

Case Studies of Sustainable Water and Wastewater Pricing



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Introduction

Clean and safe water is critical for both human and ecosystem health. Our nation's livelihood depends, in large part, on the quality of our water—for drinking, swimming, recreation, economic uses, and other benefits of healthy ecosystems. Over the past 20 years communities have spent hundreds of billions of dollars on drinking water treatment and supply and wastewater treatment and disposal. However, the infrastructure that provides us with drinking water and treats our wastewater is aging. Utilities and their local communities must provide the primary sources of funding to meet those needs. The water and wastewater systems profiled in the following case studies offer some valuable perspectives on how utilities and communities can meet these funding needs. While federal and state funding can help water utilities meet future needs, other strategies may be appropriate for addressing the challenges we face in maintaining our nation's water infrastructure.

EPA has developed the Sustainable Infrastructure Initiative to help in addressing these challenges. The initiative is based on **Four Pillars of Sustainable Infrastructure**:

-  **Better Management** Better management practices like asset management, environmental management systems, consolidation, and public-private partnerships can offer significant savings for water utilities—both large and small.
-  **Full-Cost Pricing** A key consideration in constructing, operating, and maintaining infrastructure is ensuring that there are sufficient revenues in place to support the costs of doing business. Sensible pricing can also have the added benefit of encouraging efficient water use.
-  **Efficient Water Use** One way to reduce the need for costly infrastructure is to better manage uses of water. There are many options for enhancing water efficiency including metering, water reuse, water-saving appliances, landscaping, and public education.
-  **Watershed Approaches to Protection** In addressing infrastructure needs for the purposes of water supply and water quality, it is important to look more broadly at water resources in a coordinated way. Targeting resources towards highest priorities, permitting on a watershed basis, and water quality trading are all means of ensuring that actions achieve the greatest benefit.



A reservoir and water supply pipeline



A water meter

The Role of Sustainable Pricing

The most important source of revenue for water and wastewater systems is their customers. The income customers provide is critical to ensuring that systems are operated properly and efficiently today—and that they will be able to continue providing high-quality service tomorrow. By charging their customers for the actual cost of service, systems guarantee themselves not only a stable source of funds sufficient to cover their costs of operation (including treatment, storage, and distribution costs), but also funds for infrastructure investments.

How much customers are asked to pay for any commodity or service sends a signal to them about the value of the product or service they are purchasing. Fees and other charges that reflect the full cost of water service will help customers to recognize the value of that service and to become more aware of how much water they use and how they use it.

Each of the systems profiled in the case studies that follow has had a different experience in sustainable pricing. Stanly County in North Carolina, for example, is just beginning to make its pricing structure more sustainable. The Marin Municipal Water District in California, on the other hand, has long had a sustainable pricing structure and has been able to combine it with a comprehensive water conservation program.

The experiences of these and the other systems profiled here can give water and wastewater utility staff, state regulators, and providers of technical and financial assistance new perspectives on how to develop and implement sustainable pricing practices.



A sedimentation basin



A water conservation garden

Key Terms

Capital Improvement Plan (CIP)	A budgeting and financial tool that a system can use to establish asset rehabilitation and maintenance priorities and to establish funding for repairs and improvements.
Cash Flow Basis	Measuring and recording the cash receipts and cash payments of an enterprise when they occur. This approach omits accruals, prepayments, deferred payments, and non-cash receipts and non-cash payments.
Certificates of Participation	Tax-exempt government securities used to raise funds to improve and construct buildings or purchase equipment. Investors who purchase Certificates of Participation receive lease payments made by the municipality for the project or equipment.
Cost-of-Service	A system's total cost of providing water to its customers and/or treating its customers' wastewater.
Debt Service	Principal or interest payments on an outstanding debt (e.g., a mortgage or loan).
Decreasing Block Rate	A rate structure under which the price of water per unit (block) decreases as the amount used increases. Blocks are set according to consumption (e.g., up to 2,000 gallons used, 2,000 to 6,000 gallons used, etc.).
Depreciation	An estimate of the reduction in the value of an asset due to wear and tear, obsolescence, or impairment.
Enterprise Fund	A form of accounting that utilizes a separate fund or cost center for a specific purpose. Enterprise funds are generally sustained by revenues generated within a specific entity like a water or wastewater system.
Equitable Rate Structures	Rate structures under which all customer classes (e.g., residential, agricultural) are paying their "fair" share of the full cost of water service.
Flat Rate/Fixed Fee	Rate structure under which all customers pay a set fee (monthly, quarterly, etc.) for water service that is not tied to the amount of water used.
Full Cost Recovery	Recouping the entire cost of water provision through rates, fees, charges, and other revenue derived from water sales.
Increasing Block Rate	Rate structure under which the price of water per unit (block) increases as the amount used increases. Blocks are set according to consumption (e.g., up to 2,000 gallons used, 2,000 to 6,000 gallons used, etc.).
Recycled Water	Treated wastewater used for beneficial purposes such as agricultural and landscape irrigation, toilet flushing, and replenishing a groundwater basin (a process known as groundwater recharge). A common type of recycled water is water that has been reclaimed from municipal wastewater or sewage.
Rate	The charge a system assesses its customers for use of the system's services, usually billed monthly.

