CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)	Project Number
Laura Gong	**S1206**

Project Title

Analysis of Optimal Locations for Ocean Wave to Maximize Energy Generation

Abstract

Objectives/Goals
Energy making-related emissions from power plants and other traditional fuels cause major respiratory and cardiovascular health risks. Producing reusable, environment-friendly energy such as harnessing energy from ocean waves is necessary. This project#s long term goal is to develop the most efficient way to harness potential energy from ocean waves with the use of point absorber buoys, which produces more usable energy as there are greater wave heights. The first-year goal is to analyze which areas along the coast of California have the largest waves in specific future weeks, thus producing more energy.

Methods/Materials
Collecting previous wave height data from coasts along the California coast is crucial to predict where and which weeks will have the greatest wave heights. Python 2.7 program is capable of predicting and graphing previous and future wave heights. It is necessary to predict and graph the wind speed in those certain locations to analyze the how wind speeds affect the height of waves. Graphs of the wave heights, wind speed, gust speed and air temperature show the relationship between them to predict which week will have large waves.

Results
Optimal sites to place point absorbers are in Cape Mendocino, Diablo Canyon, Half Moon Bay, Humboldt Bay, and San Francisco. The second week of December will have the highest waves. Therefore the optimal week to harness energy from ocean waves is during the second week of December.

Conclusions/Discussion
The data analysis goal was reached as the optimum locations to produce the most energy were found. Most data regarding wind speed and gust speed show that higher waves have speeds greater than average speeds that year. The graphs concerning sea surface temperature greatly differ. Thus, sea surface temperature isn#t a major factor to determine wave heights, but wind speed and gust speed are.

Summary Statement

This analysis decides the optimal locations along the coast of California to put point absorbers by finding the relationship of possible factors: wind speed, gust speed, and sea surface temperature - to wave heights.

Help Received

Mrs. Julie Munoz provided support throughout the process. I received my data from NOAA National Data Buoy Center. I then ran the data through a Python script I had created on my own