

Problem Statement and Goals

Solar Cooker Energy Calculation

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Table 1: Revision History

Date	Developer(s)	Change
20 January 2023	Deesha Patel	Initial release of document
22 January 2023	Deesha Patel	Updates according to issue

1 Problem Statement

Renewable energy is essential nowadays as fossil fuel causing damage to the environment in all ways. Many countries have started to develop the renewable energy. Solar energy can be used in heating water, cooking food and transforming it into another form of energy.

1.1 Problem

The main challenge for developing is how to utilize more solar energy by changing the box design or choice of glass. One work by Grupp, M., Montagne, P., and Wackernagel, M. (1) includes replacing the conventional solar cooker (where we can put the pot anywhere in the box) with the fixed pot position in a solar cooker. Even though such design choices give good results, we need to focus on how the internal reflector of the glasses can affect the cooking temperature in the conventional box. This project aims to calculate and analyze how internal reflectors can be helpful in improving the overall cooking temperature in the solar cooker. We got the inspiration for this project from a proposed mathematical model of internal reflectors (2). And when the internal steps are added, the inside temperatures in the solar cooker also increase.

1.2 Inputs and Outputs

It will take several inputs including the number of reflectors, glass considerations (angle, size, dimension, thickness), and solar radiation, and give an output of

our analysis to use the internal reflector method in increasing temperature in the box.

1.3 Stakeholders

The companies who manufacture the solar cooker are the potential stakeholders of our system. Citizen of the countries who want to support the country in development of Renewable energy are end-user.

1.4 Environment

This software can be deploy on any operating system including Mac OS, Windows 10 and greater and Linux operating system.

2 Goals

1. It will provide improved temperature in Solar Cooker.
2. It will give solution to utilize more heat energy for cooking food compare to existing solutions.

3 Stretch Goals

1. We will Visualize the final Structure and make it real.
2. We will experiment proposed solution in different environment and regions which can give us a surety that it work as desired.

References

- [1] Michael Grupp, Pierre Montagne, and Mathis Wackernagel. A novel advanced box-type solar cooker. *Solar Energy*, 47(2):107–113, 1991.
- [2] Hilario Terres, Arturo Lizardi, Raymundo Lpez, Mabel Vaca, and Sandra Chvez. Mathematical model to study solar cookers box-type with internal reflectors. *Energy Procedia*, 57:1583–1592, 2014. 2013 ISES Solar World Congress.