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TECH

Data Centers and Hidden Water Use

In California, computer farms are under scrutiny for their large and growing use of water for cooling

Facebook's data center in Prineville, Ore., has a cooling system that pulls air in from outside and uses some reclaimed water.

PHOTO: MEG ROUSSOS/BLOOMBERG NEWS

By Drew FitzGerald

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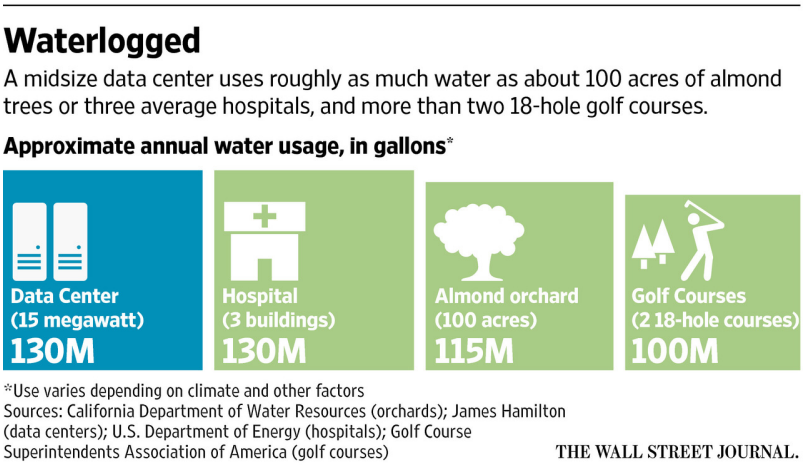
Silicon Valley's appetite for data is well known. Its thirst is less understood.

Amid record drought in California and other parts of the American West, the machines that support everything from Instagram photos to Netflix movie marathons require substantial quantities of water for the air-conditioning systems needed to keep the servers cool.

California has more than 800 data centers, the most of any state, according to an estimate by tech consultancy 451 Research LLC that excludes smaller computer rooms that businesses use. Based on that and estimates for water use, the state's data centers consume roughly as much water in a year as 158,000 Olympic sized swimming pools.

At a time when California authorities are telling waiters not to automatically offer water, data centers' water use has largely escaped scrutiny. While data centers water needs are small relative to agriculture and power producers, their growth is entangling the state's most successful business with its most pressing environmental problem.

Industry efforts at greater efficiency so far have mainly focused on power. Some data center operators are looking for ways to reduce their demands on municipal water systems, by reusing dirty water or harvesting rainwater. Others are setting up giant storage tanks or digging their own wells.



"It's not like we've ignored water," said Patrick Flynn, head of sustainability efforts for IO Data Centers LLC, which operates two data center complexes in Arizona. "It just turns out that the lowest hanging fruit is investing in energy efficiency."

Data centers rely heavily on air conditioning for cooling their thousands of computers and storage devices, requiring lots of electricity and water. The biggest of these computer farms are growing 4% a year, 451 Research says. Emerson Electric Co. EMR 0.20% ▲ , which is a supplier of cooling equipment to data centers, expects operators to add the equivalent of three midsize centers a year in California.

Every new data center brings a thirsty customer. A midsize 15-megawatt center uses between 80 million and 130 million gallons of water a year for cooling, according to industry estimates. At the high end of that range, each new facility is akin to planting 100 acres of almond trees, adding three hospitals or opening

more than two 18-hole golf courses.

In California, Gov. Jerry Brown ordered cities to cut annual water use by 25%. Businesses have been largely spared from the cutbacks. State officials say restrictions are intended to conserve without hurting the economy.

Data centers aren't the state's biggest water users. But they generally require municipally-provided clean, treated water like restaurants and hotels. Agriculture, which accounts for roughly 80% of water use in the state, can use untreated water from streams and lakes. Electric utilities, the state's second largest water consumer, also can sometimes use salt water.

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In Bluffdale, Utah, a 200-acre National Security Agency data center campus will use more water than the entire town of 8,000 when it reaches full capacity, according to initial design documents. It is on track to use a 10th of the town's total water use this year, its third year in operation.

Water use is just now emerging as a central consideration for data center operators. Microsoft Corp. , which runs more than 100 data centers globally, turns off its cooling units when outside temperatures allow as a way to reduce water use, according to a company spokeswoman. Google Inc. tries to harvest water from rain, canals and other non-drinkable sources to reduce its footprint.

At its 18 Bay Area data centers, Digital Realty Trust Inc., which runs several dozen centers around the world, has set an internal goal to eventually cut its water use by a quarter. The company struck deals with local utilities to use recycled wastewater where available, but that "gray water" isn't always available. In Los Angeles, for instance, a new recycled water pipeline could take years to reach most of the region's downtown data centers.

"It's going to be a challenge," Aaron Binkley, Digital Realty's director of

sustainability programs.

In Sacramento, Calif., NTT Communications Corp.'s RagingWire data center, which houses systems for major websites including Twitter Inc., has drilled wells to secure cheap water and to have a second source should its municipal supply be interrupted. Dupont Fabros Technology Inc., the owner of a 250,000 square foot data center in Santa Clara, Calif., has built two half-million gallon water storage tanks as back up to make sure it doesn't run dry.

> **If they don't start charging more for water, there is going to be a water shortage for everybody.**
>
> — , Emerson Electric vice president

Other conservation efforts are hamstrung by worries about website failures. A cool climate is considered safer, executives say. "If you're a CIO, what you get your ass kicked for is downtime," said Chris Yetman, chief operating officer at Vantage Data Centers.

Some data centers rely on waterless cooling units, though experts say the wrong technology can backfire by pulling more power from the electrical grid, undermining the industry's more pressing effort to cut electricity use.

"Water is cheaper than electricity," said Jack Pouchet, Emerson's vice president of business development. "If they don't start charging more for water, there's going to be a water shortage for everybody."

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