivable land is god of the farmers, if used for other than agriculture, it will be unpredictable loss to the society. Therefore Solar Power Tree is very efficient to capture large amount of solar energy by utilizing a very small surface area of valuable land.

It would be cost effective and better for the human mankind. Installation of Solar Power Tree is better alternative to produce electricity.

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