



**4<sup>th</sup> Annual Cal Poly Pomona Student RSCA Conference**  
**March 4, 2016**

**University Library,**

Oral Presentations from 12:45 to 5 pm

**Bronco Student Center (Ursa Major),**

Poster Session, Performance Presentation, and Reception from 4 to 6:30 pm

**Lead Author:** Sean Yazdi

**Major:** Mechanical Engineering

**College:** Engineering

**Co-author(s):** Andres Ceja, Abraham Morales, Vien Nguyen

**Faculty Mentor(s):** Dr. Reza Lakeh and Dr. Ali Sharbat

**Presentation Type:** Oral Presentation

**Project Title:** Solar-assisted Inland Brackish Water Desalination System

**Synopsis:** Feasibility of using renewable energy for water reclamation projects

**Abstract:** Reverse osmosis technology that utilizes both photovoltaic panels to power the system and concentrated solar panels to directly heat the brackish solution prior to desalination is a useful way to harness solar energy to produce drinkable water. The hydraulic system brings brackish water to 250 psi and directs the flow through a reverse osmosis membrane that separates the salt content from a permeated solution. The concentrated solar panel system heats the brackish water before it enters the reverse osmosis membrane, allowing for an increased separation rate of salt particles from purified water. This desalination system can remove about 99% of particulates per pass while using 0.63 kWh to purify each cubic meter of water. Based on Southern California Edison's rate of \$0.46 per kWh, this unit saves \$0.29 per cubic meter of desalinated water while, on average, producing 1 liter of permeate every 10 minutes. The Environmental Protection Agency defines potable water as having less than 500 mg/L of total dissolved solids within the solution. Assuming the salinity of brackish water is between 500 to 10,000 mg/L, this unit can produce fresh drinking water from a wide range of saline solutions of varying salt content. Sodium chloride has been the target solute to remove due to its majority presence in water resources around southern California, specifically in local inland aquifers. In conclusion, this desalination system can remove sodium chloride from brackish water and effectively produce potable water while solely using renewable energy to power each process.