

Solar Botanic Tree to Harnessing the Power of the Sun and Wind

Vikrant Kumar

*Dept of Electrical Engineering, THDC IHET, B.Puram, Uttarakhand, India
vikrantprajapati92@gmail.com*

Mohd Azmal Mansoori

Dept of Electrical Engineering, THDC IHET, B.Puram, Uttarakhand, India

Ashutosh Puri

Dept of Electrical Engineering, THDC IHET, B.Puram, Uttarakhand, India

Abstract- In the course of the beyond few decades, the advanced technological nation of the words had been engaged in an electricity and assets race that has introduced us to the location of the energy crisis. Many developing countries including India have also been engaged in this race during the last two decades or so. It is now widely diagnosed that the fossil fuels and other traditional assets, presently used in the generation of electrical energy, may not be either sufficient or suitable to preserve tempo with the ever growing world call for electric energy. The prospects for assembly this call for and heading off a crisis in delivering would be progressed if new and alternative power sources can be advanced. One such alternative is solar botanic tree, this energy source will produce electrical energy from three natural and inexhaustible energy sources. This solar botanic tree can be the best available renewable resource in India for generating electricity.

Keywords- Renewable energy resources, Solar Botanic tree, Nano leaves, Nano inverter, transducer.

I. Introduction

In countries like India, strength intake has been growing at an exponential price. Due to populace explosion and land acquisition trouble in India, the energy demand can be fulfilled handiest by way of the usage of renewable sources. There are numerous renewable resources like wind, solar, ocean thermal, geothermal, tidal electricity and so on. But the problem with above energy resources is that they are quite fluctuating and unreliable. The current renewable energy system only works on a particular source like wind turbine uses only wind to generate energy which makes it less efficient and reliable.

Although these renewable energy resources can fulfill future energy demand but in highly populated country like India there installation will be highly challenging task. As such we would need an energy generating system which is compact enough to be applied in

congested location and versatile enough to employ two or more sources simultaneously. In above condition solar botanic tree/energy harvesting tree is our best alternative.

The floor of the earth gets sun radiation energy at an average of 81,000 terawatt-exceeding the complete international energy call for by using an element of 5,000. Plant life was harnessing a number of this electricity with maximum performance for billions of 12 months thru the photosynthetic cycle in their leaves. Solar Botanic tree additionally works at the identical principle. Energy generated from one preferred sun Botanic tree might be enough to mild up three or four-bed room houses.

This area saving tree could now not only make it less difficult to grow solar and wind strength technology to mild up homes and streets in towns, however also in rural regions where farmers are unwilling to surrender big tracts of land for solar panel installations.

II. Solar Botanic Tree

2.1. Components of solar botanic tree

The solar botanic tree will mainly consist of

- ❖ Nano leaves consisting of transducer
- ❖ Branches
- ❖ Trunk
- ❖ Nano inverter



Fig. 1 Nano Leaves

2.2. Types of solar botanic tree

Mainly two kinds of trees are currently developed for this technology.

- ❖ The broad leaf trees
- ❖ The solar botanic evergreen trees

The Broad Leaf Trees can provide between can provide between 3500 kwh-7000kwh per year. The solar botanic evergreen tree can provide between 2500 kwh-7000kwh per year. 2.3. Energy sources for solar botanic tree

Mainly there are three energy resources which are used by solar botanic tree

- ❖ **Heat energy**:-This is collected through the use of Thermo-voltaic (TV) cells which convert Heat energy into electrical Energy by using semiconducting materials(a m

aterial whi which is between a metal and a n insulator; it has negative temperature resistance).

- ❖ **Solar Energy**-There are also small photovoltaic cells (PV) incorporated in the nano leaves. These small PV cells capture the light energy emitted by the sun. This light is then converted into electrical energy.
- ❖ **Kinetic energy** - Kinetic energy is captured through movement of Nano leaves. The wind generates motion in stems and branches. This motion is collected via piezovoltaic (PZ) cells. The PZ has semi-conducting devices incorporated into the artificial structure of trees and plants. The PZ and the semiconducting devices convert typical wind into electrical energy.

2.4. Working of solar botanic tree

In every Nano leaf of solar botanic tree, there are three types of transducers which are incorporated. They are:-

- ❖ **Piezoelectric transducer**:- This transducer works when outside force like wind, rain produce mechanical stress in petiole, twigs and branches. The more wind and rain vibrations the more stress will be produced across the leaf. This stress will produce millions of Pico watt of electricity.
- ❖ **Thermo-voltaic transducer**: - This transducer layer situated in Nano leaf generates electricity through thermal radiation of sunlight.
- ❖ **Photovoltaic transducer**: - this transducer layer situated in Nano leaf convert infrared radiation from sun into electricity.

DC Output from all the three transducers is combined with transducers of other leaves and are supplied to the Nano inverter to convert it into AC.

