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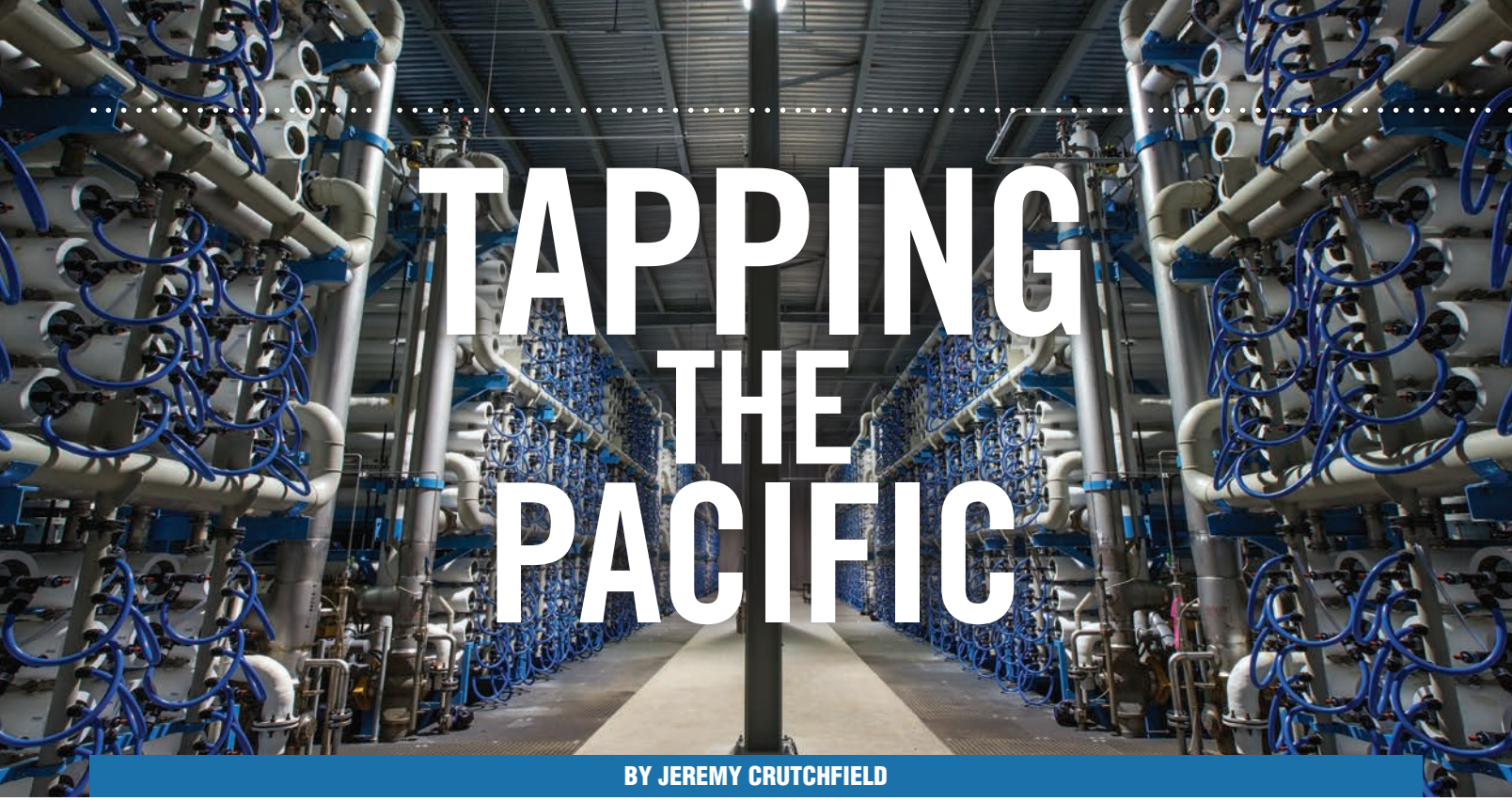


TAPPING THE PACIFIC

BY JEREMY CRUTCHFIELD

All photos are courtesy of San Diego County Water Authority.