Rate Structure	A set of fees and rates that a water system uses to charge its customers for water. The structure can take into account the system's characteristics (e.g., location in a highly industrialized area) and goals (e.g., to generate enough revenue to cover the full cost of water provision and encourage conservation). The structure can also account for customers of different classes (e.g., agricultural or residential), income levels, and water-use habits.
Repayment Insurance	An insurance policy that makes regularly scheduled principal and interest payments on a loan or bond if the borrower is unable to do so and would, without the repayment insurance, default on the debt. (Note that the insurer does not pay off the loan; rather, it makes the regularly scheduled debt service payments. The number of payments the insurer makes may be limited by the terms of the policy.)
Reserve Account	An account used to hold funds set aside to finance future system expenses such as infrastructure rehabilitation or replacement, or to address system emergencies.
Revenue	Funds earned by the system through the sale of water or by other means.
Revenue Bond	A municipal bond issued to finance a project or enterprise in which the issuer pledges to the bondholders the revenues generated by the operation of the projects financed by the bond. Revenue bonds may be issued to fund the construction of bridges, highways, hospitals, and other revenue-generating projects.
Seasonal Rate	A rate that varies depending on the time of the year. Seasonal rates can be used in conjunction with any other rate structure, including flat rates and uniform, decreasing, or increasing block rates.
Single Tariff Rates	A unified rate structure for multiple water systems (or other utilities) that are owned and operated by a single utility but that may or may not be contiguous systems or physically interconnected. Under a system of single-tariff pricing, all customers of the utility pay the same rate for service, even though the individual systems providing service may vary in terms of the number of customers served, operating characteristics, and stand-alone costs.
Surety	A sum of money held as a guarantee for a loan in good faith. It is similar to a deposit on a loan or contract.
Transfer Payment	Payment made by a government as a gift or aid, not as payment for any good or service nor as an obligation.
Uniform Rate	A rate structure under which customers pay a single charge per unit of water. For example, customers may pay \$5.00 per thousand gallons. The cost per thousand gallons remains constant even if usage changes. A uniform rate may be combined with a fixed fee so customers would pay a fixed monthly fee plus a charge per unit of water purchased.

Stanly County Utilities, North Carolina: Beginning the Transition to Full-Cost Pricing



Background

Stanly County Utilities (SCU) operates two small combined water and wastewater systems and one small water system (Stanly County, Greater Badin Water & Sewer District, and Piney Point Water District) with a combined 9,000-person service population. Although run as an enterprise fund, SCU has long depended on transfer payments from the County's general fund to sustain its operations. SCU realizes this situation is unsustainable—the transfer payments from the County divert resources from other pressing needs and there is no incentive for customers to use water efficiently. SCU is therefore moving to adopt, in the next 5 years, a pricing model that will ensure consistent revenues sufficient to cover its operating costs and fund capital improvements.

To begin its move to full-cost pricing, SCU hired consultants, paid with funds from the North Carolina Rural Economic Development Center, to conduct a rate study and develop a capital improvement plan (CIP). When it initiated the rate study, Stanly County set a number of objectives for any transition to full-cost pricing:

- *Economic Development/Extension of Service.* Water and wastewater service will be used as an incentive for economic development.
- *Consistency with Cost of Service Principles.* Rates will be set to recover the full cost of utility operations, including operation and maintenance (O&M) costs, debt service, capital reinvestment, and indirect costs such as billing, personnel, and vehicle maintenance.
- *Minimal Customer Impacts.* Rates will be adjusted in a manner that avoids large cost increases for customers.
- *Self-Sufficiency.* SCU will no longer depend on transfers from the County to cover its costs.
- *Revenue Stability.* Revenues will be predictable and stable, both seasonally and year to year.
- *Affordability.* Low-income/fixed-income or disadvantaged customers will be protected from unaffordable rates.
- *Conservation/Demand Management.* The pricing structure will encourage more efficient water use.
- *Rate Stability.* Rates will be adjusted in a manner that reflects a planned approach, rather than a reactive approach.
- *Ease of Implementation.* Changes will be easy to communicate to customers and elected officials and will have clear customer service and administrative impacts.
- *Legal/Defensible.* The new rate structure will be consistent with accepted practice and industry standards, local ordinances and state statutes, contractual obligations, etc.

The rate study determined that SCU's water rates needed to be unified and changed to an increasing block rate. SCU's current wastewater rates were found to be sufficient for covering the wastewater systems' operational and capital costs through 2010. SCU completed the first step in modifying its water rate structure in 2005, by reducing the number of rate blocks and creating a single tariff for the three systems it operates. The utility will move from its current decreasing block structure to a flat rate by 2007, and eventually to an increasing block rate.

Besides changing its water rate structure, SCU is moving towards self-sufficiency by reducing the annual transfers it receives from the County's general fund, reducing its reliance on grant funding, contributing to a capital reserve fund, and positioning itself to fully support capital expenditures through reserves, low-interest loans, and revenue bonds by 2010. The result will be a system that no longer diverts valuable County resources to subsidize its water rates, sends its customers appropriate

price signals about the value of their water and wastewater service, and has a sustainable pricing structure.

Cost Allocation

SCU’s operating costs include supply, storage, and distribution infrastructure and maintenance. Its costs also include debt service. Water system costs historically have been covered by SCU’s operating account, the County’s general fund, grants, and low-interest loans. Wastewater system costs are covered by wastewater rate revenue. In its transition to full-cost pricing, SCU will reduce its dependence on grants and transfers from the County’s general fund and eventually will fully fund operations from its operating fund. In 2006, SCU will establish and begin funding an operating reserve fund. The utility also plans to establish a capital reserve fund and anticipates beginning to transfer funds to it from the operating reserve fund in 2009. SCU includes depreciation in its accounts, but at this point in its transition to full-cost pricing does not fund the depreciation. As SCU’s rates and rate structure are adjusted further in the utility’s transition to full-cost pricing, SCU will allocate costs to the appropriate customers and customer classes. SCU’s rate model anticipates financing capital projects with a combination of rate revenue and debt. Debt financing will continue to include low-interest loans and will begin to include revenue bonds issued by the utility.

