

CORNER OFFICE



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Billionaires Wanted

Big investors could solve California's water crisis. What's stopping them?

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Billionaires Wanted

AT 4:47 IN THE afternoon on Sunday, February 12, more than 13,000 Californians were ordered to leave their homes.

Some, at the direction of the Butte County Sheriff's Office, headed north, past the town of Oroville. Others, however, heeded the call of the Yuba County Office of Emergency Services, whose bulletin screamed different directions: "Take only routes to the east, south, or west. DO NOT TRAVEL NORTH TOWARD OROVILLE!!!!!"

Confusion and fear reigned. Highways turned into parking lots and then closed. Emergency evacuation centers filled up. "This is not a drill," warned the initial alert. "Repeat, this is not a drill."

After weeks of rain and snowmelt, immense flooding had severely strained the Oroville Dam. Authorities feared it could burst within the hour.

A Look Inside the Californian Water Crisis



Suspended above Oroville and the Sacramento Valley, the Oroville Dam blocks the Feather River as it emerges from the snow-covered mountains of the Sierra Nevada. On a typical day water freed from the dam flows in an orderly fashion through a hydraulic power plant before making its way down through the Central Valley and eventually to Los Angeles. But February 12 was no typical day.

The lake had been rising all week. By 3:00 that afternoon water levels were dangerously high. The decision had been made to use an emergency spillway to drain off the excess, like a valve releasing heat from a pressure cooker. But cracks and then a massive hole appeared in the spillway. Authorities were forced to turn to the backup spillway, which had not been used since the dam was constructed in 1968. That spillway began to rapidly erode; water flowed over the top of it. Suddenly, California was facing a disaster beyond the scope of most people's imaginations.

That same day Oroville's mayor, Linda Dahlmeier, was flying back from a business trip. Upon boarding her flight to Sacramento, she decided to get some rest. When she landed and turned on her cell phone, it exploded with urgent

alerts, voice mails, and e-mails. During the mayor's short flight, an emergency had been declared.

Dahlmeier immediately called Ted Craddock, chief of utility operations for the California Department of Water Resources. "I asked him two questions," she recalls. "How could this have happened?" Nobody could have predicted it, Craddock replied. "Then I asked him, 'How far down is the water?'"

Forty feet, he said.

Dahlmeier has lived around water her entire life, and she knew immediately what that meant: A tidal wave of water could come crashing down on the communities below the dam.

"Nobody would have lived," she says. "Life as we know it in California would have changed forever."

FLOODING IS ONLY one of many water concerns in America. Although images of Hurricane Katrina's aftermath still sear the country's consciousness, droughts and contamination are more persistent, if less immediately damaging, than disasters on that scale. For every New Orleans there are many Flints (lead contamination) and Californias (until recently, persistent water shortages). The human toll is immense and hardly limited to the U.S.: flooding, droughts, and poor water quality affect countries worldwide.

A significant contributing factor is massive underinvestment. The Environmental Protection Agency estimates that the U.S. needs to spend a minimum of \$655 billion on water infrastructure over the next 20 years to continue supplying Americans with healthy, safe water. California forecasts that it needs more than \$50 billion to reduce flooding risk within its borders. Governor Jerry Brown's ambitious WaterFix program — a controversial project

formerly known as the Bay Delta Conservation Plan — seeks to address some of the state's most pressing water problems. It is estimated to cost about \$17 billion.

The scale of global water needs is hard to fathom. The Organization for Economic Cooperation and Development puts the bill for improved water supply and sanitation at \$6.7 trillion by 2050. In remarks at the landmark 2015 United Nations Climate Change Conference in Paris, OECD Secretary General Angel Gurría explained that by 2050, “nearly 4 billion people will live in river basins under severe water stress, and global nitrogen effluents from wastewater are projected to grow by 180 percent. Over the same period, global demand for water is expected to grow by 55 percent. The international community is finally waking up to the gravity of the situation, and we have set ourselves a number of ambitious objectives.” Gurría continued, “But let’s be clear: These efforts will fall short unless we resolve the question of access to finance for water infrastructure.”

