

Water Plant's Long Journey

Idea for Desalination Facility Came Years Ago; Some Slam Its Cost, Energy Use

By [ERICA E. PHILLIPS](#)

CARLSBAD, Calif.—When the San Diego County Water Authority first hatched a dream of slaking this region's thirst with desalinated water from the Pacific Ocean, Southern California was reeling from a five-year drought that had choked its water supply by a third.

That was two decades ago.



San Diego County Water Authority
A rendering, in yellow, of a desalination plant in Carlsbad, Calif. The plant will make ocean water drinkable to supply a thirsty region.

Now, after a yearslong permitting process, a spate of lawsuits and a complex coordination effort, that dream has resulted in a freshly poured concrete foundation. This month, workers began assembling what is planned to be the Western Hemisphere's largest desalination plant in this city about 30 miles north of San Diego.

But the \$1 billion plant still could face hurdles. Environmentalists may raise further challenges over the large amount of energy it will consume and its impact on surrounding habitat. Consumer advocates say the resulting water rates will harm lower-income residents.

We're going to be opposing this project for the next 20 years, said Marco Gonzalez, an environmental lawyer who has brought legal challenges over the plant.

The plant's backers are undeterred. "The quest for water-supply reliability is a marathon, not a sprint," said Dennis Cushman, the water authority's assistant general manager. "You have to have the intestinal fortitude and a thick skin to get through it."

Once the plant is complete, including a 10-mile pipeline connecting its output to the authority's aqueduct, the new source is projected to supply about 7% of the county's water, or about 50 million gallons a day, starting in 2016.

From Sea to Faucet

Cost to build the Carlsbad Desalination

Project: \$1 billion

Expected startup date: 2016

2012 regional water use: 612,000 acre-feet*,
or about 200 billion gallons

2020 projected regional water use: 779,000
acre-feet

Percent of 2020 water use from new plant:
7%

Water-rate increase for household of four:
\$5-\$7/month

Source: San Diego County Water Authority

*equivalent to an acre filled one foot deep with
water

Though costly and energy-intensive to
produce, desalinated seawater has one

distinct advantage over the region's
other water sources: It is drought-proof.

Poseidon Water, a private Boston
company that finances and manages
water-infrastructure development, is
overseeing the construction of the
Carlsbad Desalination Project. The San
Diego water authority, which serves a
population of about 3.1 million,
completed financing on a 30-year

agreement with Poseidon last December.

Carlsbad is seen as a model for more than a dozen other similar West Coast projects working to get off the ground. California's Department of Water Resources convened a task force in 2002 to examine seawater desalination and the group found that, given the state's future water needs, desalination could be appropriate as part of each region's "water portfolio."

Desalinated ocean water has become common in the Middle East and in parts of Europe and Asia. Israel's urban areas, for example, get about 40% of their water from the sea.

The plant will use a technology called reverse osmosis. Water is pumped through a membrane with holes "half a million times smaller than the diameter of a human hair," said Peter MacLaggan, vice president for project development at Poseidon. The membranes reject 99.8% of the salt in the water, as well as bacteria, viruses and other particles, producing what Mr. MacLaggan called "extremely high-quality water."

But the process takes a tremendous amount of electricity. San Diego Gas & Electric built four new circuits to supply 40 megawatts of energy to run the plant—enough to power about 26,000 homes. The plant will cost some \$49 million to \$54 million a year to operate.

Desalination plants use "far more energy than any other water-supply option," said Leila Monroe, a lawyer with the Natural Resources Defense Council. The state task force's study says reverse osmosis requires about 30% more energy than existing water-supply systems.

Ms. Monroe said alternatives such as collecting storm water for reuse or installing low-flow toilets and showerheads are more efficient in many cases.

A family of four in urban San Diego county, which currently pays an average of \$72 a month for water, will see its bill rise by \$5 to \$7 due to the plant, according to the water authority.

Mr. Gonzalez, the environmental lawyer, said the monthly additional cost could be as much as \$15 or \$20 for some rural customers.

There could be further hurdles when the state's Water Resources Control Board examines Poseidon's seawater intake and wastewater discharges. The board is working on amending a set of ocean-dumping regulations to address desalination plants.

Desalination produces about one gallon of dense brine for every two gallons of water it takes in; the plant is required to dilute the brine before discharging it. The plant will need about 300 million gallons of water a day from the ocean. Environmental advocates say the intake process and brine discharge could harm ocean plants and wildlife.

Poseidon's authorization is up for renewal by the regional water board, and opponents say they plan to challenge that permit until Poseidon agrees to use safer water-intake technology.

Mr. MacLaggan said the plant is designed to conserve as much energy as possible, and Poseidon plans to purchase renewable-energy credits and carbon offsets for the electricity it uses.

It's expensive water, said Ellen Hanak, a water policy researcher at the Public Policy Institute of California. But the shortages 20 years ago "really colored their views in San Diego about having more drought resilience and having more local self-reliance."

The water authority's Mr. Cushman said the attitude of many community and business leaders toward the drought was "Never again!" But he admits the process of building the plant has been arduous.

This month, as the plant's developers gathered with government officials and community leaders at the site, Mr. Cushman said, "I got the impression I was looking at people who'd just successfully completed their first marathon."

Write to Erica E. Phillips at erica.phillips@wsj.com

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