Sustainable Synergy in GSL: *Exploring a Dual Approach to Reduce Evaporation & Generate Solar Power*

Yuliana Garcia & Dr. Upmanu Lall
University of Michigan - Ann Arbor; Columbia University

Introduction: The Great Salt Lake in Utah—characterized by its reliance on evaporation as the sole outflow—faces a significant challenge due to declining water levels; hence, there is a *need* to consider the potential of floating solar panels as a solution to mitigate evaporation. Given that surface area has been shrinking rapidly over last decade with new record low in 2022 at 4,189.6 ft. (NASA, 2022) it is essential to address the important ecological, health and economic implications of the GSL, as it is a crucial indicator of regional climate.

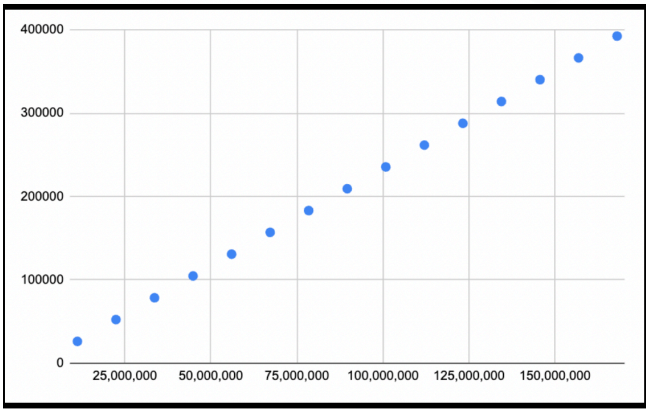

Figure 1. Linear Relationship of Collected Data

Methods: By harnessing solar energy and reducing water loss, floating solar panels offer a dual benefit of renewable electricity generation and, to an extent, the preservation of the vital ecosystem. This study thoroughly analyzes past installations, documented evaporation reduction, energy production, costs, and any reported problems to propose a customized resolution for the Great Salt Lake. Methods for calculating solar production are outlined, taking into account the optimal fraction of the lake for maximizing energy production; therefore, a relationship between variables and patterns to determine ideal panel coverage in GSL were established.

Results: With the implementation of floating solar panels, approximately 70% of evaporation can be reduced, with benefits that outweigh the costs. Furthermore, implementation can lead to potential revenue generation and water resource conservation. Thorough consideration of associated costs and environmental impacts is essential before large-scale adoption.

Conclusions:. Essentially, when leveraging collected relevant data, insight into the viability, advantages, and potential impact of implementing floating solar panels on the Great Salt Lake was evaluated. Hence, contributing to sustainable water management and renewable energy generation. This is a potentially outstanding solution to the problem since instead of a cost for water saving there is co-benefits.

References:

1) Calder, R. and C. Neal, 1984. Evaporation from Saline Lakes: A Combination Equation Approach. J. Hydrol. Sci., 29(1), p. 89.

2) The Great Shrinking Lake. NASA. https://earthobservatory.nasa.gov/images/150187/the-great-shrinking-lake

3) Riley, J J. 1966. The Heat Balance of Class A Evaporation Pan. Water Resources Research, 2(2), p. 223.

4) Salhotra, A. M., E. E. Adams, and D. R.F Harleman, 1985. Effect of Salinity and Ionic Composition on Evaporation—Analysis of Dead Sea Evaporation Pans. Water Resources Research, 21(9), p. 1336.

5) USGS. (n.d.). USGS 10010000 GREAT SALT LAKE AT SALTAIR BOAT HARBOR, UT. USGS current conditions for USGS 10010000 Great Salt Lake at Saltair Boat Harbor, UT. https://waterdata.usgs.gov/ut/cb_62614=on&format=html&site_no=10010000&referred_module=sw&period=&begin_date=1985-01-01&end_date=2022-08-09

Acknowledgements: In addition, I want to express my gratitude to the Amazon SURE Program and the Water Lab— especially to my mentor, Dr. Upmanu Lall—for all the support and input.