Governments alone will not be able to foot the bill. Private investors realize that water has the potential to be a multibillion-dollar market, but the peculiar nature of water — it is essential for life, considered a human right, and the most valuable commodity on earth even though it’s often given away — makes privatization particularly sensitive. Yet investors’ participation is essential for a solution.

First, they must overcome water’s unique problems.

For one, scale is a challenge. There are 53,000 regulated community water systems in the U.S. Some are very large; most are tiny. The diffuse nature of America’s control over water makes it hard for investors to put money to work and for smaller entities — often those most in need of capital — to raise it.

Price is another problem. Bluntly put, water is not as expensive as it should be. “Ultimately, the solution is to price it and have everyone pay the same price, or a reasonable market price, for the cost of providing the water,” says David Richardson, a managing director at Impax Asset Management Group, one of the few equity managers to offer a specific water investment fund.

“The price of water is going to rise because it has to,” agrees Tom Ferguson, vice president at Imagine H2O, a San Francisco-based accelerator for water-focused start-ups. “The question is how fast and how far.”

Perhaps more problematic than water's complexity and price is the fact that people aren't entirely comfortable with billionaires and private equity firms owning what comes out of their taps. Because of this, investors' experiences with water have been mixed. Legendary financier T. Boone Pickens is among the best known of the investors who have sought to get rich in water. During the late 1990s and early 2000s, the oil speculator began acquiring water rights in the Texas panhandle, with plans to sell the water — located on 443,000 acres below ground, in the Ogallala Aquifer — to the Dallas metro area. Pickens's proposal outraged many environmentalists and communities, especially as it would have taken resources away from drought-stricken areas. In 2011, after more than a decade of negotiations, Pickens sold the rights to a local supplier for \$103 million, having failed to strike a deal with Dallas or make as much money as he'd hoped. Other investors, such as private equity firm Carlyle Group, have dabbled in water with only moderate success.

Despite such controversies, outside money is expected to flow into this space like water over the Oroville Dam. The need for it is too great — and in California that need can be traced, in part, back to these very same investors.

THE PEOPLE OF OROVILLE fled their homes because of almonds.

Their town is a straight one-hour drive north of Sacramento, California's sleepy capital. The Feather River, passing through the Oroville Dam, is a major tributary of the Sacramento River, which shapes the Sacramento Valley. That valley and the San Joaquin Valley farther south make up the state's Central Valley, which stretches 450 miles down the backbone of California.

The Central Valley is one of the most fertile places on earth. The vast majority of America's fruits and vegetables are grown in California; the state and its Central Valley are responsible for 99 percent or more of the country's almonds, artichokes, dates, figs, grapes, olives, peaches, pistachios, pomegranates, and

walnuts. In January and February, when farmers markets in New York City offer only endless radishes and sad-looking root vegetables, the stalls in California boast a bounty of fruit, including avocados and Meyer lemons.

Such abundance requires immense amounts of water, and this demand, dating back to the California gold rush, spawned arcane rules governing the usage of the water pouring through, among other places, Oroville. The state's fundamental problem isn't so much a lack of water but its uneven distribution: Northern California has too much, while most of Central and Southern California has too little.

To solve this problem, a complex infrastructure developed, including the 21 dams and 700 miles of tunnels that make up the California State Water Project (SWP). On top of this are overwhelming numbers of water authorities and regulators. Rights are often fought over in court. Infrastructure construction is perpetual, and ambitious plans are always being proposed and opposed.

Established in 1960, the still-incomplete State Water Project was an engineering marvel of its time. The initiative gathers water from where it is plentiful and redistributes it to 28 agencies or enterprises farther south. Beneficiaries include Los Angeles, San Diego, the San Francisco Bay Area, the Santa Clara Valley, the Central Coast, and the San Joaquin Valley. Key to the project is the Oroville Dam, which at 770 feet is the tallest in the U.S. (The more famous Hoover Dam is 45 feet shorter.)

While 70 percent of the project's water goes to urban areas, a crucial 30 percent is allocated to farmers. Their water is cheap. The second-largest SWP entitlement holder, Kern County Water Agency, which primarily serves agriculture, pays about \$45 an acre-foot, while Los Angeles' Metropolitan Water District of Southern California pays \$298 per acre-foot. Farmers also tap rivers, inlets, and underground sources.

