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*Boosting Solar-Collector Efficiency with a Fresnel Lens*

This project attempted to design a more efficient and less costly form of converting solar energy to electricity through photovoltaic solar cells. Since a significant cost of a solar panel installation is directly tied to the cost of the solar cell, the goal was to increase the amount of light directed to the cell thereby reducing the number of solar cells needed.

The approach was to focus concentrated sunlight onto a solar cell by use of a Fresnel lens. A Fresnel lens was selected as it is thin, light weight, and can focus the light on a small area. By placing the solar panels on a test apparatus which would hold two 8x11 inch Fresnel lenses, data was then collected to measure the converted solar energy. The electricity produced from the concentrated cell was compared to a cell that was in a fixed position and another cell that would move with the concentrated cell but without a lens as the control. The sun's focal point was centered on the solar cells while the current (amps) was measured and recorded using a laptop computer.

From this experiment it was concluded that a Fresnel lens can concentrate the sun's energy and produce significantly more power provided that the temperature of the cell can be limited. The data showed that the amp output was increased by 42%.

The applications of this project would be in residential to industrial solar energy sources by providing less costly and more efficient energy from sunlight.