



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

<b>Name(s)</b> <b>Ian Weiss</b>	<b>Project Number</b> <b>S1719</b>
<b>Project Title</b> <b>Our Roads: A Large Thermoelectric Generator</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> A road setup produces a temperature gradient and creates an electrical charge through the Seebeck Effect and with that creating energy.</p> <p><b>Methods</b> A thermoelectric power generation system, which I build through a pavement setup with copper pipes and a pumping system that then takes in heat from a source (the pavement) and outputs electricity (the warmed water pumping into a bowl). It does this by using a thermoelectric module or plate, which needs a temperature difference from one side to the other to generate electricity.</p> <p><b>Results</b> The average temperatures over this testing period ran in the high 70s and the energy production maintained steady in the 4-volt range, peaking at 4.3 volts when the high for the day reached 75 degrees Fahrenheit. My setup was able to harvest a consistent charge of 5 volts when temperatures reached above 80 degrees Fahrenheit, which is enough energy to charge an iPhone or power the average LED light requiring approximately 1.5 volts of energy. All in all my experiment was a success because I found a way to turn wasted heat energy into electrical energy, which can help protect our environment as our population grows.</p> <p><b>Conclusions</b> Converting my system to a larger model, like a neighborhood street, would produce higher output. For example the street we live on measures 800 feet long by 35 feet wide., That gives us a square footage of 28,000 square feet. At the rate of 5 volts per minute for a 2 square foot area this would mean my street would be able to produce 70,000 volts per minute. Now imagine what an entire city could produce all while using clean solar energy and protecting our environment.</p>	
<b>Summary Statement</b> I created a thermoelectric generator that produced energy.	
<b>Help Received</b> None. I designed, build and ran this experiment at home.	