**Minuri Gamage**

Junior Division Energy & Transportation

*Here Comes the Sun....*

This project is designed to investigate if solar panels mounted on a typical Colorado homes' roof can produce sufficient electric energy to satisfy the lighting needs of the home. Additionally, the effect of the angle of the sun with respect to the surface of the solar panel was investigated. This was used to determine if a roof in any orientation could be used for mounting solar panels effectively. A home built Pyranometer constructed using a solar panel, a current meter and a variable resistor was used to measure the amount of sunlight that could be converted to electricity. It was calibrated in full sun. Many trials of the experiment were conducted on multiple sunny days. Cloudy conditions were simulated using a shield, and the angle of the panel was changed to different sun angles. With the panel facing the sun, up to 90% of the solar energy is converted to electricity by solar panels even on cloudy days. The results show that they produce about 70% of maximum capacity in the worst conditions (cloudy days), even when the panels are facing away from the sun. For a typical home using 300 watts of lighting for 4 hours a night, modern solar panels can produce all of the energy needs using 1000 square feet or less of roof surface. The investigation and analysis of results prove that the amount of sunlight received in Colorado, if converted to electricity using roof mounted solar panels is sufficient to satisfy the lighting needs of a typical home. The results also show that the orientation of the solar panel mounted on the roof does not significantly reduce its effectiveness.