



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Kenny Hua	Project Number J0209
Project Title Waste Heat Recovery	
Abstract Objectives/Goals The objective of this study is to find a way to capture heat energy produced from electrical appliances and recycle it into usable electrical energy. Methods/Materials 40 watts light bulb, electrical wires, 40mm x 40 mm thermoelectric cooler (TEC) module, 40mm x 40 mm heat sink, and a digital multimeter. I constructed the apparatus and used it to collect and convert thermal energy into electrical energy. The experiment was conducted with the TEC placed at three different distances from the heat source (light bulb) and 10 trials were done at each distance. The multimeter was used to measure the amperage and voltage that were produced by the waste heat recovery apparatus. Results After placing the TEC at three different distances from the light bulb in an attempt to recycle the heat energy, I found that placing the TEC at 0cm away from the heat source produced the greatest result. When the TEC was 4cm away from the light bulb, only 0.0009 watts were produced. 0.0018 watts were produced when the TEC was placed 2cm away from the light bulb and 0.0054 watts at the distance of 0cm. This indicates that it is possible to recycle heat energy into a usable electrical energy. Conclusions/Discussion As a result of the experiment, I have managed to ascertain that it is possible to recycle heat energy and convert it into electrical energy that can be used for other purposes. This means that any equipment that is capable of producing heat can serve as a potential source of energy through this particular method of waste heat recovery.	
Summary Statement I devised and constructed a system to recycle heat energy and converted it to electrical energy.	
Help Received I designed and constructed the apparatus, and performed the experiment by myself.	