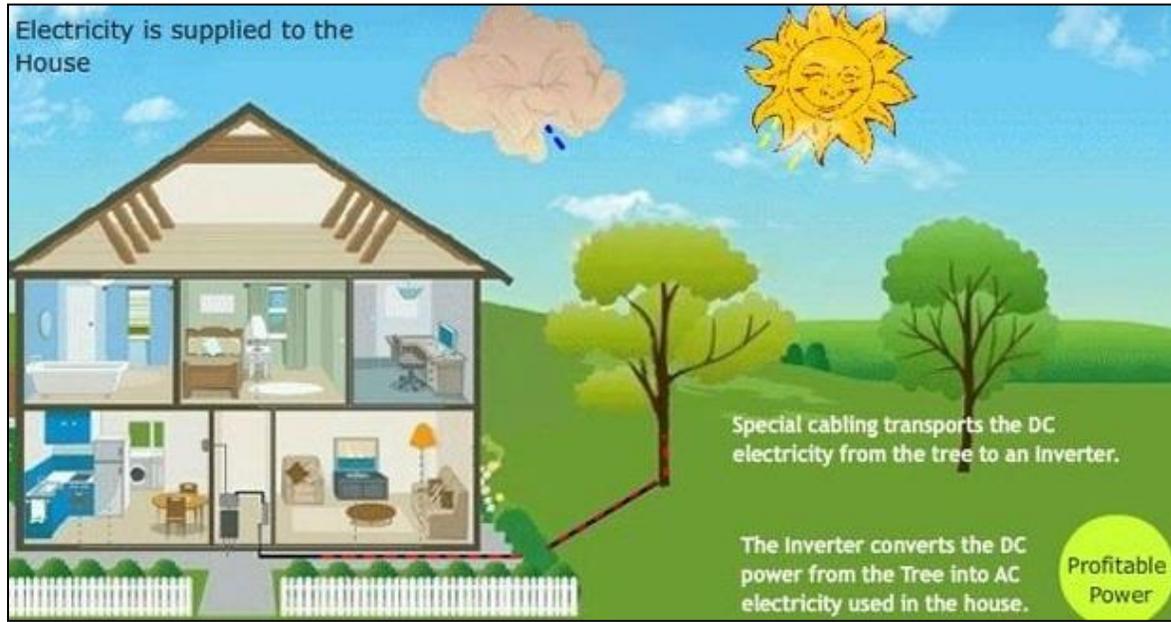


Fig.2 Solar Botanic Tree System

Table 1 Transducer Analysis For Various Sources

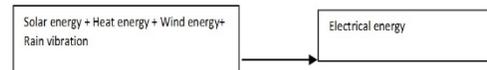
Weather condition	Piezoelectric transducer	Thermovoltaiic transducer	Photoelectric transducer	Electric output
Sunlight	0	1	1	1
Wind	1	0	0	1
Rain	1	0	0	1
Sunlight + wind	1	1	1	1
Wind + rain	1	0	0	1

For supplying power to the utility combined DC output from individual tree can be combined with other trees and then can be supplied to the power conditioning Centre which comprises of inverter harmonic controller and other controlling instrument. So in this case there is no need for individual Nano inverter In above figure DOI-10.18486/ijcsnt.2017.6.2.03 ISSN:2053-6283

‘0’ signifies not contributing to electric output and ‘1’ signifies contribution in producing electric energy **III. Future of Solar Botanic Tree In India**

Why solar botanic tree in India

- ❖ Existing renewable energy resources such as solar panels, wind and tidal turbines, bio-gas etc. are less efficient, require large land of area and are also expensive.
- ❖ India being a developing country and highly populated requires a power plant where maximum energy can be generated by using minimum land.
- ❖ Other sources like windmills and solar panels are limited up to wind and solar energy respectively.
- ❖ Solar botanic tree can use both solar and wind energy at same time in single structure.



- ❖ Solar botanic tree can supply significant portion of all electricity with combined solar wind power.
- ❖ Solar botanic tree will also harness more energy compared to roof top panels.

IV. Best Site to Use Solar Botanic Tree

- ❖ Desert: The earth has large areas of unexploited deserts which can be used to generate a massive amount of electricity, if artificial trees were planted.
- ❖ Golf courses, Recreation ground and parks
- ❖ Office Parking and industrial zone.



Fig.3 Sample Site

V. Application and Aadvantages

5.1. Application

- ❖ Supplying electricity in congested area.
- ❖ Working as energy source for distribution generator.
- ❖ In charging Electric hybrid cars.
- ❖ Supplying power in urban and rural area.
- ❖ Providing energy and shade in desert.
- ❖ Supplying electricity in geographical areas.
- ❖ Can be used in deforested and barren areas for natural beauty and energy generation.
- ❖ Can be placed across the highways, street,

balconies, verandas, private garden.

- ❖ Applicable on airports, mountain regions, coastlines.
- ❖ Can be used for crop protection along with energy generation.

5.2. Advantages

- ❖ Less land requirement.
- ❖ Efficient energy generation.
- ❖ Pollution free.
- ❖ Can work on one or more energy sources simultaneously.
- ❖ Enhance natural beauty.

VI. Conclusion

This eco-friendly, highly efficient artificial trees will make use of renewable energy from the sun along with wind power and rain vibration, which are an effective clean and environmentally sound medium of collecting solar radiation and wind energy. By use of these trees the energy crisis can be dealt with an efficient, non-polluting manner. There is no doubt that in India both population and pollution are increasing day by day as such man to land ratio will drastically reduce and land requirement for solar power generation can't be fulfilled. So, technologies like solar botanic tree will be the prime source of energy and solve the problem of energy crisis by satisfying various constraints.

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