

# DESALINATION & ARCHITECTURE

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## THE HOOVER DAM

\_ The Hoover Dam was built in 1935 on the Colorado River, on the border between Arizona and Nevada.

\_ It was built as an effort to control floods, provide irrigation water, and produce hydroelectric power.

\_ This section of the Colorado River became Lake Mead, the largest man-made water reservoir in the U.S.



## LAKE MEAD

\_ Today, 8 million people in Arizona, Nevada, and California depend almost entirely on Lake Mead.

\_ Cities such as Las Vegas could not exist in the Mojave Desert without Lake Mead.

\_ Over one million acres of farmland need the lake for irrigation.



## RECENT YEARS

\_ More than 90 percent of Lake Mead's waters come from melting snow and rainfall in the Rocky Mountains of Utah, Colorado, and Wyoming.

\_ Factors, such as population growth, and a 12-year drought in the Rocky Mountains have led Lake Mead to lose more water than it is taking in, depleting it to near catastrophic levels.

\_ If no action is taken, Lake Mead water levels will deplete to a point where the Hoover is no longer useful, and it may potentially dry out by the year 2020.



## STATE PLAN

\_If the lake's elevation falls another 23 feet, the Southern Nevada Water Authority will be asked to give the go-ahead to construct a proposed pipeline to tap ground water across Eastern Nevada.

\_The 300 mile pipe-network will cost an estimated 5 to 15 billion dollars and will take some 10 to 15 years to complete.

\_Critics of the project expect it to cost more and to deliver less water than authorities have estimated. Some also fear that large-scale groundwater pumping would threaten wildlife and the livelihoods of ranchers and farmers.



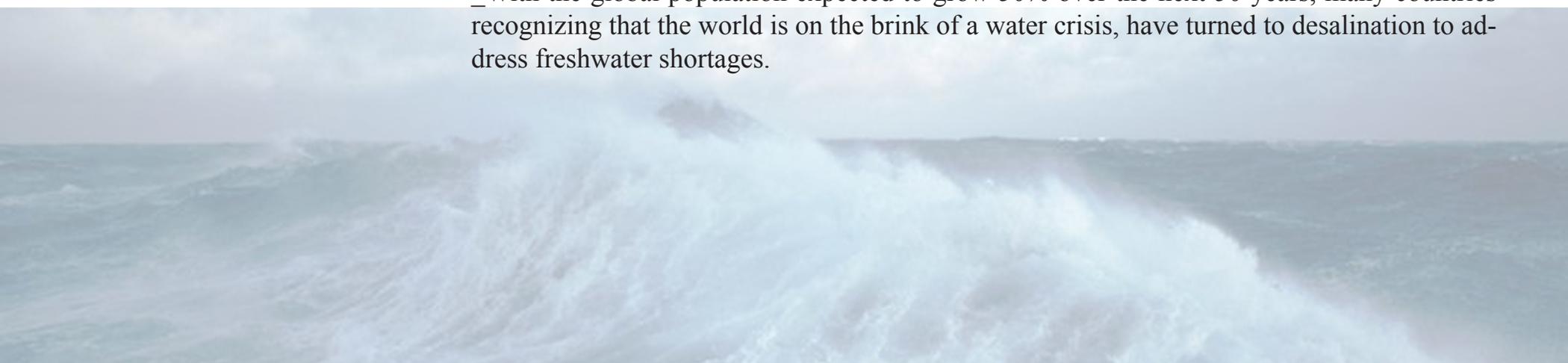
## MY PROPOSAL

\_ My proposal is to instead use the pipe-line to bring in seawater from Southern California and build a desalination plant on Lake Mead to produce the needed freshwater.

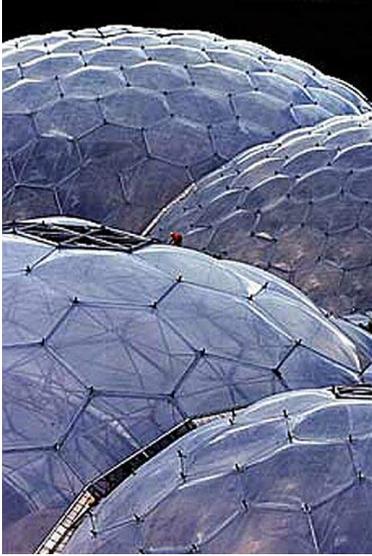
\_ Still, less than a decade ago, large-scale desalination was too energy intensive and too expensive to be economically considered as a source for freshwater. Large-scale desalination was only practiced in the Middle-East, where the demand for freshwater outweighed the cost of energy.

\_ Today, this is no longer the case. New technology is helping cut down on the cost of desalination. For some coastal cities, it is now less expensive to obtain freshwater from desalination, compared to traditional methods.

\_ With the global population expected to grow 50% over the next 50 years, many countries recognizing that the world is on the brink of a water crisis, have turned to desalination to address freshwater shortages.



## Eden Project



## CASE STUDIES

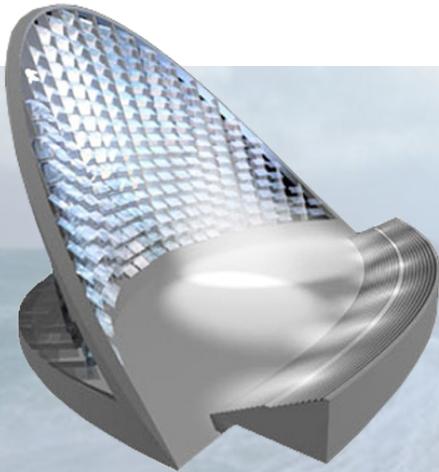
\_ Structural components of a desalination plant can be used to enhance the desalination process, at the same time helping to cut down on energy requirements.

\_ Two great examples of how architecture can enhance the desalination process are the Garden of Eden seawater greenhouse in England by Charlie Paton and Spain's Teatro Del Agua designed by Grimshaw architects.

\_ The Eden project is designed to trap heat and condense water that is already in the air using no fossil fuel. The result is a large amount of freshwater created from thin air and used to irrigate an indoor garden.

\_ Like the Garden of Eden, the Teatro Del Agua uses no fossil fuel to mimic the natural hydrologic cycle, at the same time providing an excellent outdoor theatre.

## Teatre Del Agua



## Brine Pollution



\_Desalination plants can cause pollution if salt waste Brine is not carefully disposed. Many desalination plants still dispose Brine waste in the ocean, increasing pollution and putting marine life at risk.

\_At a time when sustainability and energy conservation are among the leading trends in architecture, architects such as Rick Joy have shown that great buildings can be built primarily out rammed earth. And, in the Uyuni region in Chile, it is not uncommon to find houses that are built almost entirely out of salt.

\_My proposal involves producing freshwater from seawater, and using the leftover salt in applications, such as non-load bearing walls, lithium ion battery production, human consumption, and more, to prevent pollution.

## Salt Hotel



## A REFINING STONE

\_Pre-historic Native American cultures in the Mojave desert depended on stone to conduct their daily activities. It is with a refining stone that men would sharpen their bone and metal spears and it is also with a refining stone that women would grind corn to prepare flour tortillas.

\_Last semester, my studio challenge was to create an artifact. So, I aimed to create an artifact that is inspired by the native american refining stone but also that metaphorically speaks of the refinement present in a desalination plant, and then let the qualities of this artifact help me design a desalination plant.