Subsidies/Transfer Payments

SCU currently funds 10 percent of its capital improvement costs through cash or debt; the balance comes from the County’s general fund, grants, and federal appropriations, including a large grant from the North Carolina Clean Water Management Trust Fund and an appropriation (under section 219 of the Water Resources Development Act) to the US Army Corps of Engineers.

Rates

The utility currently has a fixed charge for the first 2,000 gallons of water used and a decreasing block rate thereafter. There are separate water rate schedules for residential and commercial users. Wastewater customers are charged a uniform usage rate based on their water consumption.

- Rate Structure:** Water: decreasing block rate with a minimum charge. Wastewater: uniform rate.
- Lifeline Rate/Program:** None. The utility directs users who have difficulty paying their water bills to a local crisis assistance center that can help cover expenses such as water bills.
- Implementation:** SCU reduced the number of rate blocks and created a single tariff in 2004 and 2005. It will change its rate structure from the current decreasing block structure to a flat rate by 2007, and then eventually to an increasing block rate. SCU has several public involvement objectives for its transition to full-cost pricing, including improved communication within and among stakeholder groups, stakeholder education to increase awareness of SCU’s obligations and objectives, and coordination with affected groups to find common solutions.

Current Rates

Meter Size/ Customer Class	Fixed Fees/Charges	Usage Fees/Charges	
		Water	Wastewater
Residential	\$16.58/month for first 2,000 gal.	\$7.73/1,000 gal. for 2,001 to 10,000 gal.	\$5.25/1,000 gal.
		\$5.31/1,000 gal. for 10,001 to 20,000 gal.	
		\$2.37/1,000 gal. for over 20,000 gal.	
Commercial	\$18.08/month for first 2,000 gal.	\$10.14/1,000 gal. for 2,001 to 10,000 gal.	\$5.25/1,000 gal.
		\$6.89/1,000 gal. for 10,001 to 20,000 gal.	
		\$2.37/1,000 gal. for over 20,000 gal.	

G&W Water Supply Corporation, Texas: Developing Rates in a Growing Rural System



Background

The G&W Water Supply Corporation (G&W) is a member-owned nonprofit water system in Grimes and Waller Counties in southeast Texas. This growing rural system began with the consolidation of two small private systems in the early 1990s and currently serves about 4,000 people. Aside from occasionally adjusting rates for its only large commercial customer, G&W has had the same rates and rate structure since it began operating. Over the years, G&W has been able to cover the costs of system operation with its revenue; the customer base has grown an average of 10 percent each year and the resulting growth in revenues has matched any increases in costs.

As part of its regional water supplier certification from the Texas Commission on Environmental Quality (TCEQ), G&W has the right to be the retail water provider in its 288-square-mile service area. Past growth in the service area has come from residences and ranches connecting to the system rather than continuing to use private wells or dig new ones. Until very recently, the system has not been affected by the expansion of the Houston suburbs, less than an hour southeast of G&W's service area. A new 480-lot subdivision being built in G&W's service area will have its own water source, treatment, and distribution system; however, as G&W is the regional water supplier, the developer will deed the system to G&W and G&W will soon start to operate the subdivision's water system.

Even though the subdivision will be using its own water, G&W faces the prospect of continued growth in its customer base and increasing demand on its production capacity from other sources. Consequently, G&W recently commissioned an engineering study of its well capacity and infrastructure needs. The study recommended increasing the system's well and storage capacity with three new wells and tanks, adding another stand pipe, and looping the distribution system. With these improvements, G&W should be able to meet the water needs of its customers for up to 20 years.

Once G&W determines the property acquisition costs for the new well and tank sites and identifies financing for the project, it plans to develop a detailed rate model and adjust its rates and rate structure to ensure a sustainable pricing structure. One consideration of any future rate structure will be to ensure that the costs of serving new customers are borne by those new customers (through rates for their customer class, through connection fees, or both). Another equity consideration is that the rates and fees paid by new customers should not subsidize service to existing customers. The arrangement with the new subdivision, where the new customers have covered the costs of developing their own water source, etc., reflects these equity considerations. As G&W moves towards a new phase in its growth, with the costs borne by the appropriate rate payers, it will also begin moving towards an equitably and sustainable pricing structure.

Cost Allocation

G&W contracts with a private company to operate and maintain the system. G&W purchased a Supervisory Control and Data Acquisition (SCADA) system to operate its plants and a computer system to manage its billing. The contractor provides office space. The assets in the new subdivision are paid for by the developer and will be deeded to G&W, which will count the deeded assets as contributed capital. G&W will refund to the developer a portion of the water sales from the subdivision to pay for mains and services. G&W relies on groundwater for all of its raw water, which the system does not treat. Its costs include pumping costs, storage, and maintenance of the distribution system.

The system tracks depreciation in its accounts and maintains several reserve accounts. These reserves include one year of service on its debt (required by the lender, US Department of Agriculture Rural Development), a building fund, and an equipment-replacement fund.

G&W's customers are mostly residential. It has retail business customers and one large commercial customer (a hotel/conference center and campground). The system charges all its residential and retail business customers the same rate, and negotiates a separate rate with its large commercial customer.

Subsidies/Transfer Payments

G&W financed its initial major capital projects (the physical interconnection and upgrades associated with the consolidation of the two original systems) through a combination of US Department of Agriculture Rural Development grants and low-interest loans.

