

# As state's demand for water increases, so does its appetite for power

## Policymakers urge conservation to address 'energy-water nexus.'

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For the past few years, the topics of energy conservation and water conservation might have appeared to mix like oil and water, so seldom were the attempts to blend them.

But this year, as discussions of the state's energy and water demands bounce around the Capitol, environmental groups, academics and some businesses are starting to think about them together in ways that could clear a path for more ambitious conservation programs, change the types of power plants that are built and boost the attention paid to water resources when the state considers new plants.

"It takes energy to move water, and it takes a lot of water to make energy," said Michael Webber, the associate director at the University of Texas' Center for International Energy and Environmental Policy. Webber spoke at a policy forum on energy and water this month at the university's J.J. Pickle Research Center. Cleaning and pumping water for drinking or lawn-watering requires energy, Webber explained, and power plants need water to cool and recapture the steam that drives their engines.

Policy wonks have deemed the phenomenon worthy of its own catchphrase - "water-energy nexus" - and in just the past year or two, it has cropped up at conferences and in white papers.

So far, no state has changed up forecasting methods to think of water and power jointly, although California published a report about its water-energy relationship in 2005.

Texas, where the population could double by 2060 and further stress water and energy resources, could be among the first. A draft report released in April by the Texas Water Development Board recommended that state planning agencies work together to plan ways to cope with the energy-water nexus. Future power plants might have to depart from conventional open loop cooling systems, where large quantities of water pass through a plant and are discharged back into a lake or river, to a closed loop system, in which water is recirculated through cooling towers or evaporation ponds.

Cities have to do their part, too, according to the report.

"Conserving water and conserving energy are synonymous," Webber, one of the report's authors, told a Senate panel in April.

He said renewable energies from wind turbines and solar panels require almost no water to operate. But he warned that some unconventional alternatives can make matters worse: Desalination plants produce potable water, but they require a lot of energy. Biofuels can substitute for foreign oil, but they require lots of water.

The state water board report recommended that the agency play a more prominent role in the permitting and siting process for power plants and that power plants use less water and recycle it internally.

Any changes to water cooling systems would send a ripple across the energy industry in Texas, where utilities have already proposed new nuclear and coal-fired plants as the thirst for water and power in cities continues to grow. Each kilowatt-hour generated from coal requires 25 gallons of water, according to a 2007 report by the federal Sandia National Laboratories.

"That means U.S. citizens may indirectly depend upon as much water turning on the lights and running appliances as they directly use taking showers and watering lawns," the Sandia report said.

The energy-water nexus has already led to real world complications. In August, an Alabama nuclear plant voluntarily shut down for one day because drought had lowered and heated water in the river that feeds the plant. The power plant would have further warmed the water as it discharged it, potentially endangering wildlife.

Austin's own river basin, where the population is growing rapidly and utilities want to build more power plants, is an exemplar of the energy-water crunch.

About a fifth of water drawn from the Colorado River is used by power plants from Austin down to Matagorda, said Suzanne Zarling, executive manager of water services at the Lower Colorado River Authority.

And power plants hoping to locate along the Colorado River's banks have put out feelers for possible water use that, taken together, would roughly equal all the water available during drought in the Highland Lakes, or about 445,000 acre-feet a year.

"We have to balance electrons going out of the basin with water needs in the basin," Zarling said.

The electricity Austinites demand requires about 18,100 acre-feet of water a year, said Ed Clark, a spokesman for Austin Energy.

Moving water, in turn, requires a lot of power.

A plan contemplated by the river authority and the San Antonio Water System would pipe billions of gallons of water from the Colorado River to San Antonio. Within the basin, the LCRA charges \$126 to guarantee an acre-foot of water during drought. The same amount of water would cost San Antonio \$2,000 or more, partly because of the energy costs of moving it, Zarling said.

Requiring power to operate its water and wastewater treatment plants and to pump water around the city, the Austin Water Utility takes up at least half the city government's electricity consumption, said Daryl Slusher, assistant director of conservation and environmental affairs for the utility.

About 4 percent of the nation's electricity is used for water supply and treatment, said Lisa Epifani, an assistant secretary at the U.S. Department of Energy.

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