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

(IJCSNT) International Journal of Communication Systems and Network Technologies
ISSN Number: 2053-6283
Volume 6, Issue No. 2, 85–90

https://journals.mirlabs.in/index.php/ijcsnt
DOI-10.18486/ijcsnt/6.2.082

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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.

Received: 02 May 2017; **Revised:** 09 August 2017; **Accepted:** 25 August 2017;
Published: 31 August 2017;

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Introduction

In countries like India, strength intake has been growing at an exponential price[1]. due to populace explosion and land acquisition problem, it becomes very difficult to establish a power plant which requires a large area for its establishment[2]. Although these renewable energy resources can fulfill future energy demand but in highly populated country like India these resources require a large area for their installation[3].

The floor of the earth gets sun radiation energy at an average of 81,000 terawatt-exceeding the complete international electricity consumption[4]. This area saving tree could now not only make it less difficult to grow solar and wind strength technology to mild up houses however additionally beautify the classy price of an area[5]. In this paper, an effort has been made to introduce the solar botanic tree which is capable of harnessing solar, wind as well as rain energy in a single structure and requires less land as compared to conventional renewable resources[6].

Solar Botanic Tree

Components of solar botanic tree

The solar botanic tree will mainly consist of

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

Figure 1. Nano leaves

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 3500 kwh–7000 kwh per year. The solar botanic evergreen trees can provide more than the broad leaf trees.

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.
- **Solar Energy:** There are also small photovoltaic cells (PV) incorporated in the nano leaves. These small PV cells capture the solar energy and convert it into electrical energy.
- **Kinetic energy:** Kinetic energy is captured through movement of Nano leaves. The wind generates motion in stems and branches of nano leaves which is converted into electrical energy through piezoelectric transducer.

Working of solar botanic tree

In every Nano leaf of solar botanic tree, there are three types of transducers which are incorporated[7]. They are:

- **Piezoelectric transducer:** This transducer works when outside force like wind, rain produce mechanical stress in petiole of nano leaf and this mechanical stress is converted into electrical energy[8].
- **Thermo-voltaic transducer:** This transducer layer situated in Nano leaf generate electricity through thermal radiation.
- **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[9].

For supplying power to the utility combined DC output from individual tree can be combined with other tress and then can be supplied to the grid after converting it into AC through the inverter[10].

In above figure ‘0’ signifies not contributing to electric output and ‘1’ signifies contribution in producing electric energy.

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 area and are limited to a single energy source[11]. India being a developing country

Figure 2. Solar botanic tree system

Table 1. Transducer analysis for various sources

Weather condition	Piezoelectric transducer	Thermo-voltaic 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

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.

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 are planted in these deserts.
- Golf courses, Recreation ground and parks
- Office Parking and industrial zone.

Figure 3. Sample site

Application and Advantages

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.

Advantages

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

Conclusion

This eco-friendly, highly efficient artificial trees will make use of renewable energy from the sun along with wind power and rain to generate electrical energy. It requires very less land as compared to the conventional renewable energy resources and can work on more than one energy source simultaneously.

Thus, solar botanic tree can be the best available renewable resource in India for generating electricity while enhancing the natural beauty of the area.

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