

## Energy, water the state's new power couple

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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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(GRAPHIC)

Population growth in Texas means greater **water**, energy needs (see microfilm)