CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)
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Project Number
S1029

Project Title
Utilizing Floating Solar Panels to Save Dry Reservoirs: Folsom Lake

Abstract

Objectives/Goals
In 2015, California experienced the worst drought in history and reservoirs have been highly affected by it. Water levels in reservoirs slowly decreased, but there is a solution. Through the use of solar panels and hydroelectric generators, water can be conserved by reducing surface area of water exposed to sunlight and by moving water upstream. The system proposed utilizes a simple two way hydroelectric generator along with a floating array of solar panels. Large arrays of solar panels will be deployed into the lake and will be connected to the hydroelectric pumps to reduce evaporation and produce energy.

Methods/Materials
The materials consisted of a 60W solar panel, water pump and a generator. I designed a prototype model of the generator and the proposed floating solar panels. The solar panel was connected to the generator by wires to produce solar energy for the generator to act as a motor. The motor is what generates motion for the water to transfer from one side to another. The transfer of water was directed through tubes on the water pump.

Results
By comparing Folsom Lake to similar situations where solutions have been applied, the total cost of the proposed Folsom Lake drought solution is preliminarily estimated to be about $400 million. As calculated the Floating Solar Panels would only take up 1/10 of the lake#s surface area to produce the same kWh/year as the Folsom Lake Power Plant. For the water that is covered by the solar panels, evaporation would be reduced up to 70% in that area and Folsom Lake would save a total of 10% or more of water storage. In addition, the solar power would also be utilized to pump water from the American River to Folsom Lake if ever needed.

Conclusions/Discussion
Floating Solar Panels on reservoirs save land, are up to 30% more efficient in generating solar power, improves water quality, reduces evaporation, slows algae growth, and withstands earthquakes. The prototype model was built to illustrate the effectiveness of solar panels in the transfer of water and to study the effect of floating solar panels on top of Folsom Lake. To calculate different numbers and percentages, similar projects were researched for comparison purposes. By focusing our attention on one reservoir can aid other reservoirs with the same issue which is the main goal of this project.

Summary Statement
My project focuses on Folsom Lake, but proposes a solution to save all reservoirs that suffer from drought, evaporation, and lack of water.

Help Received
Professor Zhao at UC Davis helped answer questions that I had about solar energy and its importance on the world. I designed the prototype model and came up with the idea myself.