The complexity of California's system of water rights and access was starkly highlighted by the recent drought, from 2012 to 2016. Water was in such short supply that cities and towns were asked to drastically cut back their usage. In April 2015, Governor Brown issued an executive order directing the State Water Resources Control Board to cut urban water usage statewide by 25 percent. Farmers weren't entirely spared: In February 2014 the Bureau of Reclamation, a federal agency under the Department of the Interior that oversees water resource management, announced that some farms in the Central Valley would be getting none of the water they had requested for that year; others would get

up to 40 percent. The next year was more of the same. With federal water supplies down, farmers turned to their local rights, leading to intense battles and lawsuits. At the same time, several of the state's valuable (and irreplaceable) aquifers were depleted.

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A popular villain emerged from this scorched earth: the almond farmer. The almond industry is hypersensitive to any accusations that it exacerbated the California drought, but the nuts are an undeniably thirsty, and popular, crop. Producing one almond takes approximately one gallon of water. A grape takes less than a third of a gallon.

"Anywhere from 70 to 80 percent of California's water is used by agribusiness," says F. Rowe Michels, the Southern California-based CEO of Alpheus Water Research. "One has to question whether agribusiness is sustainable, because for the past 30 years the number of wells that go into the aquifers to pull up water has been increasing exponentially." Michels adds that the Colorado River, Southern California's other great source of water, "often does not get to Mexico anymore. And the big reservoirs are drawing down. The past year of good moisture will help some, but it's really a little hiccup."

Almond farmers feel unfairly maligned by the backlash. Their product, they argue, is highly nutritious and consumes little water compared with, say, cattle. Yet it is striking how much the California almond industry has grown over the past decade. The state had 1.1 million acres of almonds in 2015, up from 700,000 in 2005, according to the U.S. Department of Agriculture. At the height of the drought, farmers converted vineyards to almond operations. The reason was simple: money. In 2013 a pound of almonds fetched \$3.21; in 2000 it was worth 97 cents. The value of the California almond crop in 2013 was \$6.4 billion, up from \$666 million in 2000.

And who owns the almonds? Big investors. TIAA Investments, part of the TIAA family of financial businesses, is among the world's top almond producers. TIAA and other investment managers, including Hancock Agricultural

Investment Group, have been buying up farmland in California. In some cases Hancock replaced existing crops with more lucrative, and thirstier, pistachio and almond trees. (When asked for comment, a TIAA spokesperson e-mailed the following to *Institutional Investor*: “TIAA is a long-term investor in farmland committed to sustainable agricultural practices such as our water management and conservation programs which are designed to efficiently use natural resources to meet the demands of local climates and geographies where we invest.”)

For investors the allure of these lucrative crops is clear. But for California — where most experts believe droughts are set to continue despite the recent reprieve — the move toward crops that are less, not more, sustainable in a low-water environment merely adds to the state’s burdens. And if profit-driven investors cannot be trusted to support the delicate California ecosystem with their farming practices, some wonder what will happen when they get their hands on the water itself.

VISITING OROVILLE almost a month to the day after the forced evacuations, one sees a town facing a major renovation project.

Engineers were able to increase the flow to the primary spillway and draw down water levels, avoiding disaster. Residents were allowed back within a few days. But the damage to the water system and surrounding area was significant, and repairs are estimated to cost in the hundreds of millions. Roads and pathways near Lake Oroville and its dam were still closed, with hundreds of workers beavering away to fix what broke. Showing remarkable resilience and a Californian sense of whimsy, many residents in the affected areas displayed signs in their front yards featuring slogans such as “Thanks for not cracking under pressure” and “In concrete we trust.” Massive cement trucks trundled by, delivering their loads to the construction area.

Locals had never felt they were in particular danger from their dam. As one resident says, “It was always just there.” Though some red flags were raised about a decade ago concerning the state of Oroville’s water system, California’s largest state-operated dam was on practically no one’s list of critical infrastructure projects. Instead, what concerned, and still concerns, the people of Oroville is how little they get in return for sharing their most valuable

resource with the rest of the state, including investors like TIAA and other owners of water-heavy crops.

