

# Economic Electrification Using Solar tree

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**Abstract-** This review paper describes a solar technology that imitates how trees convert sunlight into energy. Shrubs, plants and trees use an inbuilt structural design to representation their leaves, height dense to sunlight for photosynthesis. They do this finds out their survival. Recently with the rising population and energy demands, we should get an option of renewable energy source and also keep in the mind that energy should not cause pollution and other natural hazards. For this condition the solar energy is the best alternative for us, so the solar tree could be the best source of energy for us. The efficiency of the plant can also be improved by using the "SPIRALLING PHYLLATAXY" technique.

**Index Terms -** Solar tree, Spiralling phyllataxy, Photo voltaic cell, Photosynthesis.

## I. INTRODUCTION

A solar tree is an artificial tree in which photo-voltaic cells arranged in a Fibonacci series pattern instead of leaves. The Solar tree produces more energy than a conventional flat arrangement of solar cells. "Solar energy is the conversion of sunlight into electrical energy moreover directly by using photo voltaic or concentrated solar power". Solar energy is a renewable form of energy source which is competitive with fossil fuels.

The sun produces energy by the process of thermonuclear fusion because it is a spherical object of hot ionized gases. The interior temperature of the sun is approximate  $8 \times 10^6$  k to  $40 \times 10^6$  k, where energy is released by the fusion of hydrogen and helium.

Solar power is available in large quantity and considered as the cleanest means of the renewable energy. Solar radiation converted into usable form like solar photovoltaic, solar thermal and solar architecture.

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This new solar technology can be implemented for rural electrification in a cost effective manner with no compromising efficiency.[1],[2],[3] To install solar panels we require a very large land area, to fulfill solar energy requirement. To avoid this problem we can install a solar tree instead of a no of solar panels which require a very small space.

## II. SOLAR POWER

The sun gives out  $3.7 \times 10^{26}$  watts of energy into space, out of which earth intercepts only  $5 \times 10^{-10}$ th part of the solar energy output. The energy intercepted by earth is equivalent to  $1.7 \times 10^{17}$  watts. The energy emitted by the sun within three minutes is equivalent to the world energy consumption during a year. Most of the solar radiation reaches the earth as electromagnetic waves of about 0.25 to  $3 \mu$  wavelengths. Solar energy is a unique source of energy which can be exploited in many different ways as one such way is by direct conversion to electricity by photo voltaic. 1839 scientists Edmund Becquerel first recognized the photo voltaic effects. [5] Scientists made solar cells of selenium in the 1880s. And, modern photo voltaic technologies, were developed in RCA Labs and BELL Labs in the mid 1950s.

In Photovoltaic conversion, solar radiation falls on semiconductor devices called solar cells, which convert sunlight directly into electricity. When light falls on the junction between two types of semiconductor called P-type and N-type. N-type semiconductor has a large amount of electrons and P-type semiconductor less amount of electrons. When a bright light falls on a cell, photon energy from the light enables electrons to break free from the junction between them. This effect is called the photoelectric effect. The flow of electrons constitutes an electric current. Direct current is produced by the solar cell, which is converted to alternating current by using an inverter.

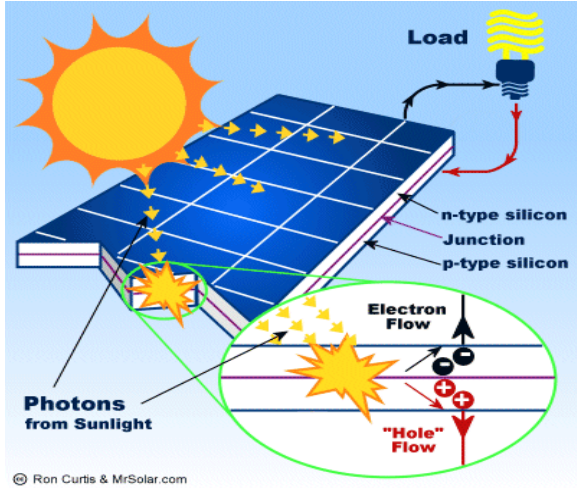


Figure: 1 Solar panel

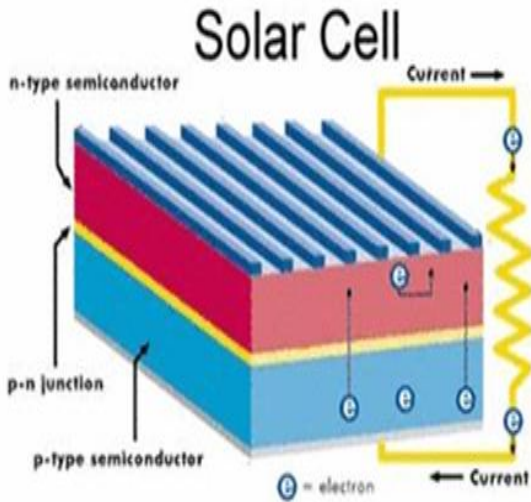


Figure: 2 Solar cell

### III. DESIGN OF SOLARTREE

In the nature the trees produce their own food by the process called PHOTOSYNTHESIS. According to this process green plants produce their own food with the help of sunlight and water present in the soil at the day time. Human society depends on green plants for their food directly or indirectly, So we can say that this process indirectly provides food for humans. To understand about the solar tree we can take an example that it is a tree in which the stems are connected works as the branches of the tree and the solar panels are working as the leaves. Green leaves

are producing food materials for human beings similarly leaves of the solar tree (solar cells) are producing energy for the society, So it is very suitable to call it as a tree.

### IV. SPIRALLING PHYLLATAXY TECHNIQUE

Solar tree is designed by spiralling phyllataxy technology. According to this technique we connect the lower panels from the shadow of the upper ones, because of this we can track the maximum amount of energy from the sun. This technology is used to maximize the efficiency of the plant.



#### A. Parts of solar tree

The solar tree have following parts:

- Solar panels
- LEDs
- Batteries
- Long tower
- Stems for connecting the panels



#### V. WHY IT IS BETTER THAN A TRADITIONAL SYSTEM?

Nowadays, due to rapid increase in the population of the world, we required such an energy, which produce energy efficiently using less space. In this case the solar tree could be the best one for us. According to area point of view, it is much better than the traditional solar flat PV panels, So this will be a very good alternative and should be implemented.

In the conventional PV system we require large size of land area which generate a small amount of energy.[6],[7] Installation of the solar tree requires about 1% land area as compare to the traditional PV system.

Example –We require 10 -12 acres of land for the installation of PV panels which generate 2 MW power, but for the same amount of energy generation, we require only 0.10-0.12 acres of land in case of the solar tree.



Figure: 3 Different Designs of Solar Tree

Figure: 4 Traditional PV Solar System





Figure: 5 Solar Tree

## VI. CONCLUSION

The solar new technology presented in this paper will provides nearly high efficiency. The number of papers and patents published in this area grew up exponentially over the last 10 years. However, at the present, research efforts have largely focused on solar trees. To fulfil the increasing energy demand of people. This project is very successful in saving land area. This can provide electricity continuously without any power cut problem. The extra energy can be provided to the grid.

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