

EQUINOX CENTER

A Primer on Water Pricing in the San Diego region

Introduction

The San Diego region faces significant challenges to its long term water supply. Due to environmental and legal issues, our **current supply sources are under intense pressure and will be reduced in coming years**. As population and demand increase, **water supplies** generally will become **more expensive**. We've reached a point where **the price of water needs to reflect its true value**, incentivizing consumers to be more thoughtful about its use.

Effective pricing of water to communicate its true value, and the cost of wasting it, is one of the most powerful tools water managers have to ensure a long term supply that will maintain our quality of life in the region. **Effective pricing rewards conservation, discourages gross wasteful use**, and when correctly implemented, results in more affordable water for the majority of consumers over the long run. Evidence from nearby cities and others across the West indicates that **when water is priced correctly, water usage is reduced by 16-37% over time**.

Currently, the **City of San Diego**, the largest water retailer within San Diego County, is **assessing a new water pricing structure**, but there have been many questions about the extent to which the city should overhaul its current rate structure.

This primer on water pricing takes a look at traditional water pricing and investigates the benefits and challenges of steeply-tiered water pricing structures.

How does water pricing work?

Water **rate structures** vary widely as they need to be **responsive to the area's particular geography, climate, residential density, and other factors**. In determining the price of water, utilities have a multitude of options ranging from flat rates for all customers (flat rates do not take into account the volume of water used), uniform rates (where a meter is used to determine the amount of water consumed by the customer, but the utility charges the same rate for each additional unit of water consumed), simple tiered rates, and tiered rates with water budgets (explained in more detail below). As shown on Figure 1 below, **water conservation is maximized when tiered rates are implemented**.

Figure 1.

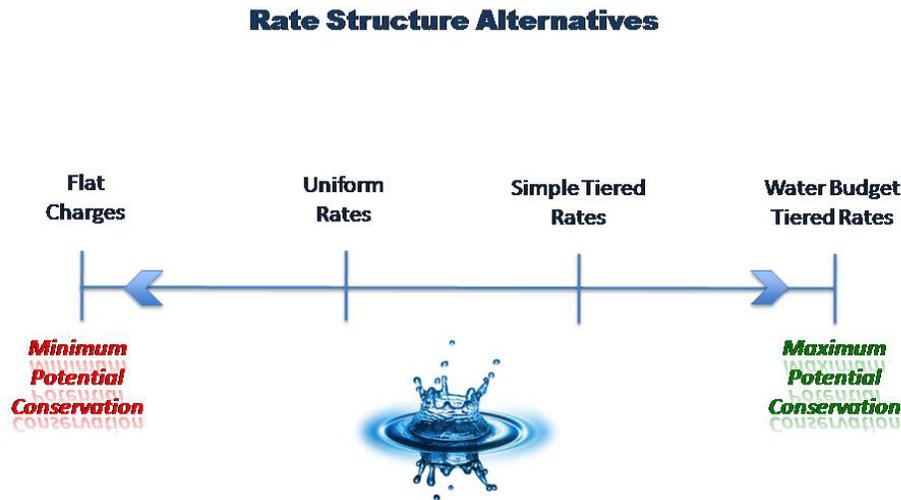


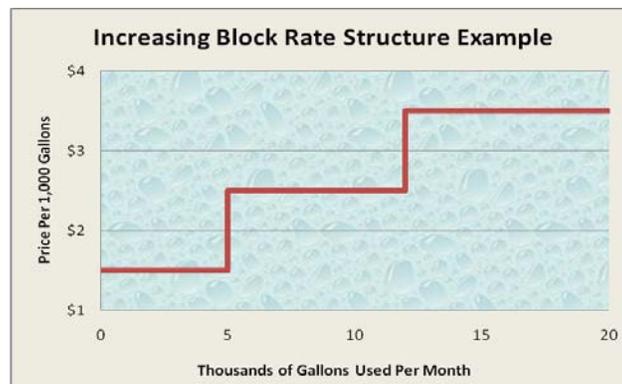
Figure 1 Adapted from Rafelis Financial Consultants, Inc. presentation to City of San Diego Stakeholders, Sept 25, 2009

Most utilities in San Diego County charge a **monthly fixed fee to all customers** to offset the administrative, operational and maintenance costs associated with providing water to their customers. In addition, **utilities** generally charge each customer for the actual amount of water consumed, although the **price for water used** itself is often **inexpensive** compared to the fixed monthly fee.

