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In California, What Price Water?

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CARLSBAD, Calif. — On a calm day, a steady rain just about masks the sound of Pacific Ocean water being drawn into the intake valve from Agua Hedionda Lagoon. Listen hard, and a faint sucking sound emerges from the concrete openings, like a distant straw pulling liquid from a cup.

At the moment, the seawater is being diverted from the ocean to cool an aging natural-gas power plant. But in three years, if all goes as planned, the saltwater pulled in at that entryway will emerge as part of the regional water supply after treatment in what the project's developers call the newest and largest seawater desalination plant in the Western Hemisphere.

Large-scale ocean desalination, a technology that was part of President John F. Kennedy's vision of the future half a century ago, has stubbornly remained futuristic in North America, even as sizable plants have been installed in water-poor regions like the Middle East and Singapore.

The industry's hope is that the $1 billion Carlsbad plant, whose builders broke ground at the end of the year, will show that desalination is not an energy-sucking, environmentally damaging, expensive white elephant, as its critics contend, but a reliable, affordable technology, a basic item on the menu of water sources the country will need.

Proposals for more than a dozen other seawater desalination plants, including at least two as big as Carlsbad — one at Huntington Beach, 60 miles north of here, and one at Camp Pendleton, the Marine Corps base — are pending along shorelines from the San Francisco Bay Area southward. Several of these are clustered on the midcoast around Monterey and Carmel.

The San Diego County Water Authority has agreed to buy at least 48,000 acre-feet of water from the plant each year for about $2,000 an acre-foot. An acre-foot equals about 326,000 gallons, roughly enough for two families of four for a year. The authority has made a long-term bet that those costs — now double those of the most readily available alternative — will eventually be competitive. But it still means the authority will pay more than $3 billion over 30 years for only about 7 percent of the county's water needs.

As Sandra Kerl, the deputy general manager of the authority, said in a recent interview, "There's a lot of eyes on this."

The technology used in the Carlsbad plant, known as reverse osmosis, was developed decades ago.

It involves pushing the water through a series of microscopic sieves rolled up into larger cylindrical filters. The energy-intensive process separates pure water from both salt molecules and impurities. The filters, some of which are made locally, are cheaper and more durable than they were a decade ago, industry accounts say, bringing down the overall price of the plant and its operations.

In the Western United States, where the complexities of water law and heavily subsidized federal and state water projects have complicated the economics of water delivery and hamstrung any widespread development of water markets, the Carlsbad plant offers a peek into a future when water prices reflect the actual cost of procurement and delivery. David Moore, a managing director of Clean Energy Capital, financial advisers to the San Diego County authority, said the water authority had "made the call that over time this water is going to be more affordable than other sources. That was the fundamental risk of the transaction." The price of water the authority now gets from the Metropolitan Water District of Southern California is about $1,000 an acre-foot.

The bet on this technology was not an obvious one; the recent history of desalination in the United States and Australia has been mixed, at best. Some recently constructed Australian plants are flourishing while others stand idle some of the time. In this country, technological missteps, delays and bankruptcies dogged the first big plant, which finally opened in Tampa in 2007.

"Tampa was a buzz kill for the sector," Mr. Moore said.

So the Carlsbad plant is being watched not just for its performance or its effect on the local marine environment, but for its financial architecture.

Mr. Moore and other financial advisers are trying to make investors and bondholders comfortable with the technology by mimicking the financial approach of a merchant power plant — for instance, substituting a "water purchase agreement" for a "power purchase agreement," to show that Carlsbad's water has a guaranteed market.

The water purchase agreement was signed by the San Diego authority and the plant's developer, Poseidon Resources, of Stamford, Conn., in late November. Poseidon bears the responsibility for completing the plant and operating it; the authority does not pay for any water that is not delivered.

The project's costs are financed by two bond offerings totaling $734 million and a $189 million equity investment. In addition, the water authority is committing about $80 million to other capital needs. All of these arrangements have interlocking guarantees and risks, with the costs of constructing the plant borne by the project developers and the water authority responsible for constructing a 10-mile pipeline to send the water on its way to San Diego's taps.

The public water authority did not want its ratepayers to be responsible for paying for water that

was never delivered; it will pay only for water that meets its standards and goes into its reservoirs. That said, when the water is flowing in 2016 the county must pay as much as $113 million annually, which could rise over time.

Late last year, this financial picture prompted Fitch Ratings to give the project's bond issue a BBB- rating, the lowest for investment grade debt. For Fitch executives, familiar with the unexpected obstacles in deployment of desalination technology, the water purchase agreement was a critical factor leading to a rating above junk level.

The cost comparison remains ugly for desalination right now, but the water agency has calculated that, given the history of annual rate increases from the Metropolitan Water District of Southern California, the desalinated water could be cheaper than the current supply by 2024.

Then there is the question of reliability. Water supplied by the Southern California water district comes from Northern California transfers and Colorado River diversions. Climate change is likely to cut into both sources over time. And San Diego and the Southern California district have a history of antagonism; the Carlsbad plant, which would supply as much as 7 percent of the region's needs, is the most recent of several San Diego efforts at diversification.

But water policy experts and local environmental activists are skeptical about the value of desalination compared with conservation and reuse. They will be watching the plant from a very different perspective.

Heather Cooley, a senior research associate with the Pacific Research Institute, an Oakland-based nonprofit group specializing in water supply questions, said that even if the Carlsbad plant worked well, a new rush to desalination was hardly certain.

It depended, she said, on whether "water demand continues to grow, as was likely in the past, or whether, as we've seen in the past 15 years, it stays the same or even declines, based on efficiencies and conservation and the structure of the economy."

She added that by promising to buy at least 48 million gallons a day from the plant, the county water authority has less incentive to step up its push for water conservation, or to invest further in water reuse.

The environmental group the Surfrider Foundation, which has fought the Carlsbad plant at every turn, expects the plant to be an object lesson in how not to guard against water shortages. Among other things, the foundation emphasizes the energy needs of the plant, which will consume 5,000 kilowatt-hours of electricity to produce an acre-foot of water.

As electricity costs go up over time, the county's water bill — already estimated to be $5 to $7 a

month higher for each customer by 2016, thanks to Carlsbad — will rise in tandem.

But authority officials noted that water delivered from the Southern California district also required energy, and its cost, too, would go up in such circumstances.

The costs have been one focus of opponents.

“If the county had taken a holistic, practical approach to water management and water supply needs, it would never have done something so costly,” said Belinda Smith, a member of Surfrider.

She and her colleagues see the surface water intake valve as the plant’s Achilles’ heel. The current state permit covering the intake’s operations expires when the Encina natural gas power plant is no longer using cooling water. If the new permit required expensive changes — if, for instance, the entire intake had to be moved below the surface — the cost to ratepayers, and particularly to Poseidon, could increase significantly.

The county and the developers said this eventuality was covered in the financial planning.

But for the moment, Poseidon officials are energized by the prospect of beginning construction, after a decade of delays. Peter M. MacLaggan, a senior vice president at Poseidon, referred to the experience of the company’s desalination technology partners when he said, “We’re at desal 3.0 or 4.0 here at Carlsbad.”

He added that the need for new water supplies could provide a ready market for the technology, if it is effective. “Water in California has been cheap and plentiful. And that’s no longer the case,” he said. In San Diego, he said, “We’re facing it. The rest of California is facing it to different degrees. We’re all challenged in finding new water supplies.”