

# **RECLAIMED WATER RATES HELP ACHIEVE WATER SUPPLY AND CONSERVATION GOALS**

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## **Abstract**

This presentation will explore how Tucson Water has used reclaimed water rates as part of its program to increase the use of reclaimed water for non-potable purposes and to further its conservation goals. The presentation will include discussion of the cost of service analysis that is done on the reclaimed system as part of the rate making process, the City's policies on reclaimed water pricing, and subsidy of the reclaimed system from the potable system.

## **Tucson, A Water Conscious Community**

Tucson, located in the Sonoran Desert, receives only 11 inches of rain a year and has no local surface water supply. As a result, Tucson has always been a water-conscious community. The Tucson area is growing rapidly, at a rate of 2.5 to 3 percent annually. Today Tucson Water is delivering its customers groundwater and Colorado River water from the Central Arizona Project that has been recharged and recovered.

Tucson's reclaimed water system is unique in several ways. Rather than a means to dispose of treated wastewater, it is an important and growing water supply for this desert community. Wastewater is the only supply that will continue to grow as the population increases. Therefore, reclaimed water plays an increasingly important role in the water supply picture. The City has committed to the increasing the use of effluent as part of its long-range water supply plan. This commitment anticipates that effluent for non-potable reuse will be eight (8) percent of the total water demand through the year 2050.

## **A Regional Overview**

The City owns and operates a municipal water utility, Tucson Water, which provides potable and reclaimed water service in the Tucson metropolitan area. Tucson Water serves potable water to over 690,000 people, about 80 percent of the metropolitan population. In 2004, the utility delivered approximately 110,000 acre-feet of potable water and 12,000 acre-feet of reclaimed water. In the Tucson region, the combined annual municipal, agricultural, and mining groundwater pumpage is nearly three and a half times greater than the rate of replenishment of the aquifer.

Pima County owns and operates the regional wastewater collection system and treatment facilities. An intergovernmental agreement between the City and the County provides the City with the right to use about half of the 68,000 acre-feet (calendar year 2004) of secondary effluent produced at the two regional treatment plants.

Today, some of this secondary effluent is used in the reclaimed system and the remainder is used to irrigate two other golf courses or is discharged into the Santa Cruz River, under an NPDES Permit, where it recharges the aquifer.

## **Tucson's Reclaimed Water System**

Since the first customer (a golf course located at the end of a 10-mile pipeline) received reclaimed water in 1984, more than 100 more miles of pipe have been added to the system. Today, the reclaimed water system has more than 140 miles of pipeline and 17 million gallons of surface storage. The average day delivery is 12 million gallons and the summer peak day is approximately 26 million gallons.

Reclaimed water is produced in two ways: at a filtration plant and through recharge and recovery. The filtration plant further treats secondary effluent from one of the County's wastewater plants and is permitted to produce up to 10 MGD.

Reclaimed water is also produced at two recharge and recovery facilities: the Sweetwater Recharge and Recovery Facility located south of the filtration plant and the Santa Cruz River. The Sweetwater facility consists of eight constructed basins which are used to recharge secondary effluent. It is operated under an aquifer protection permit that allows 6,500 acre-feet of treated wastewater to be recharged and recovered annually. A constructed wetlands is also part of the Sweetwater facility. The wetlands was designed to treat the backwash water from the filters and is also used as a public environmental amenity

The Santa Cruz River facility is a "managed in-channel" project. Secondary effluent produced at the County's wastewater treatment plants is discharged into the river and "stored water credits" earned. These credits are then used to recover effluent from wells which pipe water into the reclaimed system

The recovered water is a very good quality, less than one NTU turbidity with nitrogen levels below the 10mg/L drinking water standard. This low nitrogen level is significant because the secondary effluent produced by the County is not denitrified and is typically in the 28mg/L range. Recovered water from the recharge facilities is blended with water produced at the filtration plant to produce water that meets Tucson's Reuse Permit requirements. The amount of recovered water blended with the filtered water varies daily based on total system demand and the quality of the filtered water. In 2004, the blend was about 58 percent filtered water and 42 percent recovered water.

## **Customer Characteristics**

In calendar year 2004, 11, 900 acre-feet of reclaimed water was delivered to over 750 customers. Sixty-two percent of this water was delivered to fourteen golf courses. Another 18 percent was delivered to parks. The remainder was delivered to schools (10 percent), single family (2.8 percent), agriculture (2.6 percent), commercial (1.8 percent), multi-family (0.36 percent), and street landscape (1.0 percent).

Although reclaimed water deliveries have increased by nearly 50 percent since 1995, the percentage of deliveries in each customer category has remained relatively constant except in the single-family group, which has had the highest increase. This can be attributed to increased public awareness of the availability of reclaimed water and a model environmental community which includes reclaimed water service to each home. All of the City-owned golf courses are irrigated with reclaimed water or secondary effluent.

