Characterizing the Electrical and Thermal Performance of a Circular Exhaust Pipe Thermoelectric Generator

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A circular thermoelectric generator (CTEG) device will be built to recycle the wasted thermal energy given off by an automobile exhaust pipe. The devices that will be utilized to build the CTEG are soldering gun, fume hood, thermocouple thermometer, thermocouple probes, volt/amp meter, and a car's exhaust pipe. The CTEG is beneficial to the world because it promotes the idea that people can decrease the pollution they contribute to the environment by reclaiming the wasted thermal energy that come from the usage of fossil fuel in vehicles. In the experiment, the CTEG will fasten around an automobile exhaust pipe. The temperature difference between the direct contact with the exhaust pipe and the area around the exterior of the CTEG will allow the researcher to measure the power generated with a volt/amp meter (Seebeck effect). The researcher will measure the CTEG’s generated power outside every five minutes until the engine is running for 30 minutes. This will provide a method to determine the optimal engine time and location the CTEG was the most efficient. The efficiency of the CTEG will be evaluated by plotting the delta-T measurements on the x-axis and power generated on the y-axis. The associations between the two variables will be run through regression line calculations, which allows the researcher to analyze the performance of the CTEG numerically. The expected outcome of the data and numerical calculations is a strong, positive, and linear association between the delta-Ts and the power generated by the CTEG device.

Awards Won:
Fourth Award of $500