Rates

Each month G&W charges its residential and commercial customers a minimum of \$19.50 for the first 2,000 gallons of water and \$4.00 for each additional 1,000 gallons. The hotel/conference center and campground uses an average of 1 million gallons each month and is charged \$600 for the first 100,000 gallons and \$2.50 for each 1,000 gallons used after the minimum.

Rate Structure: Minimum monthly charge plus a uniform rate for usage above the 2,000 gallon minimum.

Lifeline Rate/Program: None.

Implementation: G&W holds open board meetings and an annual general meeting that members can attend. G&W intends to consult its members about any rate and rate structure changes through these forums.

Current Rates

Meter Size/Customer Class	Fixed Fees/Charges	Usage Fees/Charges
Residential and Commercial	\$19.50/month for first 2,000 gal.	\$4.00/1,000 gal. for over 2,000 gal.
Largest Commercial Customer	\$600/month for first 100,000 gal.	\$2.50/1,000 gal. for over 100,000 gal.



G&W laying new service lines and distribution mains

Newport, New Hampshire: Ensuring a Sustainable and Equitable Rate Structure



Background

The town of Newport in western New Hampshire runs its water system as an enterprise fund. The water system relies primarily on a surface water source in a protected watershed, supplemented by groundwater from a single well. The system serves about 5,000 people and has residential, commercial, and municipal government customers. Its single large industrial user accounts for 20 percent of sales.

In the early 1990s Newport faced the expense of building a new treatment plant for its surface water supply. The system revised its rates in order to cover some of the estimated costs of the new treatment plant and what would be required to cover the system's costs at that point in time. The resulting rate increase covered the system's cost of service including debt service and a portion of the capital project costs.

The system maintained these rates through 2002, when it undertook a rate study to determine the rates necessary to cover its operating costs and the impending capital costs that would not be covered by loans and grants. The rate study projected declining cash and working capital balances due to increasing expenses and repayment of debt and declining revenues due to static rates and decreased usage. The problem year was forecast to be 2004–2005, when cash balances would be depleted and working capital would be below recommended levels. (The projections were similar when capital projects were excluded, but the declines were of lesser magnitude.)

To ensure adequate revenue to maintain its cash and working capital balances, the system chose to increase rates by 10 percent per year from 2004 to 2008. To help offset any rate shock for customers that use nominal amounts of water (and are usually the customers with the most limited resources), the system reduced the cap on the minimum usage charge from 5,000 to 3,000 gallons per billing period.

The rate increases and the rate structure adjustment ensure that the system will continue to cover its cost of service while shifting more of the cost burden to higher volume water users. The resulting pricing structure is more sustainable and more equitable compared to Newport's previous pricing structure.

Cost Allocation

The system's costs are comprised of administration (billing office costs, staff salaries, etc.), treatment (costs incurred from the source to the treatment plant), services (costs incurred from the treatment plant through the distribution system), debt service, and capital costs.

Major capital improvement projects are projected as being funded with capital reserve funds, when possible, along with Drinking Water State Revolving Fund (DWSRF) loans and Community Development Block Grant (CDBG) funds. The projections use historical grant-to-loan percentages. For accounting purposes, grants are recognized either as cash received or as annual loan forgiveness.

The system uses a cash flow basis for rate-setting that includes the costs of planned system improvements. A 10-year planning horizon is used to set rates.

Subsidies/Transfer Payments

The system partially funded its early 1990s and recent capital improvement projects with a US Department of Agriculture Rural Development loan, DWSRF loans, and CDBG funds.

The system charges all municipal government customers the same rate for water use as residential and commercial customers.

Rates

Customers are assessed a straight usage charge based on meter readings taken 3 times per year. Approximately 98 percent of customers are metered. The system's largest industrial customer, which uses over 5 million gallons in a billing period, pays a lower rate. Unmetered customers are charged a fixed fee based on resident equivalent units. The system is working towards metering all unmetered customers. The system's minimum bill is for 3,000 gallons per billing period. Customers are billed 3 times a year.

Rate Structure: Uniform usage rate with a minimum of 3,000 gallons per billing period.

Lifeline Rate/Program: None.

Implementation: In 2004, the system began phasing in annual rate increases of 10 percent over the next 4 years. The system also reduced the cap on its minimum usage charge from 5,000 to 3,000 gallons per billing period to offset any rate shock for customers that use small amounts of water. These are the first rate increases and rate structure changes since 1990. Prior to receiving approval for the increase, the system made a concerted effort to inform the town selectmen and residents about the need for the increase. The system does not anticipate having to increase rates again until 2013.

Current Rates

Meter Size/Customer Class	Fixed Fees/Charges	Usage Fees/Charges
Residential, Commercial, and Municipal	\$13.26/billing period for first 3,000 gal.	\$4.42/1,000 gal. for over 3,000 gal.



Newport's surface water treatment plant

Greeley, Colorado: **Recovering Water Rights Costs**



Background

The city of Greeley operates its drinking water and wastewater systems as separate enterprise funds. The source for the drinking water system, which serves over 93,000 people, is surface water in three major river basins. Greeley's Master Water Plan evaluates the system's infrastructure, finances, and future source water needs. It defines specific steps to provide a reliable water supply for Greeley to the year 2020, with more general plans proposed through 2050.

Over the past 120 years, Greeley acquired the senior water rights to its surface water sources in order to meet its water system's needs. The system continues to acquire water rights as needed to address growth as determined by comprehensive, forward-looking water demand studies and its Water Master Plan. Greeley also requires each new residential and commercial development to acquire the water rights needed to meet its water needs.