WATER YEAR 2018 WAS THE SECOND-DRIEST ON RECORD IN SAN DIEGO SINCE 1850, with a paltry 3.3 inches of rain at the city's official weather station. The scant total highlights the significance of the San Diego region's multi-billion-dollar investments in water supply reliability to sustain 3.3 million people and the region's $220 billion economy — investments that include the nation's largest seawater desalination plant. Situated adjacent to a lagoon in northern San Diego County, the Claude "Bud" Lewis Carlsbad Desalination Plant marked the third anniversary of commercial operations in December 2018. The plant and an associated pipeline were developed through a pioneering public-private partnership between the San Diego County Water Authority and Poseidon Water, bolstering the region's water supplies by 50 million gallons a day. That's nearly 10 percent of regional water demand. That partnership was forged with a shared objective through open, transparent negotiations; a commitment to honor the public interest; and the benefits of transferring some key project risks to the private sector. It also showed how leveraging both public and private resources to finance large projects can yield significant benefits and cost savings.

While the collaborative approach wasn't easy or quick, today the Carlsbad project is a working model of what committed partners can accomplish to advance water security in the face of a changing climate and growing populations.

Moving from Drought to Desalination

The San Diego County Water Authority's water supply diversification strategy started to take shape in the early 1990s when seawater desalination was still a distant dream. At the time, critical reservoirs for the cities of Southern California were at or near all-time lows. In 1991, the Metropolitan Water District of Southern California — the nation's largest municipal water provider and supplier of 95 percent of San Diego County's water — had raced through all five of its drought-response stages and slashed deliveries to the San Diego region by 31 percent.

The severity of the drought pushed Metropolitan to give notice of additional cutbacks that would have amounted to a 50 percent water supply reduction for San Diego County — a drastic measure averted only by downpours that delivered more than seven inches of rain in San Diego during the Miracle March of 1991.

As Southern California recovered from that epic drought, the Water Authority fashioned one of the most aggressive supply diversification strategies in the nation in hopes of preventing a repeat. That vision included water conservation-and-transfer projects that became a cornerstone of the landmark Colorado River Quantification Settlement Agreement of 2003; development and implementation of water conservation efficiency measures; water recycling; local groundwater development; and, ultimately, seawater desalination.

Early Desalination Challenges

Commercial-scale seawater desalination didn't have a long history in the United States when the Water Authority first formally recognized it as a potential regional water supply in its 1995 Urban Water Management Plan. In fact, there were no large-scale seawater desalination facilities in the nation, even though reverse osmosis membrane technology was first commercialized and continued to develop in San Diego County and desalination had been used for decades by the U.S. military and water-challenged nations. Poseidon Water, a Boston-based private developer of water infrastructure, saw the California water market in general, and San Diego County in particular, as the perfect climate for this new, drought-proof, local supply. In 2001, it proposed a model

from the power industry in which private developers sell energy to off-takers, such as utility companies. Just a few years earlier, Poseidon had secured an agreement with Tampa Bay Water for development of a 25 million gallon per day seawater desalination facility that it hoped to replicate on the shores of the Pacific Ocean.

(L to R) Poseidon Water CEO Carlos Riva, former U.S. Senator Barbara Boxer, Carlsbad City Council Member Priya Bhat-Patel, Carlsbad Mayor Matt Hall, State Senator Pat Bates' District Director Matthew Phy, and Carlsbad Mayor Pro Tem Keith Blackburn at a December 2018 event celebrating the plant's third anniversary and 40 billionth gallon produced.

In 2002, the Water Authority and Poseidon agreed to a term sheet that covered the initial interests of the Water Authority, including: (1) transparency in the development of project financing and costs; (2) a fair, open and competitive process to procure services and equipment for constructing the plant; and (3) an active role for the Water Authority in the project development process. While the initial discussions didn't result in an agreement in the early 2000s, they laid the groundwork for successful negotiations years later.