## **The Role of Reclaimed Water in the Conservation Program**

Reclaimed water is important to Tucson's conservation program from the resource perspective by replacing potable water use, where appropriate, with a non-potable source that will increase in the volume available over the years. Reclaimed water also plays an important role in assisting Tucson Water meet its regulatory conservation requirements.

Since the late 1970's, the Tucson community has placed a high value on water conservation. The City has a policy that all new golf courses and turf facilities over 10 acres use reclaimed water. Pima County also has a policy requiring reclaimed water use for new golf courses. Although the City has considered the adoption of regulations requiring other new and existing uses to use/convert to reclaimed water, this has not happened. Each time the matter was considered, it was decided that it was best to allow the market (reclaimed water rates) and community values to determine the use of reclaimed water at facilities other than golf courses.

In Arizona, water conservation is mandated by the 1980 Groundwater Act. This legislation established three "active management" areas in the state (a fourth was later added). A plan for each management area is developed every ten years and this plan governs the water use activities of municipal water providers, industry, and agriculture. The management plans establish conservation goals for each of the water using sectors. Municipal providers, like Tucson Water, can choose to have their compliance with conservation goals regulated by one of three programs: 1) the gallons per capita per day method, 2) the total per capita method, or 3) a combination of 1 and 2. At this time, Tucson Water is regulated under the gallons per capita per day program (GPCD). Under this program, all water use, except reclaimed water, is included in the GPCD calculation. The utility's 2004 GPCD was 160, six GPCD under the management plan's target. Reclaimed water accounted for another 16.5 GPCD that if it were included in the GPCD calculation would have put Tucson well over its conservation target.

## **Water Rates and Savings**

Once every two years, Tucson Water initiates a rate setting process that culminates in Mayor and Council adoption of potable and reclaimed water rates. This process includes a series of steps including a cost of service analysis for potable and reclaimed water. The "cost of service" estimates the Utility's actual cost to provide water service to each customer class. The approach to allocate revenue requirements to classes based on cost of service is endorsed by the American Water Works Association and adopted by the Mayor and Council in its water financial policies.

The cost of service analysis is considered to be the baseline for setting the amount of revenues to be recovered from Tucson Water's various customer classes. In establishing revenue targets for each customer class, cost of service results often are adjusted to meet other water objectives, such as encouraging potable customers to convert to reclaimed water.

Since Tucson Water began delivering reclaimed water in 1984, it has been the Mayor and Council's policy that reclaimed would cost less than potable water. This was done as an incentive for Tucson Water customers with uses suitable for reclaimed water to convert. Initially, it was determined that recovery of approximately 80 per cent of the cost of service for reclaimed water through the reclaimed rates would meet the goal of keeping the reclaimed rates below the potable water rates. And would also ensure that the reclaimed system paid a fair share of its expenses. The remaining 20 per cent of the reclaimed system costs are included in the potable water rates. The rate payers accept this allocation of reclaimed costs because were there not a reclaimed water system, there would have to be additional expenditures on the potable side to acquire, treat, and deliver water for non-potable purposes. As a community, Tucson is committed to conserving and reusing potable.

In the past several rate cycles, reclaimed water rates have recovered between 73 and 85 of the cost of service, with the remaining paid by the potable water customers through their water rates. Although a few customers convert to reclaimed water because "it's the right thing to do", most convert because of the savings.

Potable water is billed based on an inclining block system with the lowest block (0-15 Ccf) costing \$1.03 and the highest block (over 45 Ccf) costing \$6.97 Ccf. Reclaimed water is sold at a flat rate of \$1.31/Ccf. Almost all large volume reclaimed water customers that convert from Tucson Water's potable system realize a savings. For example, an 18-hole golf course could save \$150,000 - \$200,000 per year by converting to reclaimed water. A high school could save \$18,000 annually by converting.

These savings offer opportunities. For example, Tucson Water and two of the local school districts have agreements under which Tucson Water loans the districts money to make on-site improvements in preparation for the conversion to reclaimed water. The districts repay the loans over a 5-year period using the savings they accrued from the conversion to reclaimed water. As a result of these loan programs, more schools have been converted to reclaimed water faster than otherwise would have been possible.

## **Conclusion**

Reclaimed water is important to the Tucson region from both a resource and regulatory perspective. One way that Tucson recognizes this importance and encourages people to use reclaimed water is by pricing it lower than the potable rates. The lower cost of reclaimed water has been an important incentive for people to use/convert to reclaimed water. It has also presented the opportunity for successful loan programs which are based on the repayment of the loan from the savings accrued.