During its long history of operating the water and wastewater systems, Greeley has always sought to cover the operating costs through water and wastewater rate revenues. Establishment of separate water and wastewater enterprise funds formalized this objective and meant that appropriate accounting systems were in place to meet it. Through the combination of long-term planning, cost-recovery accounting systems, and a focus on recovering the costs of water rights, Greeley has established a sustainable pricing structure for its water and wastewater systems.

Cost Allocation

The separate water and wastewater enterprise funds are further segregated into operating funds and several separate capital improvement funds. The operating funds cover costs of treating and distributing water to customers and treating their wastewater. These operation and maintenance (O&M) costs include the existing and anticipated debt service on city-issued bonds, which are the system's primary source of outside financing. Water and wastewater rates are the most significant source of revenue for the operating funds. A minimum reserve equal to 90 days' worth of O&M expenses is maintained in the operating funds.

Greeley has a separate fund to pay for the replacement and renewal of capital assets. Transfers of funded depreciation from the operating funds are the major source of dollars to cover replacement activity. Funds transfers are adjusted yearly according to a 10-year forecast. Greeley also has construction funds to cover costs associated with growth, funded by plant investment fees and bond proceeds.

A water acquisition fund is used to pay for the acquisition of water rights. A small portion of water sales (1.5 percent), bond proceeds, and investment income are the primary sources of funding. New developments in Greeley must provide their own water. Commercial developments must supply water rights in proportion to the size of each water tap needed and the annual allotment of water assigned to each service. New residential developments must supply 3 acre-feet of raw water for every acre of land in the development. For small developments, the system accepts cash payments for the necessary water rights. The system allocates payments to the water acquisition fund, which it uses to pay for larger water rights purchases.

Subsidies/Transfer Payments

None.

Rates

Customers are charged a uniform rate per 1,000 gallons used and a fixed charge based on meter size for water, and a fixed charge and usage charge based on water consumption for wastewater. Customers are billed monthly. Water rates for large industrial customers are determined by contract and depend on annual consumption, maximum daily demand, and peak hourly demand. Wastewater rates for commercial customers depend on the type of customer (e.g., whether the customer operates a restaurant, car wash, or mortuary, etc.). Water and wastewater rates and fees are adjusted yearly according to a 10-year forecast.

Rate Structure: Water: uniform usage rate plus a fixed fee per meter, billed monthly. Wastewater: fixed charge and usage charge based on water consumption.

Lifeline Rate/Program: Greeley does not have a formal “lifeline rate/program.” Its financial department handles delinquent accounts case by case.

Implementation: Greeley revises its 10-year rate model forecast each year and adjusts its rates and fees as required to meet the objective of full-cost recovery. Rates and fees are adjusted yearly, if needed, and usually a leveling or incremental approach is used to avoid rate shock. For example, water rates have increased 4½ percent during the past 3 years and are projected to increase 4½ percent each year through 2007. Proposed changes to rates, rate structure, or fees are communicated to the system’s customers through public meetings, local newspapers, the city’s Web site, and bill inserts.

Other

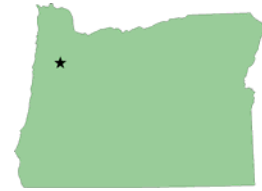
Greeley’s water conservation program provides conservation and retrofit devices to customers at reduced cost and encourages the use of native and climate-adapted plants, rotating watering restrictions, and other approaches to reduce water demand.

Current Rates

Meter Size/Customer Class	Fixed Fees/Charges		Usage Fees/Charges	
	Water	Wastewater	Water	Wastewater
5/8-3/4" - Residential	\$7.50/month	\$8.40/month	\$1.99/1,000 gal.	\$1.57/1,000 gal.*
1" - Residential	\$7.80/month	\$8.40/month	\$1.99/1,000 gal.	\$1.57/1,000 gal.*
1-1/2" - Residential	\$11.30/month	\$8.40/month	\$1.99/1,000 gal.	\$1.57/1,000 gal.*
2" - Residential	\$12.70/month	\$8.40/month	\$1.99/1,000 gal.	\$1.57/1,000 gal.*
3" - Residential	\$42.05/month	\$8.40/month	\$1.99/1,000 gal.	\$1.57/1,000 gal.*
4" - Residential	\$49.60/month	\$8.40/month	\$1.99/1,000 gal.	\$1.57/1,000 gal.*
5/8-3/4" - Commercial	\$7.50/month	\$8.40/month	\$1.93/1,000 gal.	By type of business
1" - Commercial	\$7.80/month	\$8.40/month	\$1.93/1,000 gal.	By type of business
1-1/2" - Commercial	\$11.30/month	\$8.40/month	\$1.93/1,000 gal.	By type of business
2" - Commercial	\$12.70/month	\$8.40/month	\$1.93/1,000 gal.	By type of business
3" Commercial	\$42.05/month	\$8.40/month	\$1.93/1,000 gal.	By type of business
4" - Commercial	\$49.60/month	\$8.40/month	\$1.93/1,000 gal.	By type of business

*Usage charged will not exceed the customer’s average monthly water consumption during the winter quarter.

Salem, Oregon: Developing Rates in a Growing Urban System



Background

Salem, the third largest city in Oregon, manages its water and wastewater systems through a combined enterprise fund. Salem anticipates that the number of people served by the water system, currently 177,000, will increase to 230,000 over the next 15 years. The City has undertaken a number of efforts—including the implementation of a “cost-of-service” rate structure—to ensure that its water and wastewater systems will be financially and technically capable of meeting the needs of an expanding population.

Before Salem re-evaluated its approach to pricing, its water rates consisted of a flat bi-monthly charge per wholesale customer or per water meter and a uniform volume rate per hundred cubic feet. The wastewater rates consisted of a flat bimonthly charge per customer and a volume rate based on the customer’s average winter water use. In 1997, the City began to determine how to bring water and wastewater rates in line with its master plans using three approaches: (1) a system development charge (SDC) analysis; (2) a financial planning analysis; and (3) a cost-of-service and rate design study.

