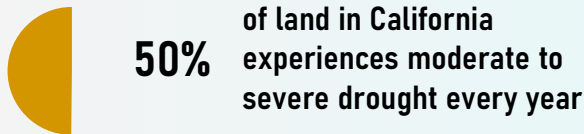


INTRODUCTION

This project proposes a desalination plant for municipal water production in the Southern California area. The process intakes seawater from coastal San Diego and removes large particles via flocculation and sedimentation. The clarified water passes into membrane bioreactors which reduce the water's dissolved organic content. This decreases membrane fouling frequency and reduces replacement costs. The pretreated water is then desalinated by passing it through a reverse osmosis system to produce fresh water which can be mineralized for human consumption.

SOCIETAL NEEDS



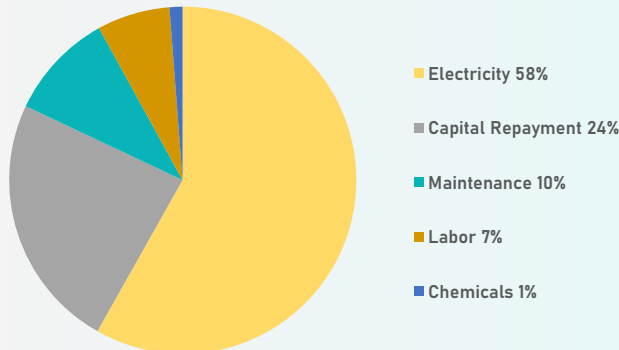
ECONOMIC ASSESSMENT

\$1048

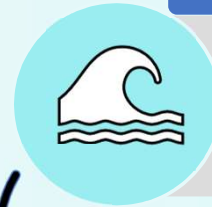
Cost Per Acre-Foot of Water

- Interest rate of 3%
- Increases 2.2% per year after 2020.
- 30 year payback period
- \$51.7 million annually

Cost Breakdown:



SEAWATER FEED



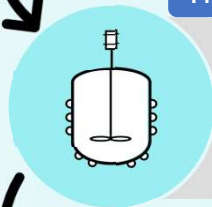
100 MGD of seawater is pumped into the desalination plant

PRE-TREATMENT



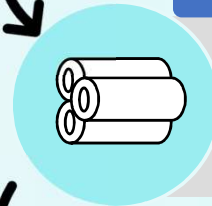
Suspended solids in the seawater are removed

MEMBRANE BIOREACTOR



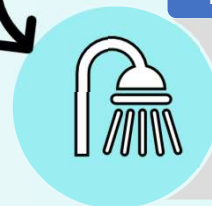
BOD is reduced by seawater microorganisms to extend the lifetime of RO membranes

REVERSE OSMOSIS



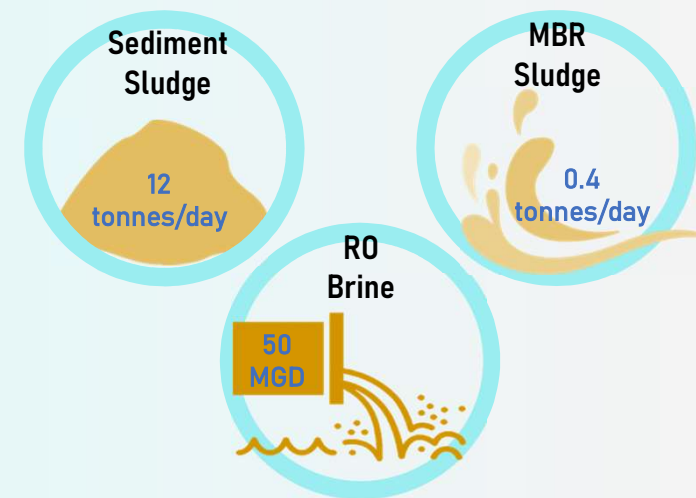
All remaining impurities in the seawater are removed

DESALINATED WATER



50 MGD Desalinated water is ready to be mineralized

ENVIRONMENTAL ANALYSIS



CORE TECHNOLOGIES

- **Membrane Bioreactor:** Bioreactor with suspended biomass and solid separation by microfiltration membranes.
- **Pressure Exchanger:** Energy recovery from high pressure brine to seawater.
- **Reverse Osmosis:** Spiral Wound membranes allow only water molecules pass through while rejecting most salt ions.

PLANT LAYOUT

