

Solar Park with Photovoltaic 3D-printed Trees: Technology Allies with Nature

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The future of our planet is balancing on a thread: combating climate change. Natural substances and fossil fuels are not replenished at the speed at which they are consumed, yet there are ever-growing energy needs. The need to exploit clean solar energy is great, as according to a research only 0.01% of the total energy globally comes from solar energy. Striving towards renewable energies is demanded. Hence, we propose a forest with 3D-printed trees, whose leaves will harvest solar energy. A prototype has already been created and tested. We provide three crucial innovations. A gyroscopic mechanism will adjust accordingly the leaves' position and inclination to be constantly facing the sun, whose rays should be perpendicular to the photovoltaic's surface. As shown from the formula $I = I_0 \cos\theta$, where I_0 is the maximum intensity of the sun's radiation and $\cos\theta$ is the cosine of the angle formed by the sun's ray with the perpendicular to the surface, when the angle θ is zero, the intensity is maximized since $\cos 0 = 1$. Thus, this mechanism improves efficiency. Also, an automated process will control the trees' heights, so that none is shaded to captivate maximum energy. Finally, each tree will rotate around itself at a constant rate depending on the heat, since with excessive temperature rise a decrease in the efficiency of the panels occurs. Our leaves utilize as much solar energy as possible avoiding the aforementioned phenomenon. These innovations, when implemented, can become pillars for a green future.

Awards Won:

King Abdulaziz &

his Companions Foundation for Giftedness and Creativity: On-line Mawhiba Universal Enrichment Program

Ricoh USA, Inc: Ricoh Sustainable Development Award of \$10,000

King Abdulaziz &

his Companions Foundation for Giftedness and Creativity: Award of \$500

Edison International : Second Award of \$1,250