The SDC analysis, completed in 1999, resulted in the implementation of new SDCs intended to recover the costs of expanding system capacity to accommodate growth and in the revision of long-term financial plans for the water and wastewater systems. The financial planning analysis provided the City with an estimate of system revenue needs. The cost-of-service and rate design study, completed in 2001, has helped the City determine how to spread these costs equitably among all customers. As a result, customers are charged according to the actual cost of providing service to their customer class. The City annually reviews and revises the water and wastewater systems’ 20-year financial plans, including the cost-of-service and rate design model. These approaches have ensured that Salem can meet the needs of its growing population in a sustainable manner.

Cost Allocation

Costs include operation and maintenance costs and capital expenditures, including debt service on revenue bonds, loans, and other obligations. Determining how to allocate these costs among customers involves four steps: (1) Categorizing revenue requirements by utility function (e.g., supply, treatment, and storage); (2) Classifying the costs for these functions as “joint” or “specific.” Joint costs are for functions performed for the entire service area. Specific costs are for functions that benefit a subset of customers (e.g., wholesale customers do not share costs associated with distribution system maintenance); (3) Classifying customers according to their “usage characteristics” (i.e., average and peak water demands) to ensure that rates are equitable; and (4) Allocating costs to each customer class and designing rates accordingly. These steps ensure that costs are equitably allocated across all customer classes.

The City covers future infrastructure rehabilitation and replacement costs, as established in the systems’ capital improvement plans (CIPs), through rehabilitation and replacement (R&R) funds. (Although the City accounts for depreciation in its financial accounts, the R&R fund requirements are determined through the CIPs and often exceed depreciation). Twenty-year revenue bonds with repayment insurance and sureties to replace debt service reserves are the first option considered and used in modeling future rate requirements.

Subsidies/Transfer Payments

None.

Rates

The City designed rates not only to ensure that each customer class generates enough revenue to cover the cost of supplying water to the customer class and treating its wastewater, but also to encourage conservation. These cost-of-service rates include bimonthly fixed charges that cover the systems' customer and meter-related costs, and volume charges that vary by customer class and cover the systems' service-related costs. Industrial customers have two classes: high peaking (customers with water consumption requirements that are higher during certain periods) and other.

Rate Structure: Water: Fixed fee by meter size plus usage fee by customer class. Wastewater: Fixed fee by customer class plus usage fee (based on water used) by customer class.

Lifeline Rate/Program: Customers are encouraged to donate to the Water and Sewer Low Income Assistance Program. The City sets aside all of the collected donations into a special fund used exclusively for low-income assistance distributed by local service agencies. In addition, the City provides assistance to low-income seniors and disabled individuals through discounted sewer charges of approximately 20 percent.

Implementation: The 5-year transition to a full cost-of-service rate structure began in July 2001. Phasing in the new rates helped avoid large rate increases for some customers and allowed time to eliminate billing system constraints. It has resulted in a shift in revenue recovery from smaller to larger customers. The average rate increase over the past 2 years was 6.5 percent.

Other

Salem has an extensive public awareness campaign to encourage water conservation. One program, the One Inch per Week lawn watering campaign, distributes free lawn watering gauges.

Current Rates

Meter Size/Customer Class	Fixed Fees/Charges		Usage Fees/Charges	
	Water	Wastewater	Water	Wastewater
5/8-3/4"	\$2.71/bimonthly			
1"	\$3.70/bimonthly			
1-1/2"	\$5.36/bimonthly			
2"	\$7.34/bimonthly			
3"	\$12.65/bimonthly			
4"	\$18.61/bimonthly			
6"	\$35.18/bimonthly			
8"	\$118.03/bimonthly			
10"	\$184.32/bimonthly			
Residential		\$16.26/bimonthly	\$1.92/CCF	\$2.36/CCF
Multiple Dwellings - Shared Meter		Varies by number of dwellings	\$1.57/CCF	\$2.36/CCF
Irrigation			\$2.28/CCF	
Commercial		\$21.03/bimonthly	\$1.62/CCF	\$3.33/CCF
Industrial - High Peaking			\$1.19/CCF	
Industrial - Other			\$1.05/CCF	
Institutional			\$1.48/CCF	
Public			\$1.65/CCF	

Note: One CCF is 100 cubic feet or 748 gallons.

Marin Municipal Water District, California: Supporting Sustainable Pricing with Water Conservation



Background

The Marin Municipal Water District (MMWD) is a publicly owned water system serving south and central Marin County, California. MMWD is the oldest municipal water district in the state, created as a special district in 1912. MMWD quickly established itself as a forward-looking water system. By 1919 the MMWD had passed a \$3 million bond issue, purchased 5,500 acres of watershed, and constructed Alpine Dam. Today, the system serves 190,000 people, maintains 21,250 acres of watershed, and has a wide-ranging water conservation program.

Water rates and fees paid by MMWD customers cover the entire cost of providing drinking water. A key component of MMWD's full-cost-recovery approach is its comprehensive integrated resource management plan, which links phased development of new water supplies to a sophisticated demand-management program. Through its conservation and water recycling programs, MMWD has stabilized demand at close to 1980 levels despite a substantial increase in population.

MMWD's approach shows that full-cost pricing can be very successfully merged with water conservation efforts. By tying new supply to demand management, MMWD relies on water conservation to avoid, or at least delay, the financial and environmental costs of developing new water supplies. Involving customers in demand management practices and charging them for the full cost of their water service has resulted not only in a customer base that is aware of the true value of its water supply but also a sustainable pricing structure for MMWD.

