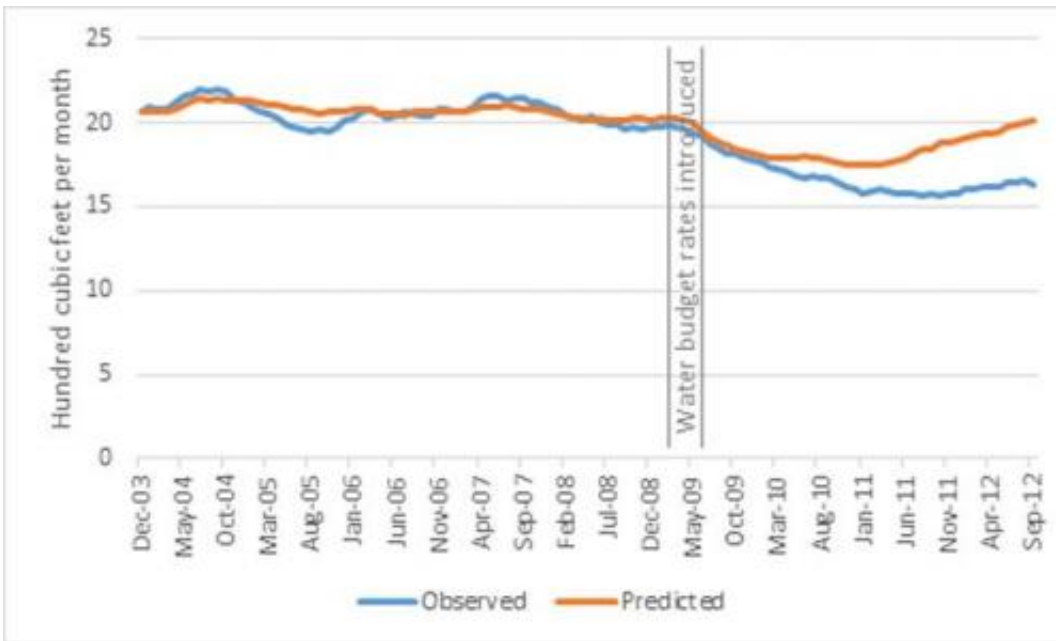


An innovative approach to promote water use efficiency

February 20 2014



This shows observed vs. predicted household water demand, 12-month moving average. Credit: Baerenklau Lab, UC Riverside.

Increasing block-rate water budgets are an innovative type of escalating tiered price structure in which the consumption block sizes are based on household characteristics, environmental conditions, and a judgment by the water utility with regard to what constitutes "efficient" water use given those characteristics and conditions.

In these [water](#) budgets, [prices](#) are set relatively low for the most essential

uses of water but then increase with usage. The price structure more accurately reflects the cost of supplying water and thus sends a more appropriate price signal to customers regarding water scarcity. It also helps water utilities to maintain fiscal balance despite uncertain fluctuations in supply and demand conditions.

But do block-rate water budgets encourage customers to conserve water?

Yes, according to Kenneth Baerenklau, an associate professor of environmental economics policy at the University of California, Riverside.

"Increasing block-rate water budgets appear to be a highly effective price-based conservation tool that does not require significantly increasing the average price paid for water," he said.

In his study, the first to estimate the conservation potential of water budget rate structures, Baerenklau used data from the Eastern Municipal Water District (EMWD) as they switched from flat rate pricing to increasing block-rate water budgets in 2009 in order to learn how much this rate structure change had reduced demand.

Baerenklau and colleagues then examined the monthly water use records of more than 13,000 single family households in EMWD's service area from 2003 to 2008 when EMWD was using flat rate pricing. They related each household's monthly water use to the price paid for water, household income, local evapotranspiration requirements, and other factors believed to significantly affect water demand. Then, they predicted what the demand for water would have been from 2009 to 2012 had EMWD retained its flat rate price structure rather than switching to water budget rates.

"We estimated that by late 2012, average household water use was

around 15 percent below where it would have been under a flat rate price structure with equivalent average prices," Baerenklau said.

"Furthermore, while the average price paid for water rose only 4 percent under water budgets, flat rate prices would have had to increase by around 30 percent to achieve the same 15 percent demand reduction. This indicates that block-rate pricing can achieve the goal of encouraging water efficiency while keeping overall prices low and addressing equity concerns."

Results from the study have been accepted for publication in the journal *Land Economics*.

Water budgets have been used since the early 1990s, but not by many water utilities. As of 2008, fewer than 14 California [water utilities](#) had implemented water budget rate structures. But between 2008 and 2011, at least nine more California utilities implemented them. This renewed interest is driven, in part, by California's "20x2020 Water Conservation Plan," which requires each water utility to reduce its per-capita water consumption by 20 percent by 2020. Other utilities are considering implementing water budget rates, but there remain concerns about the costs and benefits of doing so.

"Our research helps to clarify one of the main benefits—water conservation—at a time when the state is coping with an extreme drought and expecting a drier and more variable climate in the future," Baerenklau said.

EMWD of Southern California provided funding for the study.

Baerenklau was joined in the study by Kurt Schwabe and Ariel Dinar, his fellow faculty members in UC Riverside's Water Science and Policy Center. They worked closely with staff at EMWD. The team of researchers continues to work on related urban water management

issues, including the effectiveness of both price and non-price instruments on residential water conservation.

"We are working with alternative models for the EMWD data to further examine the water budget rate effect in that district, and we are planning to conduct a similar study with Western Municipal Water District that should improve our understanding of how water demand responds to household income shocks," Baerenklau said. "We also are developing a method for estimating the welfare effects of changes in block rate prices, with funding from the Giannini Foundation of Agricultural Economics."

Provided by University of California - Riverside

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