Mayor Dahlmeier likes to say that “my tap water comes from God; everyone else gets their water from us.” She lives in a painstakingly restored midcentury modern home in one of Oroville’s elevated neighborhoods. She wears cowboy boots and denim. “This is what rural America looks like,” she says. Below her house the Sacramento Valley rolls out, a carpet of farms and water. A Meyer lemon tree grows in her yard.

The mayor, who took office in January 2011, hopes to use the dam crisis to draw attention to the pressures her community is under. Undercapitalized and underresourced, Oroville lacks the political clout for its voice to be heard at either the national or the state level. Lacking much in the way of jobs or prospects, town residents voted almost overwhelmingly for Donald Trump, not necessarily because they agreed with his policies — like most of rural America, the local farming industry relies heavily on migrant labor — but because they felt he at least gave voice to their dissatisfaction.

With a population of 19,000, Oroville only recently got its first Starbucks. Jerry Brown waited nine days after the dam crisis before visiting, for which he was severely criticized. When the governor did show, some felt his public remarks focused more on large, flashy infrastructure projects — like the LA-to-San Francisco bullet train and his own WaterFix, which would build two new tunnels to channel water from Northern to Southern California — than on little Oroville.

In particular, the town feels it got a rotten deal when the dam was built. Oroville was promised that jobs and tourism would come, but much of the promise was never fulfilled. Although money is now coming in to fix the dam, Dahlmeier is worried that her town will once again miss out on its share of the pie.

She is probably right.

CALIFORNIA IS ABOUT to embark on something of a water spending frenzy. The problem, however, is that the spending may overlook places like Oroville.

In November 2014 voters passed Proposition 1, which raised a \$7.5 billion bond for water investments in support of the California Water Action Plan, an initiative to put the state on a path to sustainable water. The largest chunk of that \$7.5 billion, some \$2.7 billion, is being directed toward water storage projects. “This is not your typical grant program,” says California Water Commission board member Joseph Byrne. “It is considered an investment program. We are not just giving money for people to just broadly do whatever they want.” To be eligible for the program, projects must have a public benefit. The largest portion of the fund — 50 percent or more — will go to projects that enhance the ecosystem, but other projects can deal with recreation, flood control, emergency response, and water quality. Projects must be for-profit and 50 percent externally funded.

But private money rarely invests so heavily in water. Today the private sector accounts for just 9 percent of U.S. water and sewage infrastructure spending, according to consulting firm McKinsey & Co. For the power sector that figure is 92 percent.

One possible solution is for local communities and utilities to issue their own bonds to make up for the 50 percent of Water Action Plans that must be externally funded. Yet these groups, seeking to tap the commission for smaller projects, could be challenged to raise outside capital. Because they do not oversee large populations and often are responsible for poorer rural areas like Oroville, they lack the potential revenue base to raise money.

The Aspen Institute, which hosts an annual forum on water in partnership with Duke University, identified funding for these smaller utilities as a key problem in its 2016 report. “Small water utilities or agricultural businesses don’t often have the revenue base to recover full costs, and so are unlikely to take financial risks,” the report said. “Additionally, the transaction costs . . . are high, incentivizing investors to focus on larger deals.”

Trevor d’Olier-Lees, senior director in the infrastructure practice at S&P Global Ratings, contributed to the Aspen Institute discussion. He says one option for these smaller projects and utilities is bundling — grouping a number of similar

projects together. “The trouble with water is a lot of typical projects might only cost \$7 million, \$10 million, or even \$40 million, and you really don’t get investors excited about that size of project. What bundling does is it takes a series of projects into one financing and suddenly investors say, ‘I’m interested in that.’” D’Olier-Lees says bundling has been used to great effect for infrastructure-related projects in Canada and the U.S., and is just now being explored by some water-related entities.