Cost Allocation

MMWD's operating costs include source water (withdrawal and purchase costs), treatment and storage of water, distribution of water, and maintenance of a large watershed. Watershed maintenance activities include managing fire risks, assisting visitors, monitoring plant and animal populations, restoring natural habitats, and maintaining access roads and trails. Depreciation and debt service are also funded from operating revenues.

The operating costs are covered by monthly service and usage charges. The service charge is based on meter size and covers the cost of meter reading and billing, customer service, meter replacement and repair, water conservation, and administration. The charge for the amount of water used covers the cost of water supply, treatment and distribution, and watershed maintenance. MMWD also assesses connection fees to recover past and future capital costs related to providing water and increasing system water production capacity.

MMWD's large-scale capital improvements have been funded by bond issues and certificates of participation. Using its Long Range Capital Plan, the system includes the debt service on these bonds and certificates when it develops the cost models used in determining its rates.

Subsidies/Transfer Payments

None.

Rates

MMWD runs on a 2-month billing cycle. Each bill contains a service charge and a water usage charge. The usage charge for residential customers is an increasing block rate with two seasonal blocks (winter and summer—because water use is lower in the winter, the winter block ranges are smaller than the summer block ranges in order to ensure a more consistent flow of revenue). Nonresidential customers

are charged a block rate that increases according to the proportion of the water budget established for each customer that is used during the billing period. The water budget is representative of a service's actual water needs. It is based on the historical water use for the site, site audits, and area averages for similar services. For billing purposes, the water budget is spread over the six billing periods. These bi-monthly divisions are referred to as the account's baseline. The water use for each billing period is compared to the account's baseline for the same period and is billed accordingly.

Rate Structure: Service charge and an increasing block rate for water usage, billed monthly.

Lifeline Rate/Program: Service charges are waived for customers whose annual household income is less than or equal to the low-income level set by the federal Department of Housing & Urban Development and who meet other criteria. For medically disabled individuals who meet certain criteria, all water used is billed at MMWD's lowest block rate.

Implementation: MMWD has consistently engaged its customers when contemplating and implementing rate adjustments and rate structure changes.

Other

MMWD recycles up to 2 million gallons of water a day and distributes it in a separate pipeline system to more than 250 customers. The separate recycled water delivery system has no direct inter- or cross-connections with the regular drinking water system. The recycled water is used primarily for irrigation, but also for toilet flushing, commercial carwashes, commercial laundries, and air conditioning cooling towers. MMWD has pioneered many of these uses for recycled water and has helped to introduce state legislation making these uses permissible under state law. MMWD is also considering desalinated water as a potential water supply source.

Current Rates

Meter Size/Customer Class	Fixed Fees/Charges	Usage Fees/Charges	
5/8"	\$16.70/bimonthly		
3/4"	\$18.46/bimonthly		
1"	\$25.50/bimonthly		
1-1/2"	\$43.15/bimonthly		
2"	\$64.24/bimonthly		
3"	\$120.58/bimonthly		
4"	\$166.47/bimonthly		
6"	\$359.60/bimonthly		
8"	\$711.74/bimonthly		
10"	\$1,063.88/bimonthly		
Single-Family Residential		Summer	Winter
		\$2.43/CCF for 0-31 CCF	\$2.43/CCF for 0-21 CCF
		\$4.86/CCF for 32-78 CCF	\$4.86/CCF for 21-48 CCF
		\$9.72/CCF for 79-125 CCF	\$9.72/CCF for 49-80 CCF
	\$14.58/CCF for over 125 CCF	\$14.58/CCF for over 80 CCF	
Multi-Family Residential		\$2.43/CCF for 0-12 CCF	\$2.43/CCF for 0-12 CCF
		\$4.86/CCF for 13-24 CCF	\$4.86/CCF for 13-22 CCF
		\$9.72/CCF for 25-32 CCF	\$9.72/CCF for 23-30 CCF
		\$14.58/CCF for over 32 CCF	\$14.58/CCF for over 30 CCF
Business, Institutional, and Irrigation		\$2.43/CCF for 0-85% of baseline	
		\$4.86/CCF for 86-150% of baseline	
		\$9.72/CCF for over 150% of baseline	
Recycled Water		\$1.36/CCF for 0-100% of baseline	
		\$2.72/CCF for 86-150% of baseline	
		\$5.44/CCF for over 150% of baseline	

Note: One CCF is 100 cubic feet or 748 gallons.

Chatham County, North Carolina: Accounting for Shifting Customer Base and Consumption Patterns



Background

The Chatham County water system serves a number of unincorporated (rural and suburban) areas south of Chapel Hill, North Carolina. The water system was built up over time from smaller local systems. Its growing customer base has shifted from almost exclusively rural users to an increasing number of suburban users. The system serves approximately 11,000 people. Initially financed with transfer payments from the County's general fund, the system now is run as an enterprise fund and recovers all of its costs through rates and charges.

Like many rural water systems, Chatham County's comprises several small systems serving sparsely populated communities. The County initially established a minimum monthly charge rate structure to ensure a reliable, consistent revenue stream. With the growth of nearby suburbs, however, the system's customer base began to shift from rural residents using small amounts of water to suburban customers with higher consumption rates. This shift in consumption combined with the original rate structure resulted in inequities for low-consumption users.