What is a simple tiered pricing structure?

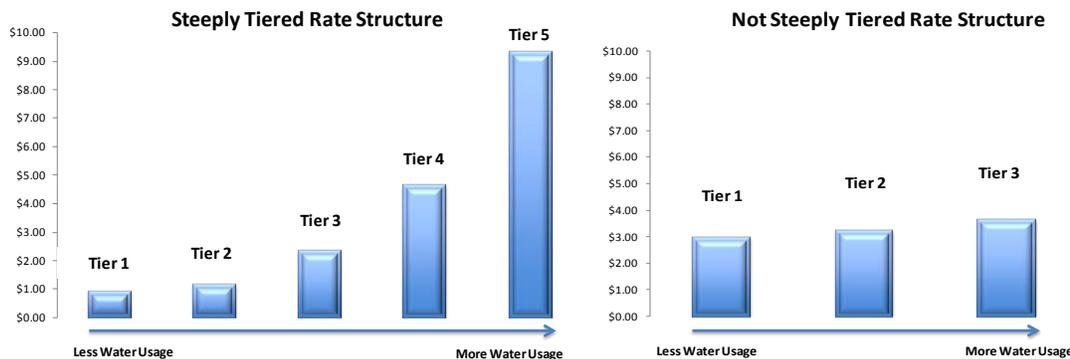
In a **tiered pricing structure**, the rate charged for water consumption each month resembles a set of stairs (see Figure 2), which are called tiers or blocks. **Water used within the first tier is the least expensive.** If a customer's water use exceeds the limit of the first tier, subsequent water use is charged at a higher, second tier rate. **As consumption continues into higher tiers, the price for water consumed continues to rise.** Typically, the **more dramatic the rise in cost, the greater the incentive is to conserve water.**

Figure 2.



While roughly 75% of water providers in San Diego County already use a tiered pricing structure for residential customers today, the **model has limitations when not properly designed**. The **incremental rate increases between tiers is generally not enough of an incentive to result in significant conservation behavior**. Also, a simple tiered rate structure that is **too heavily weighted towards fixed costs does not provide enough of an incentive to conserve** because a reduction in water use has **negligible impact on the customer's bill**. In addition, improperly formulated price structures coupled with other mandatory conservation regulations **can result in precarious financial situations for some water districts because they are unable to cover their fixed costs when less water is consumed** by their customers.

Figure 3.



What is a “water budget-based” tiered rate structure (sometimes also known as “allocated”, “goal-based” or “customer-specific” water rates)?

Some water districts, particularly in the south and southwest, have combined tiered pricing with water budgets for their customers. **Water budgets**, also sometimes known as water allocations, are designed by the water utility and **quantify the amount of water typically consumed by a customer, or type of customer, using water efficiently**. Water budgets may be **based on the number of persons per household, lot size or landscape square footage, daily weather or climate, seasons, indoor or outdoor uses, historical usage, or a combination of the above**. Rates are then established that **provide incentives (lower rates) for customers who use less than their water budget, and that penalize customers exceeding their budget**.

For a water budget-based, tiered rate (WBTR) pricing structure to be accepted by customers, it is critical that the water budgets are perceived as “fair”. The **water provider** must decide what local factors are appropriate to consider, and **establish a process to determine appropriate, reasonable water consumption** for its customers. Some districts create water budgets by conducting **household surveys** to determine the number of occupants to create an estimate for indoor water consumption. Others budget water based on **how much of the customer's landscape is paved, irrigated, etc.** Still others sponsor **workshops** that promote meaningful dialogue among customers that result in consensus **regarding reasonable versus excessive water usage**.

What are the results from districts that have implemented WBTR structures?

