An Interdisciplinary Approach to Deforestation and Lung Disease: Using Photovoltaic Systems to Build Low-Cost Solar Cookers

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Globally, more than 1.3 million people die prematurely each year because of exposure to indoor air pollution due to the burning of biomass. The burning of wood and other solid materials for cooking releases carbon dioxide, the leading cause of global warming. Additionally, the cost of solar energy decreases annually by twenty percent, and is rapidly becoming the easiest way to implement electricity in the developing world. This project is a novel approach to create a sustainable immersion heater, consisting of an outer metal tube, a thermally conductive and electrically insulative composite, and a diode chain, that can be used to aid countries undergoing demographic transition. To improve the prototype, different types of composites, such as magnesium oxide and sesame oil, were tested, along with improvements in the overall efficiency and affordability of the heaters. The immersion heaters were either connected to a DC power supply or a solar panel, and temperature sensors documented temperature differences in order to determine the best internal composite. The data was analyzed scientifically and sociologically through indicators created by the United Nations Development Programme. The final design was an oil-based heater made out of recycled aluminum soda cans that costs $1.48 to build. Further testing would be to attempt to cook dry goods, as immersion heaters can only be used on wet goods.

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