Can Water Providers Afford Conservation?

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Water utilities exist to provide water to their customers; as water supplies become increasingly scarce, utilities must find new sources. Conservation is a frequently considered option: it may be cheaper than finding or treating a new water source and can quickly produce the desired outcome of "extra" water. However, less water used means less water billed, and utilities depend on the income from water sales to pay their expenses. Although seldom voiced to the public, a serious concern for utilities is: What if conservation is *too* effective? If demand drops substantially or a rebate program is wildly popular, the utility may not be able to afford to conserve.

Depending on its cost structure, a utility's net income can be significantly impacted by successful conservation programs. Most costs associated with operating a municipal water system are fixed, such as debt service and payroll. Costs directly tied to the amount of water delivered—mostly energy and chemicals—are about a third of total costs. Therefore, a 10 percent drop in demand might reduce a utility's costs by only 3 to 4 percent, while revenues could fall 7 to 12 percent.

What Affects Finances?

Aggressively pursuing water conservation is not necessarily a bad financial decision, however. The extent to which a conservation measure or program affects a water provider's finances depends largely on the primary reason conservation is pursued, the characteristics of the water supply being conserved, what is done with the conserved water, and aspects of the conservation measure itself.

Conservation programs carried out because "it's the right thing to do" or even to comply with a legal mandate probably will cost the utility if it has an adequate water supply. But if an area is experiencing substantial growth and the alternative to water conservation is importing distant supplies, pumping from deeper wells, or treating lower-quality water, conservation can improve the utility's bottom line by deferring system expansion and the integration of new, more costly water supplies. Programs that free up water for growth or environmental restoration or bank groundwater supplies for future generations could save the utility money over many years. More immediately, conservation may be a fiscally sound response to short-term drought or a treatment plant nearing capacity.

Is there a middle ground that reduces the financial risks of effective conservation while still rewarding conservation?

The long-term reliability of the existing supply, whether it is renewable, how far it must be transported, and the fate of the conserved water all impact the finances of a conservation program. If conserving a surface-water supply means unused water is lost downstream, the fiscal impacts will be greater than if that water—or local groundwater—is banked for future use. If conserved water is used to support growth rather than stored, the provider may become more vulnerable to future shortages.

Key financial aspects of the conservation measure itself include whether it is low-cost, such as a public relations-based program, or potentially high-cost, as with rebates for new appliances or landscape modifications. A scalable conservation measure, in which the program can be expanded or contracted based on public response, offers lower financial risk should the program prove unexpectedly popular. Southern California's Water$mart program ran out of rebate funds several times this year and had to switch to a reservation system.

Declining Demand Also a Factor

Long-term declines in per-capita water consumption have heightened utilities' fiscal concerns. A recent study by the Water Research Foundation (2009) found a pervasive decline in household water use averaging half a percent per year over the last 30 years. No strong correlations were found with geography, rates of growth, or conservation efforts.

Several water providers in the Southwest, including Phoenix Water, Tucson Water, Southern Nevada Water Authority, and Metro Water District of Tucson, report even steeper declines over the last six to eight years (see chart, right). Total water deliveries have remained level or declined, even as service-area populations and the number of hookups increased significantly. Possible explanations include:

- water conservation programs have become more effective;
- new homes have more water-efficient fixtures and appliances;
- turf-dominated landscapes are less popular, and even prohibited in some developments;
- drought has caused some gardeners to reduce or alter their landscapes;
- smaller households, smaller lots, and more neighborhood swimming pools have reduced the demand for backyard pools.

Defining the relative impact of each of these factors has proven difficult, but most municipal water managers cite efficiency standards for new water-using fixtures and appliances as the principal cause for reduced indoor use.

Aggravating the long-term decline in per-capita water demand is the current recession and drop in new home construction. This has resulted in dramatic decreases in hookup fees, which often pay for system expansions. Increasing numbers of vacant homes have also reduced revenues. This aggregate decline in demand, revenues, and hookup fees has made it difficult for utilities to meet fiscal targets and dampened their enthusiasm for conservation. Few, if any, are planning wholesale expansion of conservation programs. One utility planner commented that such programs have done as much damage to demand as they can afford.

Conservation Versus Revenue?