To some, the most effective means of funding water projects is through big money: sovereign funds, state pension plans, and private equity firms. One such investor that owns water is the California Public Employees’ Retirement System. The \$300 billion, Sacramento-based fund is the major owner of the Willow Springs Water Bank. Located in Antelope Valley, part of the Mojave Desert, the water storage facility helps keep Southern California hydrated during dry periods and allows it to store water during times of plenty. The water bank currently offers local utilities as much as 500,000 acre-feet of water storage in underground aquifers. Willow Springs’ long-term plan includes 1,000 acres of percolation ponds, pump stations, 62 water wells, a 72- to 84-inch two-way pipeline, and 640 acres of solar panels. The water bank’s partners are among the groups expected to apply for part of that \$2.7 billion in water storage bond money to help finance the next stage of development.

When it comes to private sector money, Californians might want to be careful what they wish for.

One example makes this clear. Private equity firm Carlyle Group acquired Park Water Co. in 2010. The family-owned utility in Downey, California, provided water to southeast Los Angeles County. It also owned two other utilities, Apple Valley Ranchos Water Co. and Montana Water Co.; the first served Apple Valley, California, and the latter provided water to Missoula, Montana. Since Park Water’s deal with Carlyle, both Missoula and Apple Valley have sued under eminent domain in an attempt to take back control of their water providers. Starting in 2011 the people of Apple Valley saw their rates increase repeatedly, including a 2015 surcharge to make up for lower usage; they now pay \$300 to \$400 per year more for water than customers of local public water utilities.

The challenges are even greater in developing countries. A 2013 study by a group of nongovernmental organizations accused Dutch institutional investors, including pension plans ABP and PGGM — funds that pride themselves on

being progressive and sustainable investors — of participating in a global “land and water grab” through investments in real assets in countries such as Sierra Leone and Mozambique. For countries with very little in the way of water infrastructure, even the slightest change to land use can have devastating effects on local communities.

RATHER THAN WAITING on old-line private equity firms or other large institutional investors to ride to the rescue, the people of California are looking 150 miles southwest of Oroville. There, in the office buildings of San Francisco and Silicon Valley, are the nonprofits and early-stage venture funds that give the area its unique culture — and potentially give the state and world a solution to their water woes.

As California baked in its recent drought, the Bay Area came under increasing pressure to turn its attention away from social networking and toward fundamental problems of water and climate. Water and venture capital aren’t an entirely natural fit, however. First, water suffers from a lack of market pricing. Second, as with energy, anyone brave enough to plunge into water investing faces a preexisting and complex system.

Imagine H2O’s Tom Ferguson believes there is immense potential at the nexus of new money and water. The firm was founded in 2009 as a hub for water-related businesses. “If you are brave enough to be an entrepreneur, that is one thing,” Ferguson says. “If you are brave enough to be an entrepreneur in water, that is a whole other thing.” Water is largely overlooked by Silicon Valley, he asserts, but lack of competition isn’t necessarily a bad thing from an investor’s perspective. In water, Ferguson says, “you can throw a cat and hit a billion-dollar market.” Of the 80 start-ups Imagine H2O has invested in, the survival rate is an impressive 85 percent. “If you are looking to build a sustainable business over the long term, there are oceans of opportunity,” Ferguson says, though he warns that many water companies are not good candidates for venture capital, lacking the type of rapid growth that this money demands.

Along with entities like Imagine H2O, the venture philanthropy, not-for-profit, and impact investing communities have started to take up the challenge of water. The Walton Family Foundation and the David and Lucile Packard

Foundation, for example, have founded the Colorado River Collaborative, an effort to address water scarcity in the Colorado River basin. But water is crying out for its own charismatic billionaire — an Elon Musk or a Bill Gates — to take up the cause.

Dahlmeier, for her part, would like Silicon Valley to come to Oroville. She points out that Oroville is only a short 20-minute helicopter ride from the San Francisco Bay Area, but sometimes when it rains it is impossible to get a reliable phone connection there. “We are the thread that sews the tapestry of America together,” she says. “If it were not for rural America, urban America would not exist.”

Dahlmeier sincerely believes that with the right investment her town could yet become a sort of “Facebook on the Forebay,” a hub of learning and technology set in the foothills of the Sierra Nevada. “This is where the future is going to lie,” the mayor says. “In all of us. This is how you are going to fix things.”

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