



Arizona Department of Water Resources

Conserving Water Today for Arizona's Tomorrow

Conservation-based Water Rate Structures

For More Water
Conservation
Information
Contact:

[www.azwater.gov/
conservation](http://www.azwater.gov/conservation)

Statewide
Conservation Office
(602) 771-8422

Phoenix AMA
(602) 771-8585

Pinal AMA
(520) 836-4857

Prescott AMA
(928) 778-7202

Santa Cruz AMA
(520) 761-1814

Tucson AMA
(520) 770-3800

Introduction

Water rate structures play an essential role in communicating the value of water to customers. And since price influences the perceived value of a product, rate structures can be an important instrument in promoting long-term efficient use of water.

Conservation Water Rate Structures

Conservation-based rate structures are those that encourage the efficient use of water by charging customers more as water use increases.

There are two types of conservation-based rate structures:

Inverted or Increasing structures have increasing rates – customers who use higher volumes pay more per unit of water.

Seasonal or Off-peak structures have increasing rates per unit of water during the peak demand season (for example, during the summer, a customer may pay more due to the increased demand).

Other types of rate structures exist that may actually encourage high water use and run contrary to conservation efforts as they provide no price incentive to use water efficiently:

Uniform rate structures have a flat rate per unit of water regardless of the volume used.

Declining rate structures have decreasing rates per unit of water as more water is used.

Rate structures are generally referred to as block or tier structures, where a uniform per unit fee is assigned to a specific volume range of water. Many variations and regional-specific considerations can be applied to setting each block volume.

The appropriate rate structure is important in communicating the value of water and encouraging customers to use it responsibly.

Example of an Increasing Block Rate Structure

Numbers used in these tables are hypothetical and used only to illustrate different methodologies.

| Gallons Used Block/Tier | Monthly Service Charge (\$) | Metered Water Rates (\$ / Kgal) |
|-------------------------|-----------------------------|---------------------------------|
| 0 – 4,200 | 9.90 | 3.00 |
| 4,201 - 19,200 | 9.90 | 4.50 |
| 19,201 - 28,200 | 9.90 | 5.00 |
| 28,201 - 33,000 | 9.90 | 6.50 |
| 33,001 – 39,000 | 9.90 | 9.00 |
| 39,001 – 49,000 | 9.90 | 12.50 |
| Over 49,000 | 9.90 | 15.00 |

Example of a Seasonal or Off-peak Block Rate Structure

| Monthly Service Charge | Metered Water Rate (\$ / Kgal) | |
|------------------------|--------------------------------|-----------|
| (\$) | Oct – May | Jun – Sep |
| 9.90 | 4.50 | 6.50 |

Detailed information on establishing conservation-based rate structures is available through the Environmental Protection Agency at www.epa.gov and the American Water Works Association at www.awwa.org. Many private firms that specialize in water planning also offer assistance with rate studies and implementation.

Benefits of Conservation Rate Structures

Conservation-based rate structures are an effective way for water providers to encourage water conservation while offsetting the costs sometimes associated with implementing other types of water conservation programs.

The benefits of conservation-based rate structures include:

- Reducing peak usage
- Reducing seasonal usage
- Reducing total system demand
- Communicating an overall conservation consciousness
- Rewarding efficient users
- Surcharging for nonessential and non-efficient water uses

Conservation Fees

Providers may also want to consider establishing a water-conservation fee, which could be collected per customer per billing period and used to help fund water conservation programs.

Effectiveness of Conservation Rate Structures

A review of over 100 studies showed that for residential demand, a 10 percent increase in price lowers demand by 2 to 4 percent; and for industrial demand, a 10 percent increase in price lowers demand by 5 to 8 percent (Beecher, 1994).

Evaluating Effects of Water Rate Changes

Evaluating existing rate structures in comparison to conservation-based rate structures is a valuable first step when considering a change in rates.

