

Sustainably Covering the Central Arizona Project Canal:

Max Kukuchka-Melder | Sustainable Built Environments | Spring 2018 Capstone Showcase



College of Architecture, Planning & Landscape Architecture

Introduction:

The Colorado River is one of the most important commodities in the United States for supplying water to millions of people. It is regarded as the life line of the Southwest, and for the state of Arizona the Central Arizona Project is the canal that transports 1.5 million acre feet of Colorado River water throughout the state. With rising temperatures and Colorado River levels decreasing, water is becoming increasingly more valuable. This study was used to propose a project that would involve covering the canal with three different sustainable materials/technologies.

Methods:

Research was conducted through extensive literature review to be able to correctly conduct a cost benefit analysis of the three sustainable materials/technologies that would be proposed to cover the Central Arizona Project canal. Calculations were then completed to determine cost per square foot of each material/technology. The technologies were then evaluated and determined whether or not they were feasible or unfeasible to be implemented currently in the Central Arizona Project canal infrastructure.

Technologies	Cost	Coverage Rate	Life Expectancy	Energy Production
 Shade Balls	\$1.90-\$2.00 ft ²	91%	25+ years	N/A
 Floating Covers	\$1.90- \$2.00 ft ²	95-99%	20+ years	N/A
 Floating Solar	\$2.71 and \$3.57 per watt	99%	25+ years	15 watts ft ²

Results:

Using the CAP commercial cost of water (\$0.69) to calculate the cost per 748 gallons which is equal to one Ccf (100 cubic feet), this results in the loss of \$8,560,645.96 dollars worth of the water due to the 4.4% evaporation off the canal. The sustainable technologies listed have a coverage rate of over 90% which would drastically effect the amount of water that is lost and the cost that comes with that water loss. The financial feasibility and coverage rate is truly what determines the feasibility of the three technologies and how they could actually be implemented into the Central Arizona Project canal system.

Conclusion:

As the technology stands today, it is not feasible to cover the Central Arizona Project canal with the three sustainable options that were studied. It would be far too costly to cover the entire canal with floating covers or shade balls to financially offset the amount of water that is lost to evaporation, and floating solar is too expensive per square foot and does not produce enough power to significantly offset any of the CAP power needs at this time. Future research must be conducted and with the increase of climate change, population growth, and cost of water, these technologies will be necessary for a sustainable future.