Water Purchase Agreement Protects Ratepayers

Seawater desalination remained a priority for both the Water Authority and Poseidon. Between 2002 and 2008, Poseidon advanced its position at the Carlsbad site by securing all nine discretionary approvals needed from state and local regulators. At the same time, the region's interest and resolve for seawater desalination continued to increase: In public opinion polls, more than 80 percent of the region's ratepayers stated it was an important piece of local water supply reliability efforts. In 2010, the two parties agreed on a new set of terms that served as the foundation for detailed negotiations. Those talks resulted in a Water Purchase Agreement (WPA) on November 29, 2012, which created a 30-year public-private partnership for seawater desalination.

The WPA addressed the Water Authority's central concerns about transparency and ratepayer protections. Poseidon ultimately agreed to assume a full transfer of the financial risk associated with construction cost overruns, permitting and design efforts and nonperformance of the plant. The public's interest in price control was achieved by locking in a payment schedule for both debt and equity returns, while variable operating cost increases were linked to an inflation index.

For the agreement to work, the Water Authority agreed to assume the risk of electricity price increases, as it does with its agency-owned facilities. However, the Water Authority only pays for electricity charges up to a calculated guaranteed consumption level rather than actual use, shifting electricity consumption risk to Poseidon and incentivizing Poseidon to design and operate the plant as efficiently as possible.

As spelled out in the WPA, Poseidon's financial returns are based on a guarantee by the Water Authority of ordering at least 48,000 acre-feet annually over the 30-year term of the WPA. Annual production over this amount, up to the facility maximum production of 56,000 acre-feet, would be sold at a significantly discounted rate. This arrangement provides a financial incentive for the Water Authority to maximize use of the plant. In addition, the Water Authority agreed to carry the risk and impact of any changes in law — for instance, compliance with the California Ocean Plan Amendment adopted in 2015. After 30 years, the Water Authority has the option to purchase the desalination plant for $1, a recognition of ratepayer payments over time.

The Water Purchase Agreement allows for annual price increases for inflation estimated to average 2.5 percent per year. This compares favorably to the average seven percent increase per year in imported treated water rates imposed by MWD from 2008 through 2018. In addition, Poseidon will be allowed to increase its prices to accommodate changes in laws or regulations that generally apply industry-wide to similar facilities. These cumulative increases are capped at 10 percent for a single year and cumulatively at 30 percent over the 30-year agreement.

Unlike traditional publicly owned water projects, the WPA included a risk transfer to the private sector that resulted in a more limited role for the public agency partner. Poseidon, as the owner, contracted for the construction and operation of the plant. However, given the critical nature of the water supply, the WPA assigned to the Water Authority a role in selection of contractors and key equipment, along with approval rights over construction milestones, such as mechanical completion, performance testing and project completion.

While the WPA governs the development and operation of the plant, other agreements were necessary to integrate seawater desalination into the existing regional water delivery infrastructure. The Water Authority and Poseidon negotiated a Design-Build Agreement to construct a 10-mile, 54-inch diameter conveyance pipeline that connects the plant with the regional aqueduct system.

The total $1 billion price tag for developing and integrating the new locally controlled, drought-resilient water supply consisted of the desalination plant ($537 million), the conveyance pipeline ($159 million), Water Authority system improvements ($80 million) and project financing, such as interest during construction, debt service reserve and transaction costs ($227 million).

Financing Required Multi-Faceted Approach

Financing the Carlsbad project required a long-term, collaborative effort along with additional agreements between the Water Authority, Poseidon, Stonepeak Infrastructure Partners (Poseidon's private equity investor) and the California Pollution Control Financing Authority (a conduit issuer of low-cost bonds).