Below is a table that will help determine how revenue will be effected if a conservation-rate structure is implemented. This exercise should be done for each customer class (residential, multifamily, commercial, etc.).

| Line | Item | Value |
|------|--|---------|
| 1 | Current price per gallon | \$ |
| 2 | Current revenue-producing gallons (or cubic feet) | gallons |
| 3 | Current annual revenues (line 1 multiplied by line 2) | \$ |
| 4 | Conservation goal (reduction in water use) | gallons |
| 5 | Conservation goal as percentage of current annual revenue-producing gallons (line 4 divided by line 2) | % |
| 6 | Estimate price elasticity of demand (by customer class and/or type of use if applicable) | % |
| 7 | Percentage change in price needed to induce conservation (line 5 divided by line 6) | % |
| 8 | Calculate revised price level (line 1 multiplied by (1.00 plus line 7)) | \$ |
| 9 | Revised annual water usage (line 1 less line 4) | gallons |
| 10 | Revised revenues (line 8 multiplied by line 9) | \$ |
| 11 | Annualized fixed costs | \$ |
| 12 | Annual variable costs for revised water usage | \$ |
| 13 | Revised revenue requirements | \$ |
| 14 | Net revenue effect (line 10 less line 13) | \$ |

Source: USEPA Water Conservation Plan Guidelines, Appendix A, Water Conservation Measures

Issues to Consider when Implementing Conservation Rate Structures

- In most Arizona communities, rates are significantly lower than the true cost of acquiring water (pumping, treatment, delivery, replenishment, and obtaining new supplies), which may create customer resistance to paying higher rates.
- An effective rate structure should be designed so that water used for basic and essential needs costs less than water used for discretionary or non-essential needs.
- Rate changes should be publicized and explained so that customers understand why the change is necessary. It is important to show customers how much money could be saved by lowering water use to a less expensive block.
- Water providers have a natural reluctance to initiate conservation programs since revenue streams are based on water used.

- If water rates are designed appropriately, reduced water use should not necessarily result in reduced revenue. Rates should be adjusted so that the price of water reflects the cost of getting it to the customer.
- Some water providers are reluctant to initiate conservation programs since revenue streams are based on water used. If rates are established correctly, the rates paid by customers in high-water-use blocks may actually offset revenue loss from those in lower-water-use blocks.
- If rate structures are implemented properly, utilities should be able to balance their revenue stream to cover operation and maintenance and any increased costs associated with implementation of water conservation programs. A long-term conservation program can result in significant cost savings to the water system; it can extend the life of existing infrastructure and delay the costs associated with building new facilities or retrofitting old facilities to handle larger capacities.
- For private water companies, cost recovery for water conservation programs through a rate increase must be approved by the Arizona Corporation Commission (ACC). For more information, contact the ACC: www.azcc.gov or (800) 222-7000.

“Tiers should be designed in a manner that customers who conserve will recognize cost savings, while high water users will pay a greater portion of the costs that increased usage places on the water system.”
Arizona Corporation Commission

The Need for Conservation Rate Structures in Arizona

The use of rate structures as an incentive to save water is not new. While several cities in Arizona do have seasonally adjusted or inverted block rates and conservation programs in place, data suggests that rate structures in Arizona have a wide variability in both pricing and opportunities for rate restructuring.

This variability was demonstrated through a comprehensive study that was commissioned by the Arizona Water Infrastructure Finance Authority (WIFA). The study, Rate Structure Survey Summary for 2003, evaluated the rates of 400 Arizona water providers and showed that the average monthly charge for a standardized study use of 7,750 gallons/month is \$30.16. The range of costs for this same gallon usage across the study sample was from a low of \$5.61 to a high of \$99.60.

Conclusion

Arizona’s water resources are limited and aggressive conservation measures must be adopted to protect this valuable resource. Perhaps one of the most effective ways to accomplish this is by making sure the cost of water reflects its value and encourages customers to use it efficiently.

“Rate structures have the advantage of avoiding the costs of overt regulation, restrictions, and policing while retaining a greater degree of individual freedom of choice for water customers.”

USEPA How to Conserve Water and Use It Effectively