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Driving them to drink

Oct 1, 2011 12:00 PM, By Stephen Ursery

Declining water demand causes new headaches for water managers

It may seem counterintuitive: Over the past two decades, the population served by the Newport News (Va.) Waterworks has grown by 15 percent. However, the total water consumption in the area has dropped by 15 percent. Per capita consumption has declined from roughly 130 gallons per day to less than 100 gallons per day.



That drop in demand is not isolated to coastal Virginia. For a whole host of reasons — conservation efforts, low-flow toilets, more efficient plumbing and the economic recession — water utilities across the country are reporting that their customers are using less water. Utility managers believe that decreased consumption is, by and large, here to stay. In fact, Brian Ramaley, director of Newport News Waterworks, and many of his colleagues have a phrase for the situation: "the new normal."

While they applaud efficient use, water utility managers now are confronted with some significant financial issues. Less consumption means less revenue, and water utilities' expenditures are almost entirely fixed. Consequently, utilities are being forced to reconsider their rates and their capital improvement programs to adjust to the new patterns.

How did we get here?

A 2010 study funded by the Denver-based Water Research Foundation helps demonstrate the demand trend. The study found that "a household in the 2008 billing year used 11,678 gallons less water annually than an identical household did in 1978."

According to water industry members, several factors have fueled the new consumption patterns. For instance, water-efficient toilets and plumbing have become more widespread in homes and commercial properties, Ramaley says. That is in part because the federal National Energy Policy Act of 1992 mandated the installation of low-flow toilets — which use no more than 1.6 gallons per flush, as opposed to the six gallons per flush of older models — in new construction. The U.S. Environmental Protection Agency's WaterSense and Energy Star programs that encourage individuals and businesses to purchase water-efficient devices likely have played some role, as well.

Furthermore, the public has become more conservation conscious, either through the active encouragement of water utilities or through the general influence of the environmental movement, Ramaley says. "Now, people tend to not let the water run when they're brushing their teeth," he says. "They don't just turn the hose on in the backyard and forget about it. If they do things like lawn watering, they tend to be much more controlled about that."

Pricing structures that charge consumers more as they use more also have affected consumption, says David LaFrance, executive director of the Denver-based American Water Works Association. He says the spread of water-efficient devices, the public's growing awareness of conservation and conservation-gear rate structures are "planned" reductions in water use that utilities can design their finances around. "Unplanned" reductions stem from things like droughts and recessions, and can be more difficult to financially plan for, LaFrance says.

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How to respond?

First off, water utilities should not discourage conservation, utility managers say. "You can't fight the trend," Ramaley says. "It's not the right thing to do to say, 'We've got plenty of water. We don't want people to conserve.' You have to concede from the beginning that, OK, it's a good idea to use less water."

Nevertheless, decreased water consumption does present some operational challenges, and part of the issue for municipal water utilities is that, typically, 80 to 90 percent of their expenditures are fixed, paying for things like debt service and pipeline replacement. Meanwhile, the opposite dynamic often is in play with revenue: 80 to 90 percent of their revenues are derived from consumption-based, rather than fixed, fees.

With consumption declining, utilities may reconsider their revenue ratios, which, broadly speaking, were put in place several decades ago to promote efficient water use. "You may see a shift towards recovering more of your revenue from a fixed fee," LaFrance says.

The Newport News Waterworks is reducing its dependence on consumption fees. The utility is increasing the percentage of its revenue that is drawn from fixed meter fees from 10 percent to 20 percent over the next decade.

Ramaley says water utilities should consider significant — but gradual — increases in their reliance on fixed fees, perhaps to the point that they reach a 50/50 split in revenue sources over the next three to five decades. "You can't go from 10 to 50 percent overnight," he says. "If you were to do that, it would disproportionately affect low-income households or retired couples on a fixed income."

Like its counterpart on the East Coast, the Detroit Water and Sewerage Department (DWSD) is seeking to increase its fixed fees, as well. The utility, which provides water to Detroit residents and businesses and also sells it wholesale to more than 125 communities outside of the city, has seen a 26 percent decline in its total water sales since 2003.

The drop is due in part to more water-efficient plumbing and greater overall awareness of conservation, but it largely has been fueled by the economy, says Mary Sevakis, public affairs manager for DWSD. The southeastern part of Michigan lost more than 116,000 residents and 400,000 jobs between 2000 and 2009, according to a report by the Southeastern Michigan Council of Governments.

