PRELIMINARY STUDY ON INDOOR SOLAR POWER PRODUCER USING SOLAR TUBE

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Solar panels rely on direct sunlight to generate electricity effectively. However, factors such as shading from obstructions, animal interference, harsh weather conditions, and panel orientation can significantly impact their performance. Importantly, due to urbanization, accessing direct sunlight becomes increasingly challenging. To overcome these challenges, the installation of indoor solar panels can be an innovative solution with minimal maintenance for harnessing sunlight in indoor spaces where outdoor installation is not feasible. Solar tubes are compact and cost-effective instruments used to direct sunlight into indoor spaces. The solar tube captures sunlight from outside through a dome, channel it through a light-guiding tube, and diffuses it into the indoor spaces. This study investigates the feasibility and effectiveness of indoor solar panel installation by comparing their performance with outdoor solar panels. Two polycrystalline 5 W solar panels were used in this study. One solar panel was installed inside a model house with dimension of $50\ \text{cm} \times 40\ \text{cm} \times 40\ \text{cm}$ as an indoor solar panel, while the other solar panel was placed on top of the model house. Measurements were taken using an automated IoT based microcontroller system. Preliminary results suggests that indoor solar panel was $10\ \%$ as efficient as the outdoor panel. By exploring indoor solar panels with light-guiding tubes, we have introduced an alternative solution to access more solar electricity, contributing to the development of indoor solar technology and address common issues with outdoor solar panels. This aligns with the global push for clean energy by introducing innovative methods to expand solar energy use.

***Keywords**: Indoor solar panels, IoT, Light-guide, Solar tube, Sustainable energy.*