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- ▶ [Writer's Guidelines](#)
- ▶ [Editorial Calendar](#)

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- ▶ [Article Archive](#)
- ▶ [Research and Reports](#)
- ▶ [Webinars](#)
- ▶ [Meetings Calendar](#)
- ▶ [Related Links](#)
- ▶ [The Marketplace](#)

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- ▶ [Education Design Showcase](#)
- ▶ [Impact on Learning](#)

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- ▶ [Article Reprints](#)
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Saving Water, Saving Dollars

by Klaus Reichardt

While the oil story is an important one, there is another pressing problem that has received little attention and is getting worse in more and more areas of the U.S. every year: chronic water shortages. Shortages are occurring in water-rich areas as well as areas such as Texas, Arizona, California, and New Mexico, where water has always been in tight supply.

This past year, we have been on a roller coaster ride as far as fuel, oil, and energy costs are concerned. As of January 2009, the cost of one barrel of oil was about \$40. However, just five months earlier, it was topping \$150 a barrel and the cost of gasoline notched above \$4 per gallon for the first time in U.S. history.

Because the cost of oil directly impacts all Americans and because the rise and fall of the cost of oil was so dramatic, the "oil story" was amply covered by all the news media. These extraordinary events also brought the energy discussion to the forefront with politicians, economists, energy experts, and environmental activists. Texas oil and gas executive T. Boone Pickens, among others, was on television several times a day promoting the use of wind power to help wean the United States off its dependence on foreign oil.

Another Story

While the oil story is an important one, there is another pressing problem that has received little attention and is getting worse in more and more areas of the U.S. every year: chronic water shortages. Shortages are occurring in water-rich areas as well as areas such as Texas, Arizona, California, and New Mexico, where water has always been in tight supply.

And the problem is not confined to North America; it is a global issue. Some areas of the world simply do not have enough water to meet demand because of population growth, poor water infrastructure, or climate change. The United Nations has suggested that in the not-too-distant future water will be as precious a commodity as oil and that the supply-and-demand issues affecting oil prices around the world will soon apply to water as well. In fact, the cost of water is already rising significantly.

According to estimates, water and sewer rates have risen between five and 20 percent per year in certain areas of the country, and are expected to continue to rise. Although this will only marginally impact residential customers (at least for now), heavy water users such as schools and universities are likely to be hit hard, forcing them to raise fees, ask for more tax dollars, reduce services, take funds away from other operating expenses, or some combination of all of these.

Water Shortages in the United States

Although water shortages and droughts have always afflicted mankind, most lay observers typically view these problems as temporary. After all, the next year there may be enough rain to provide ample supplies of water. However, the problem is getting worse. In 2008, every state in the U.S. reported a drought condition in one or more areas, with three states — California, Texas, and North Carolina — reporting more than 300 drought conditions affecting agriculture, energy production, and human consumption. In fact, according to Ken Gewertz, a reporter with the *Harvard University Gazette*, "Some Southwestern states are on the verge of catastrophic water shortages."

Some people may wonder how water shortages can occur when 70 percent of the globe is covered with water, estimated at 326 million trillion gallons. But only about one to three percent of these trillions of gallons of water covering the earth are potable (drinkable) at any one time. More than 90 percent of the world's water is salty, contaminated beyond the ability to be properly treated, or frozen at the poles. And most of the remainder is absorbed into the earth for use by plants and other living things. With such a small percentage of potable water available, conserving water, whether drought conditions exist or not, is an issue that must be taken seriously.

Multistage Water Restrictions

Most state and local governments have instituted multistage warning systems for residential and commercial, as well as educational facilities, should drought conditions develop. A Stage 1 warning usually results in only minor restrictions and inconvenience, requiring, for instance, that the use of water for landscaping be limited to a couple of times per week and only at certain hours.