Poseidon funded the development costs, supplemented by $167 million of equity provided by Stonepeak. The debt portion of the financing package consisted of $733 million of tax-exempt municipal bonds offered through JP Morgan as the senior managing underwriter. The bonds were exempt facility private activity bonds, which can be used to finance capital infrastructure on a tax-exempt basis, even if the facilities are privately-owned. Interest payments on private activity bonds are exempt from state and federal income tax, but they are subject to the federal alternative minimum tax. Financing closed in December 2012 at a favorable yield of 4.7 percent, bringing financing costs $200 million below the Water Authority's projections. The financing structure earned the North American Water Deal of the Year for 2012 by *Project Finance* magazine, which said the bond issue "could serve as a useful template" for similar projects in the future.

To further reduce interest costs, the project was separated into two ownership components: Poseidon owns the plant and the Water Authority owns the pipeline. That allowed both public and private partners to take advantage of exempt facility private activity bonds, as well as municipal tax-exempt bonds for the pipeline financing.

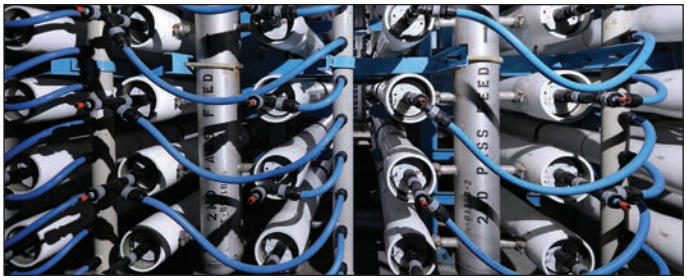
The Water Authority also agreed to pay for capital improvements to its aqueduct and water treatment facilities that were partially funded with $5 million in grants. This was acceptable to the grant funding agencies because the pipeline is owned by the Water Authority. While the WPA requires that all grant funds received shall be for the sole benefit of the public, because the desalination plant is owned by Poseidon the state has limited the eligibility for other project grant opportunities.

Based on current electricity cost estimates, the Water Purchase Agreement sets the price of water at $2,302 to $2,559 per acre-foot in fiscal year 2019, depending on how much is purchased. While that's more expensive than other Water Authority supplies, it comes with the added benefits of being both drought-resilient and locally controlled. In the end, the impact on ratepayers is modest: The monthly cost increase is about $5 per household, at the low end of the Water Authority's forecast when the WPA was signed.

Desal Plant Generates Immediate, Long-Term Benefits

The Carlsbad desalination plant started commercial operations at the peak of a statewide drought in 2015, providing an immediate benefit directly linked to the region's investment. The plant was quickly certified by state regulators as a drought-resilient water supply, effectively lowering the state-mandated regional water-saving targets from 20 percent to 13 percent. In addition, the Water Authority was recognized in 2017 with the Clair A. Hill Water Agency of the Year Award from the Association of California Water Agencies for innovation and excellence in resource management with the addition of water from the Carlsbad plant.

But it wasn't all smooth sailing. During the start-up phase, the plant experienced operational challenges and temporary outages that are not unusual for major water treatment facilities as operators fine-tune control systems and adjust to actual — and changing — source water conditions. However, the WPA anticipated most of the challenges that would occur and provided a framework to address those issues, effectively avoiding potential disputes between the Water Authority and Poseidon.



In addition, the WPA required Poseidon to pay penalties to the Water Authority for not meeting its supply obligations, another ratepayer safeguard built into the WPA. And perhaps most importantly, Poseidon instituted a suite of measures to minimize future operational slowdowns with an eye toward long-term excellence in operations.

Through the production ups and downs, the WPA worked in the background to protect ratepayers and promote a sustainable, long-term water supply for the region through an innovative partnership. Along the way, the Water Authority and Poseidon pioneered large-scale seawater desalination in California, providing a template for improving water security in other parts of the state and nation. Today, the Carlsbad facility has produced more than 40 billion gallons of high-quality desalinated water for San Diego County, reducing the strain on other water resources statewide and helping sustain the region's economy and quality of life.

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