For the fiscal year that began on July 1, DWSD designed its rate structure to collect approximately 27 percent of its wholesale revenues from fixed fees. Plans for the next fiscal year call for increasing that to 40 percent, Sevakis says.

In Northern California, the East Bay Municipal Utility District (EBMUD), which serves about 1.3 million customers in Alameda and Contra Costa counties, has not increased its proportion of fixed-fee revenue, but that is a possibility in the future, says Alex Coate, general manager of EBMUD. The district has seen daily water consumption in its service area drop from 220 million gallons per day in 2004 to about 162 million gallons per day currently, a drop that Coate attributes largely to the economy. Looking more broadly, the district's conservation effort, begun in the late 1970s, has enabled EBMUD to service 400,000 more customers without much of a change in total water consumption.

EBMUD adheres to best management practices (BMP) recommended by the California Urban Water Conservation Council (CUWCC), which advocates that no more than 30 percent of a water utility's revenue come from fixed service charges. However, CUWCC "is having [a] conversation" about changing its BMP to increase that percentage to 40 percent, according to Coate. "If they change it, that would change things for a lot of utilities," he says.

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Raising consumption rates

Utilities also have responded by raising their consumption rates. In its current fiscal year, DWSD raised rates by 9.6 percent for its Detroit customers and by 8.7 percent for its suburban wholesale customers, Sevakis says. Meanwhile, EBMUD has increased its rates about 7 percent compared to the previous fiscal year, according to Coates.

Customers can be agitated by raised rates, particularly if they have been using less water. "From a customer standpoint, this is a confusing relationship: 'I've used less, but they've raised the price,'" LaFrance says. "That's a hard thing to comprehend when you're a customer, unless you understand that the utility is a fixed-cost utility and that those fixed costs are distributed among the customer base in proportion to how much water they use."

Coate says that rate increases have been accepted almost entirely without protest, but Sevakis says some DWSD customers — particularly residents — react angrily at first. Therefore, the city has been aggressive about publishing articles on its website explaining why the increases are necessary, as well as going to community groups to talk about the rising rates. Sevakis also distributes literature at community access centers.

"It's about education," Sevakis says. "The media likes to use the headline 'Rate Increases,' so we've been trying to educate people about why you have to have rate increases. We have aging infrastructure. We've got some 2,700 miles of transmission mains that have to be maintained. There are costs associated with that."

Raising consumption-based rates can be tricky, though, Ramaley cautions: "As you raise your rates, people can react more to it [by reducing their use]," he says.

Capital improvements

Decreased water consumption has affected water utilities' capital improvement programs (CIPs), as well. For instance, Newport News Waterworks has postponed a \$250 million project to develop a new drinking water source. The utility is focusing on smaller projects — such as stormwater and wastewater reuse efforts — that can be implemented as the need arises without capital-intensive efforts, Ramaley says.

Detroit recently approved a five-year, \$1.3 billion CIP for water and wastewater projects. It replaces a previously approved \$3.1 billion plan. "We looked at that plan, and we only put in projects that were deemed critical," Sevakis says.

In Texas, the El Paso Water Utilities' two-decade-long conservation program, which features a tiered-rate system, has decreased per capita water consumption from 200 gallons per day to 133 gallons per day. The drop in demand has allowed the utility to save approximately

\$460 million in capital costs over that time by deferring the expansion of water facilities, says Ed Archuleta, president and CEO of El Paso Water Utilities.

Where do we go from here?

In some areas, consumption may increase as the economy recovers. Coate is projecting that total demand in his area will grow to 230 million gallons of water a day by 2040.

Meanwhile, Ramaley says that per capita consumption in the United States is likely to continue to drop. He points out that the per capita rates in many industrialized European countries are lower than in the United States and, thus, show the capacity for the rates to continue to fall here. "My sense is that, moving forward, declining per capita consumption both [in residences] and in industries and businesses is going to continue to be a reality," Ramaley says. "It's something that water utilities and municipalities will need to adjust their rate structures, their long-term capital programs and things like that to accommodate."

- Read the "[Six strategies for water utilities facing declining revenues](#)" sidebar to learn what steps leading utilities have used to successfully address declines in revenues.

Stephen Ursery is an Atlanta-based freelance writer.

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