CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Will Rendall; Caleb Zeid

Project Number
S0717

Project Title
Photovoltaic vs. Solar Thermal Energy

Abstract

Objectives/Goals
Our purpose was to investigate the efficiency of Stirling Engines and Photovoltaic Cells in harnessing solar energy.

Methods/Materials
We used a compass to orient our project, as well as a protractor to acquire the correct altitude and azimuth angles for optimal sun exposure. Having correctly mounted the Stirling Engine, we attached a 1 meter length of fishing line to its wheel and a 1 Kg mass. We used a stopwatch to measure the time required for the engine to complete the 9.8 joule process.

Results
A standard photovoltaic cell (solar panel) produces .017 Watts/Cm^2, while our Stirling Engine harnessed .003 Watts/Cm^2 making them 12.1% and 2.14% efficient, respectively.

Conclusions/Discussion
Our data suggests that a Stirling Engine is vastly outperformed by a Solar Cell. However, our multitude research asserts that while the upper echelon solar panel is 15% efficient, a Stirling Engine can be upwards of 30% efficient, thus we conclude that our particular Stirling Engine was inferior, but not all engines as a rule.

Summary Statement
A comparative analysis of energy collection through thermal and photoelectric use of the sun

Help Received
Donn Cushing, JVHS Shop Teacher, provided engine