However, when the warning system jumps to a more serious Stage 4 alert, severe hardship can result. For instance, when Durham, NC, home to several schools and universities, including Duke University, declared a Stage 4 alert in 2007, the restrictions stated that no person was allowed to:

- water or use a sprinkler on any lawn, grass, trees, golf greens, or flowers
- water any vegetable garden or ornamental shrubs except by handheld container during hours and days specified by the city manager
- fill any wading pool or swimming pool or replenish any filled pool except to the minimum essential for operation of chemical feed equipment
- operate water-cooled air conditioners or other equipment that does not recycle cooling water, except when health and safety could be adversely affected
- wash any motor vehicle or other type of mobile equipment

In addition, all industrial, manufacturing, educational, and commercial enterprises were required to reduce consumption, with a reduction goal of at least 50 percent, and document the specific efforts they had made.

Water costs increase significantly when alerts are called. The University of North Carolina estimated that with a Stage 3 restriction, it would cost the University more than \$1.2M more for water during a six-month period. Rates can more than double with a Stage 4 alert.

Water Conservation in the Restroom

In the past when water shortages have occurred, the University of North Carolina, along with other schools and commercial facilities, has responded by urging employees, both at home and at work, as well as students, to cut back on their water use. However, in recent years, the University and other facilities have taken much more tangible steps to conserve water. For instance, new buildings have been designed to capture and reuse rainwater for such things as landscaping. And, because much of the water used on a campus is used in restrooms and locker rooms, more effective water-conserving fixtures and systems, such as waterless urinals and high-efficiency toilets, have been installed.

It appears that after a rather slow start in the U.S., no-water (waterless) urinals have finally been accepted, and for some facilities — for instance, those seeking LEED certification — they are the first choice when selecting urinals. A study of 14 such urinals at Kaiser Permanente's French Campus in San Francisco found that they saved approximately 55 gal. of water per urinal per day — equaling about 280,000 gal. annually and resulting in a savings of nearly \$3,000 a year at current rates.

Further, a study at the University of California, Santa Barbara, concluded that maintenance time is cut in half with no-water systems as compared to conventional urinals. Predicting that the entire campus will have waterless systems installed in the near future, school administrators believe this will help reduce related cleaning labor costs as well.

As for high-efficiency toilets, a growing trend is the selection of dual-flush systems. These toilets use 0.8 gal. of water per flush for liquid waste, about half as much as a typical toilet; and about 1.1 gal. for solid waste. Automating the process, 65-second toilets have also been introduced. These systems use sensors that determine how long the toilet has been in use:

- More than 65 seconds (assuming solid waste), and 1.6 gal. of water are released.
- Less than 65 seconds and 1.1 gal. are released.

Sensor-operated faucets appear to save water as well. The U.S. Food and Drug Administration (FDA) estimates that switching from manual to sensor-operated faucets can save about one gal. of water per hand washing. This is because the sensor-operated faucets shut water off automatically when a user's hands aren't in the active area, and because the water flow can often be regulated. With manual faucets, users often lather their hands away from the sink or grab for towels without turning off the faucet, wasting precious water.

Being Sustainable Without the Suffering

Three decades ago, when then-President Jimmy Carter urged Americans to turn down their thermostats

to help conserve energy, "It was like gnawing on a rock [for Americans]," the former president said. It likely contributed to his failure to be re-elected. In the course of the most recent presidential campaign, now-President Barack Obama said he believes we need to take preparatory measures to ensure our water supplies are used efficiently and equitably. He supports the development of a national water conservation strategy, in coordination with states and municipalities.

Fortunately, when it comes to water conservation, technologies have been developed that allow us to be water responsible and more sustainable without feeling deprived. In fact, the goal now is to further educate the American people on why water conservation is needed and necessary. With this education, we can expect more and greater measures to be incorporated so that water does not follow oil's lead and become a highly contentious and expensive issue.

Klaus Reichardt is founder and managing partner of Waterless Co. LLC, Vista, CA (www.waterless.com). Reichardt founded the company in 1991 with the goal to establish a new market segment in the plumbing fixture industry with water conservation in mind.

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