The following are districts that have had **success with tiered rate structures**, in combination with water budgets. More data on results from implementation of such structures can be obtained from the paper by Peter Mayer, referenced below.

Irvine Ranch Water District, in California implemented an incentive rate structure comprised of **5 tiers**, with the **top tier (highest users) paying 8 times the base rate** that is charged to consumers who use the typical amount of water for their household. Consumers who engage in extra conservation activities (use less than a typical household of their size) are rewarded with lower rates that in essence are subsidized by penalty charges on “wasteful” users. 20% of customers entered the penalty tiers, and only 6% were in the top two “wasteful” tiers. IRWD achieved an overall **37% conservation rate** after it implemented this structure in 1990. Irvine Ranch uses the funding from penalty rates to implement further **water conservation** education efforts.

The City of Boulder, Colorado designed a rate structure that in the **highest tier charges 5 times the base rate** and achieved a **16% reduction in water consumption** in the first 6 months of implementing the structure in 2007.

Capistrano Valley, California created a water budget-based rate structure with **3 tiers** in 1990, where units of water in the **third tier cost about double of water in the first tier**. Water budgets were based on lot size and the district achieved a **35% reduction in landscape water usage** with the new rates.

In San Diego County, **Otay** was an early adopter of the water budget-based rate structure, and after implementing it, achieved a **20% reduction in landscape water usage**. With drought and water restrictions already curtailing the San Diego region’s water supplies, many other water districts in our region, including Padre Dam, Escondido, Lakeside and Carlsbad have adopted new pricing structures. Several other districts are considering rate hikes of 17% or more, including Helix, Otay and Sweetwater.

What are the advantages of tiered water pricing?

Tiered water pricing is a **market- based mechanism for promoting water conservation**, which has several advantages.

- **Tiered water pricing is self-regulating and can be cost-effective.** It requires less monitoring and enforcement to achieve its goals compared to prescriptive conservation programs that require specific behavioral changes and mandate civil penalties for those who do not adhere to the restrictions.
- **If the customer chooses to conserve, they determine how to do so within their own household.** For example, a consumer may decide to install more water efficient appliances, decrease shower time, or install landscaping that requires less water to maintain. This differs from mandated restrictions such as when and how long to water landscapes, or what kind of fountains can be maintained.
- **When priced correctly, tiered pricing can decrease demand while providing a steady stream of revenue to the water provider.** This is especially valuable in times of drought, when the utility or city will have enough revenue from water sales to purchase water when demand exceeds the projected availability of

water. In uniform rate or low-tiered pricing systems, mandatory water restrictions can cause a steep drop in revenue for the water authority, making it difficult to meet water supply needs. **Tiered rate structures ensure** that our water districts have the **revenue to provide for our long term water needs**.

- **Appropriately configured tiered pricing structures are proven to reduce water demand over the long term, not just during periods of drought.** A study of more than twenty agencies nationwide with different tiered rate structures combined with water budgets found that customers used water more efficiently and agencies had more stable revenues. In the short term, reductions in water usage come from curtailing wasteful activities, but in the long run, people invest in technologies that use less water, and water conservation increases as a result.

What are some of the challenges of implementing tiered pricing structures?

Cost Implications

One of the primary challenges that water retailers face when considering a change from uniform pricing to more steeply tiered pricing and/or water budget-based structures is convincing customers, and the electorate, that the change will not have a drastic and adverse effect on monthly water bills. One way this challenge can be overcome is by engaging in an aggressive marketing campaign to **educate consumers about impending rate structure changes**, why changes were necessary, the cost of obtaining future supplies of water, and how those costs will be passed on to consumers regardless of price structures, what an average bill will be for normal and reasonable water use, how incentives can save consumers money, who benefits from the changes, and what kind of excessive use will trigger substantially higher water bills.

Affect on Low Income Households

Another concern relates to the effect of tiered pricing on lower income families. Studies have shown that water pricing tends to have different effects on lower income and higher income households. **Lower income households spend a larger percentage of their income on water**, and therefore are more sensitive to changes in price. However, in a steeply tiered price structure, as in the case of IRWD's tiered pricing structure, **funds derived from rates charged for high usage can allow the utility to provide lower rates for high conservation consumers, creating less of a burden on lower income households** that conserve. Of course higher income households also have the opportunity to use less water and reduce their bills as well - or pay the higher fees for higher usage.