What can utilities do to limit the potential fiscal impact of conservation-triggered reductions in demand? They could implement water-rate structures that feature higher fixed fees covering meter-reading and billing costs, a large base volume of water charged, and relatively low charges for increments of water use above the base level. This would provide revenue stability—but minimal incentive for conservation. At the other end of the spectrum are rate structures in which the fixed base volume is small and rates increase with each incremental block of higher water use: this offers the greatest reward for conservation, but leaves utilities vulnerable to financial impacts of demand reduction. Is there a middle ground that reduces the financial risks of effective conservation while still rewarding conservation?

The Decoupling Option

One approach from the electric power industry is to decouple utility revenues from water delivered. A revenue target is set, and a rate structure is established that rewards conservation, such as with increasing rate blocks or seasonal rates. At frequent intervals, possibly monthly, rates are adjusted so that necessary revenues are generated regardless of fluctuations in demand caused by conservation or weather.

Proponents of decoupling claim this approach eliminates the utilities' financial disincentives to vigorously promote conservation. They also claim conservation should lower costs, save consumers money, and preserve scarce natural resources. But skeptics claim decoupling is unfair to consumers, and that most of the recent decline in water demand is the result of factors unrelated to conservation. Others claim decoupling is inconsistent with established rate-making principles.

Whether decoupling is the solution is unclear. What is clear is that concerns about the revenue impacts of conservation measures are real and must be addressed. ■

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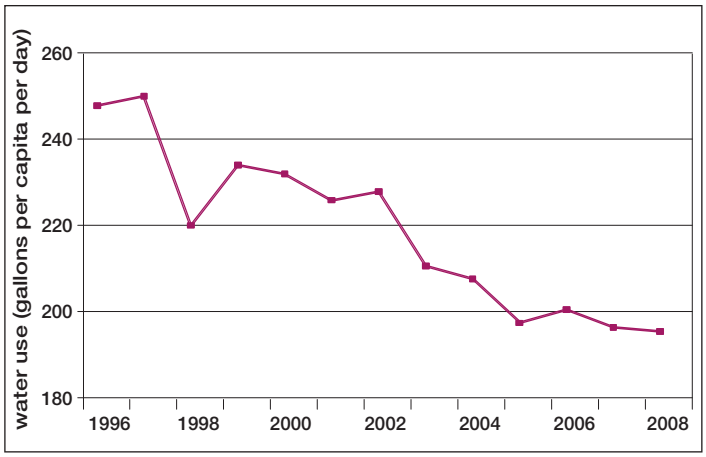

Per-capita water demand in Phoenix has declined more than 20 percent since 1996 due to more high-efficiency plumbing fixtures and appliances, landscape changes, rate increases, and more sophisticated conservation programs.

Reference

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Phoenix Demand Management Plan—A Paradigm Shift

Steve Rossi *and* ***Ray Quay*** *– City of Phoenix*

In Arizona's desert environment, the adoption of a low-water-use lifestyle by municipal customers is a critical ingredient in maintaining community sustainability. However, while we wave the water conservation flag for our customers, we must be careful not to fall into the trap of using water savings as a new water supply.

In past decades, water conservation provided a mechanism to serve more customers with the same amount of water, thereby delaying water acquisition and infrastructure expenses. This view was based on assumptions that surface water availability is only occasionally affected by short-term drought. However, recent tree-ring-based reconstruction of river flows covering an 800-year period reveals dry periods of 20 to 30 years in both the Salt and Colorado river watersheds, and both typically experience shortage at the same time. In addition, further impacts to supplies could result from global climate change.

Scenarios incorporating such conditions—where surface water is the primary supply—effectively demonstrate that allocating conserved water to growth compromises a water provider's ability to meet customer demand during shortages. The result is "demand hardening" whereby a greater percentage of a customer's usage is nondiscretionary. With the buffer allocated to growth, both longstanding and new customers would need to endure lengthier and deeper water-use reduction mandates.

Avoiding this trap requires that communities set higher water-planning standards than those traditionally used. The standards must consider the essential water-supply needs of the community during extended shortages and ensure that new development brings with it sufficient water for both normal and shortage conditions. Instead of allocating conserved water to growth, the savings during non-drought periods may be stored to reduce the community's vulnerability to future surface-water shortages.

It is important that we begin taking steps *today* to prepare for the inevitable long-term shortages. The long-term livability and economic viability of our communities lies in the balance.

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