Working water efficiency into the utility business model

June 2010

Striking a balance between revenue stability and water efficiency goals

Target Audience: Elected officials, City and County Managers, Utility Managers

With a long history of relative water abundance and lack of concentrated demand, the Southeast has had little reason to focus on water efficiency. But recent water shortages, more limited storage opportunities, the inseparable relationship between water use and energy use, and interstate water disputes have created a need to prioritize water efficiency in communities across the region.

However, for most utilities, the reality of reduced water demand presents a significant financial challenge: rising infrastructure costs must be recovered from a sinking sales base. Simply raising rates will not necessarily solve the problem. To the extent that demand for water is elastic (see end note for discussion of price elasticty of water demand), increases in water rates can actually drive water use down further. Additionally, the public may perceive that they're being "punished" for doing a good thing and reducing their water use.

Comic printed in Fayetteville Observer (NC) 2/6/04

"Conservation Conundrum"

Utilities' costs are mostly fixed in the short-term; they are not dependent on the amount of water sold or used by customers. However, the majority of revenue comes from the amount of water sold. If customers conserve, revenues drop significantly but not costs. Charlotte-Mecklenburg Utilities in North Carolina recently estimated that 82% of their revenues were based on usage, while in the short-term only 6% of their expenses varied with usage.

However, in the long-term (with planning), sustained reductions in average and peak water use can drive savings in capital investments. This can be achieved by recognizing decreasing demand and delaying investments in capacity and/or treatment expansions. Additionally, by promoting water efficiency, utilities may meet state regulations, act as responsible stewards of water resources, and engage with their customers in a positive manner.

But regardless of whether or not a utility actively promotes water-use efficiency. There are a number of outside influences driving per capita water use down. For example, the State of Georgia recently passed the *Water Stewardship Act of 2010* limiting outdoor water use for all utilities and requiring high-efficiency plumbing fixtures in all new construction permitted on or after July 1, 2012.

As a result, many in the industry are taking a strategic and creative approach to striking a balance between revenue stability and water conservation goals.

> "Water demand is recalibrating according to new economic realities and public policy directives. Ignoring declining demand does make it go away – or rather, come back. The intractable manager will remain cash-flow frustrated. The enlightened manager will be better positioned for cost recovery in accordance with a fluid equilibrium."
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> -Janice A. Beecher in Journal AWWA, February 2010

Decoupling rates and revenues, incentiving customer efficiency, maintaining affordability

The ultimate sustainability goal for a utility, both financially, ecologically and socially, is to utilize a business model that incentivizes customers to use less water without compromising the stability of revenues or affordability of essentials.

Easy to say, harder to do.

Unfortunately, there is no "silver bullet" to get to a fully sustainable utility. However, there are stepping stones. Utilities can and should develop multi-year finance plans that incorporate long-term, realistic water use goals and prudent investment strategies based on changing demand patterns. Additionally, utilities can evaluate and rework their rate structure to balance revenue stability and efficiency incentives.

One such strcture is a water budget or volumetric allotments of water to customers based on customer-specific characteristics and conservative resource standards. If designed well, an increasing block rate structure can also incentivize efficiency and address affordability. However, a utility must take precautions to avoid a large revenue shortfall if and when the utility has to call for major cutbacks in the higher blocks of consumption (i.e. in times of drought).

Many in the industry feel that water utilities need a completely new business model all together, one based on service provision, not direct sales.

There has been little experimentation with these types of models in the United States. But as technology in the industry advances, utilities can and should begin to consider a model that better decouples revenue stability from customer efficiency incentives.

For more information

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www.efc.unc.edu/projects/suwu.html

Upcoming GA trainings for utility professionals:

Crunch 2010 – Tri-state (GA, NC, SC) Water Conference
Location: Greenville, SC
Date: September 23 and 24
http://www.iwaterconference.org/

Workshop with GA Utility Professionals
Location: GAWP, Marietta, GA
Date: February 17, 2011
www.efc.unc.edu/projects/suwu.html

Price elasticity of demand is used in economics to show the responsiveness of the quantity demanded of a good or service to a change in its price. Price elasticities are almost always negative (i.e. as prices go up, demand goes down). Customers are less likely to respond to price adjustments on essential goods because there are no good alternatives..

Estimating the elasticity of demand by residential customers for water is a challenging task, but understanding the basics and the factors that move elasticity in one direction or another can be helpful in anticipating the impact of a rate increase on water demand for your utility. (Estimating elasticity for commercial, industrial and agricultural customers is even more challenging because each of these customers are unique and have different uses and processes for water.) The following are general factors that play a role in determining the response that customer bases will have to increases in water rates.

Final use for water: At low levels of demand, consumers are using water for drinking and personal hygiene, known as non-discretionary water uses. There are few to no substitutes for these uses of water; therefore, demand is fairly inelastic. However, the historically low cost of water in the Southeast has driven people to find other uses for water, including swimming pools, pressure washers, fountains and irrigation. These uses are called discretionary water uses. Demand for discretionary water uses is typically more responsive to price increases.

Income: Demand elasticity decreases as income increases (i.e. higher income households are less likely to respond to price increases).

Timeframe: Consumers are relatively more sensitive to water prices in the long run than they are in the short run. In the short run, water users have a much smaller menu of options to reduce water consumption, thus measured price responses tend to be smaller.

Other contributing factors:

- Current price
- Price information included on bill
- Household size
- Homeowners vs. renters
- Average age of customers
- Weather

Calculating Elasticity

$$\text{Elasticity} = \frac{\%\text{ change in demand}}{\%\text{ change in price}}$$

Example

Total price increase 10%; demand changes -1.5%

$$\text{Elasticity} = \frac{-1.5\%}{10\%} = -0.15$$

Residential price elasticity is in the neighborhood of -0.3 to -0.8.