SUSTAINABLE CAPSTONE PROJECTS (SCAP)
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SMALL SOLAR PANELS RELATED INDOOR AND OUTDOOR TESTING AND MEASUREMENTS

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INTRODUCTION

The main motivation behind this project is to explore the potential benefits of small solar panels for indoor and outdoor use. The use of solar energy has become increasingly popular due to its renewable nature and environmental benefits. By conducting testing and measurements on small solar panels, we aim to understand their performance and efficiency in various conditions. The objectives of this project are to assess the power output and temperature variations of small solar panels under different angles and lighting conditions. This will help us determine the optimal positioning and usage of these panels for maximum energy generation.

FINAL PRODUCT

The testing and measurement groups have made several changes to the constructed project. We have used a small solar panel connected to a multimeter to measure the temperature variations. The type of tests and measurements conducted include measuring the open circuit voltage (Voc), short circuit current (Isc), and power output (P) of the solar panels. These tests were performed under different angles and lighting conditions to simulate real-world scenarios. The conditions were carefully controlled to ensure accurate measurements and reliable data.

RESULTS AND DISCUSSION

Based on the measurements taken, we have observed variations in the voltage and current output of the small solar panels at different angles. The open circuit voltage (Voc) ranged from 20.20V to 20.620V, while the short circuit current (Isc) ranged from 0.71A to 0.72A.The power output (P) of the panels also varied based on the angle and lighting conditions. Further analysis of the results revealed that certain angles and lighting conditions resulted in higher power output, indicating the importance of proper positioning and orientation of the panels. Possible future directions for improving the project include conducting more extensive testing with a larger sample size of small solar panels. This would provide a more comprehensive understanding of their performance and efficiency in different environments.

Here are the some of the measurement taken at different days and different time.

First angle at 12:16
Voc 20.80v
Ioc 0.71A
Second angle
Voc 20.68v
Ioc 0.72A
Third angle
Voc 20.62v
Ioc 0.71A
Fourth angle
Voc 20.54v
Ioc 0.68A
Fifth angle
Voc 20.80v
Ioc 0.71A

MATERIALS USED IN CONSTRUCTION

For the realization of this project, certain materials were used. these have been categorized into two parts

Re-Used/Recycled Materials:

wood
Ceiling wood

Other Materials:

Saw cutting
Screws
Glu
Measuring tape

CONCLUSIONS

The findings of this project highlight the potential benefits of small solar panels for indoor and outdoor use. The measurements taken demonstrate the variations in voltage, current, and power output based on different angles and lighting conditions.These findings are significant as they provide valuable insights into the optimal positioning and usage of small solar panels for maximum energy generation. The project also highlights the challenges faced in conducting accurate measurements and controlling conditions for reliable data collection.By participating in the SCAP program and working on this project, we have gained a new understanding of the performance and efficiency of small solar panels. This experience has broadened our knowledge of renewable energy and its potential applications in various settings

REFERENCES

1. https://www.energy.gov/
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