Fairness in determining water budgets to go with tiered rates

Some districts, such as the Helix Water District, have proposed using household averages to determine water budgets for different tiers. However, critics argue that **steep rate increases coupled with what are perceived to be base water budgets that are too low, are unfair**. The Otay Water District has opted to use higher household averages, which they believe will be more in line with a greater number of consumers. **The intent is to set the tiers to decrease water usage where the customer has discretion over usage**, not to punish water usage where there is no discretion in usage. Again, districts can overcome this challenge by **listening to customer concerns when setting budgets, and engaging in marketing** campaigns to educate people about how budgets were derived.

Many districts choose to implement water budgets only for the single family residential sector, or test water budgets for their irrigation-only accounts. There are special considerations to implementing such plans for multi-family buildings, and the commercial and agricultural sectors, and this primer does not address those issues.

Equinox Conclusions

There are advantages and challenges to implementing tiered pricing and water budget-based pricing structures. See Figure 4 below.

Figure 4.

Opportunities in Tiered Pricing	Challenges in Tiered Pricing
<ul style="list-style-type: none"> • Direct link between conservation and the customer's water bill • No need for special restrictions, or draconian enforcement measures • Funding for conservation and efficiency programs comes from excessive water users • Agency revenues can be more stable • Long term resource management tool, not just short term response to drought • Water usage will decrease, along with related problems like urban runoff • Creates a new water ethic where customers understand value of conserving water 	<ul style="list-style-type: none"> • Setting proper break points for pricing requires more customer-level data than traditional rate structures • Public may not understand pricing tiers • Structure could seem punitive to large water customers, even if they are efficient water users • Some customers could see significant increases in their rates
Additional Opportunities in Water Budget Based Pricing Structures	Additional Challenges for Water Budget Based Pricing Structures
<ul style="list-style-type: none"> • Can be a more equitable way to share limited water supplies while preserving customer choice. • Pricing structure can be more fair when based on customer's needs • Water utility develops closer working relationship with customers • Future decisions on rates and response to drought are data driven once a budget-based rate structure is implemented 	<ul style="list-style-type: none"> • Perception of difficulty in designing and implementing water budgets • Potential public disagreements about fairness of water budgets • Could have higher implementation costs to upgrade or update billing system • May require increased customer service to handle questions and problems that may arise

Based on its research, **Equinox Center concludes that when correctly designed and implemented, steeply tiered pricing structures will maximize water conservation in the San Diego region**, value water for the precious resource it is, and help us to maintain our quality of life over the long term.

Equinox Center

To ensure a quality environment, vibrant communities and a healthy economy for the San Diego region, Equinox Center researches and advances best practices and innovative solutions to balance San Diego's regional growth with our finite natural resources. We produce and disseminate research papers, policy briefs, statistics, and maps and graphics all aimed at advancing balanced, integrated, regional approaches to San Diego's sustainability issues. For more information on water supply issues in San Diego, and best practices and case studies from around the world, please see our website at www.equinoxcenter.org.

Resources

- Comments from Ben Fissel, UCSD Doctoral Candidate in Economics
- ECoBA - Evaluation and Cost Benefit Analysis of Municipal Conservation Programs, WATER CASA, January, 2006.
- SMART WATER: A Comparative Study of Urban Water Use Efficiency Across the Southwest, WESTERN RESOURCE ADVOCATES, 2001
- Waste Not, Want Not: The Potential for Urban Water Conservation in California, PACIFIC INSTITUTE, 2003
- “Water Budgets and Rate Structures: Innovative Management Tools” , American Water Works Association Journal, P Mayer et al, May 2008
- Water Smart Innovations Conference, October 2008, Presentation by Tom Ash, “Water Budget Rate Structures Come of Age: How to Stabilize Revenue, Reduce Demand and Maximize Customer Satisfaction”