



San Diego County
Water Authority

Seawater Desalination

FACT SHEET

The San Diego County Water Authority currently relies on a single supplier of imported water — the Metropolitan Water District of Southern California. Up to 90 percent of the water used in San Diego County is imported. Diversifying the county's water resources is a crucial component of the Water Authority's long-term strategy for meeting the water supply needs of 3 million people in the region.



When looking for new water sources, it seems logical to look to the largest "reservoir" in the world — the vast Pacific Ocean. Seawater desalination — converting seawater into high-quality water suitable for drinking and other potable water uses — is a drought-proof water supply. In fact, the Water Authority has considered seawater a potential water source for decades. Until recently, however, seawater desalination has not been economically feasible.

That situation has changed.

New advances in seawater desalination technology and cost savings provided by locating desalination facilities next to coastal power plants have made the cost of seawater desalination more competitive with other water supplies available to the region. These developments have prompted the Water Authority to engage in a serious examination of several options that could make seawater desalination a reality in San Diego County in the near future.

Advancing Seawater Desalination Technologies

In the seawater desalination process, fresh water is separated from salty seawater. The remaining water, salts and impurities are then discharged as a salty byproduct, or brine. There are two methods for large-scale production of desalted water — distillation and reverse osmosis.

Distillation is the oldest seawater desalination process and has been used throughout the world. Distillation uses heat to evaporate water and separate it from salt and impurities. The evaporated

water is captured and condensed as fresh water. This is a reliable process, but is fuel-intensive and is primarily used in fuel-rich areas of the world such as the Middle East.

Reverse osmosis, a more energy-efficient process, uses semipermeable membranes to separate fresh water from seawater. Water from the ocean is forced at very high pressures through tightly wrapped membranes. The water molecules, smaller than almost all impurities including salts, are selectively able to pass through the membranes. The remaining impurities and residual water are discharged as brine, typically into the ocean.

In recent years, a dramatic reduction in the cost of reverse osmosis membranes, combined with improvements in membrane technology, have made

Why Now?

Seawater desalination now offers compelling advantages for the San Diego region. It produces very safe, high-quality and drought-proof water that would be locally controlled and managed entirely within the county. It is less affected by natural disasters such as earthquakes that could cut the region off from its imported water supplies. As an alternative water resource, seawater desalination would diversify the county's water supply mix and increase the region's self-reliance.

Moreover, several factors are converging to make seawater desalination more economically feasible — improved reverse osmosis technology, the economies of scale derived from sharing facilities with existing coastal power plants and funding opportunities created by legislation.

The Water Authority has an obligation to provide a safe and reliable water supply to the 23 water agencies it serves in San Diego County. It will continue to pursue all viable opportunities to add desalinated seawater to the region's inventory of water resources.

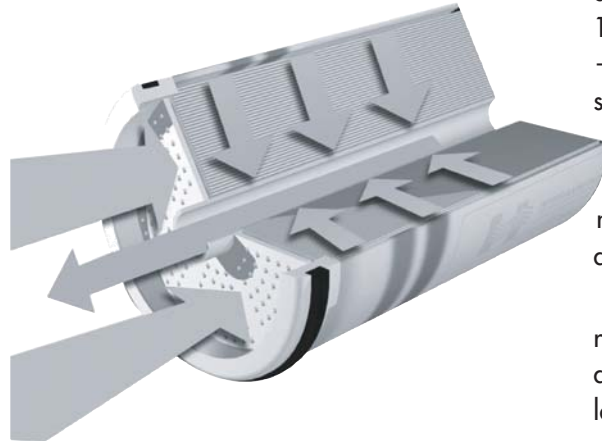
The Water Authority is actively pursuing seawater desalination as a potential water source for San Diego County. Seawater desalination is expected to become a significant source of the region's water supply.

The Water Authority is a public agency serving the San Diego region as a wholesale supplier of water. The Water Authority works through its 23 member agencies to provide a safe, reliable water supply to support the region's \$126 billion economy and the quality of life of 3 million residents.

FACT SHEET

seawater desalination more cost effective than in the past.

As seawater passes through layers of reverse osmosis membranes, water molecules are separated from salts and impurities to produce high-quality water.



Large amounts of water are measured in acre-feet. One acre-foot is equal to 326,000 gallons of water, the amount of water used by two typical four-person households in a year.

The Coastal Power Station Connection

Building a seawater desalination plant next to a coastal power plant offers several economic and environmental advantages. The power plant's existing seawater intake and discharge facilities that provide water to cool the plant's turbines could also deliver water to the seawater desalination facility and convey brine back to the ocean. At many locations, a collocated seawater desalination facility can be configured so that it does not increase the amount of seawater drawn in by the power plant. Additional cooling water would be available from the power plant to mix with the brine, diluting the concentration of salts before it is discharged into the ocean. Proximity to the power plant would also reduce the cost of bringing power to the seawater desalination facility and provides compatible use of coastal land. These factors all help to reduce the environmental impacts and cost of constructing, as well as operating, the seawater desalination plant.

The Water Authority Seawater Desalination Project

The first focus of the Water Authority's seawater desalination development effort is a facility which would be built on the site of the Encina Power Station in Carlsbad. The facility would use the power station's existing seawater intake and discharge infrastructure. It would be

the largest seawater desalination facility in the Western Hemisphere, producing 50 million gallons of desalinated seawater per day, or 56,000 acre-feet of desalinated seawater annually. This new water — representing nearly 10 percent of the region's imported water needs — would be delivered to existing water delivery systems including the Water Authority's regional aqueduct system.

Environmental compliance activities are now under way. The project could be operational as early as 2008.

The proposed facility would be similar to other reverse osmosis facilities around the world that are demonstrating the cost efficiencies provided by the latest seawater desalination technology.

Seawater Desalination Studies

In addition to the development of the seawater desalination project in Carlsbad, the Water Authority is evaluating other coastal locations that may be suitable for siting a regional seawater desalination facility. Locations in the South Bay and the San Onofre Nuclear Generating Station at the north end of San Diego County are among those options.

The Water Authority has published its Regional Water Facilities Master Plan that identifies the facilities needed to store, treat and transport water supplies to member agencies through 2030. The large-scale development of seawater desalination facilities, upwards of 100,000 acre-feet annually, has been identified as the best alternative for providing a new, safe, reliable supply of water for San Diego County.

Funding Opportunities

State and federal legislation has been introduced to support seawater desalination as a means of promoting water resource diversity. This could result in funding that would help defray the cost of seawater desalination projects.

Do You Want More Information?

Please call the toll-free project information line at (877) 682-9283, Ext. 7006. A Water Authority staff member will return your call within one business day.



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