In the late 1990s, the system decided to develop a new cost-recovery-based rate structure that addressed the inequities created by the change in consumption patterns and that encouraged conservation. Linked to revenue requirements as calculated in the system's 10-year cash flow model, the new rates and rate structure increased system revenues, and the increasing block rate structure for residential customers promoted water conservation and shifted the financial burden from users of modest amounts of water to users of large amounts. Chatham now has a sustainable pricing structure that equitably accounts for recent changes in the system's customer base and consumption patterns.

Cost Allocation

Water rates are used to cover the cost of water production and distribution. These costs include the purchase of raw water, the operation and maintenance of the treatment and distribution systems, and debt service on private bank loans. Administrative expenses are distributed equally on a per meter basis. New customers pay the actual costs of connecting to the system (which are allocated to the operating fund), plus a connection charge (which is allocated to the capital reserve fund). The connection charge is based on the size of the service connection and ranges from \$1,750 for a ¾-inch connection to \$60,000 for a 6-inch connection. Along with the connection charge, a portion of water rate revenue is used to fund system capital costs thereby ensuring that depreciation of the system's assets is adequately funded. The system uses private bank loans for some large infrastructure replacement costs and factors the loans and debt service costs into its 10-year cash flow model.

Subsidies/Transfer Payments

None. In the past, the County made transfers from the general fund to the water utility fund in order to pay for infrastructure improvements because the water system was seen as a driver of economic growth.

Rates

The system uses an increasing block rate for residential customers to promote water conservation and encourage reduced irrigation during the drier months. The first block is set at 5,000 gallons, or approximately the amount used by an average household. Nonresidential customers pay a uniform rate. Prior to implementing this rate structure, the system had not changed its rates in years, despite a shift in its customer base from rural to suburban users that affected total usage. Rates include a minimum charge, which was relatively high under the previous structure.

Rate Structure: Increasing block rate plus a fixed fee per meter, billed monthly.

Lifeline Rate/Program: No specific lifeline rate. However, in the new rate structure, the rate charged for the first usage block was reduced by approximately 20 percent to assist users of less than 5,000 gallons of water each month.

Implementation: The new rates and rate structure were implemented in 1999, with minor increases in the new nonresidential rates and residential rate blocks for over 5,000 gallons since then. The new rates and rate structure are linked to revenue requirements as calculated in a 10-year cash flow model. The new rates were developed and implemented under the leadership of a citizen Water Advisory Committee. The County delayed implementation of the new rate structure in order to inform customers of the pending changes in rates and the rationale behind the changes. System growth and the new increasing block rate structure helped increase system revenue over 50 percent from 1998 to 2000.

Other

The system provides customers with advice and guidance on water conservation with the aim of reducing demand. The new increasing block rate structure for residential customers also promotes water conservation.

The County encourages customers to attend and participate in the monthly meeting of the system's Water Advisory Committee to voice their concerns about rates and any other drinking water issues.

Current Rates

Meter Size/Customer Class	Fixed Fees/Charges	Usage Fees/Charges
Nonresidential industrial production	\$15/meter/month	\$4.57/1,000 gal.
Nonresidential commercial	\$15/meter/month	\$6.00/1,000 gal.
Residential	\$15/meter/month	\$6.00/1,000 gal. for first 5,000 gal.
		\$7.50/1,000 gal. for 5,001 to 8,000 gal.
		\$9.00/1,000 gal. for over 8,000 gal.

San Jose Water Company, California: Ensuring Consistent Revenue



Background

San Jose Water Company (SJWC) is an investor-owned water company serving over 1 million people in California's Silicon Valley. The company has been providing water service in Santa Clara County for almost 140 years. Approximately 193,000 of SJWC's 212,000 customer connections are residential. SJWC also provides water for resale to 30 wholesale customers.

SJWC's rates are regulated by the California Public Utilities Commission (CPUC). The CPUC's mission is to balance the interests of utility customers and the interests of investor-owned utilities by ensuring that the rates utilities charge are fair and reasonable. The CPUC also ensures that all necessary improvements are made to the SJWC and that the system is operated efficiently. Investor-owned water utilities in California are allowed a dollar-for-dollar recovery of expenses and a rate of return on their infrastructure investments.

In developing its rate filings for the CPUC, the system aims to keep rates low by passing efficiencies through to its customers, while generating enough revenue to cover service costs and provide a return on the company's investment in infrastructure. After the drought California experienced in the early 1990s, SJWC revised its rate structure to increase the consistency of its revenue stream and simplify revenue forecasting. The resulting pricing structure has enabled SJWC to cover its cost of service, maintain a consistent flow of revenue, and continue to keep rates affordable.

Cost Allocation

SJWC maintains a relatively complex system of accounts for expenses to support its rate cases for the CPUC; the accounts generally are divided among operations, maintenance, and general and administrative costs. The system incurs source, treatment, and distribution system maintenance costs. Approximately 50 percent of SJWC's source water is treated water purchased from the Santa Clara Valley Water District (SCVWD). SCVWD charges all groundwater users a pump tax on groundwater withdrawals. SJWC also relies on surface water sources for approximately 7 percent of its water, and incurs costs to treat the surface water. SJWC's expenses include debt service and depreciation, which is fully funded.

To develop rates in California, the CPUC requires water companies to forecast capital and operating expenses for 3 years and base their rates on a future test year. Although the rate forecasts are based on a 3-year model, SJWC's internal capital budgets are developed on a 5-year basis. While the cost of capital projects including debt service can be recovered through rates, some projects must be built and in service (as opposed to being planned or under construction) before cost recovery is approved by the CPUC. This introduces some uncertainty regarding cost recovery.

The CPUC requires SJWC to track in "balancing accounts" certain water supply expenses including purchased water costs, groundwater extraction taxes, and electric power costs. The purpose of the balancing accounts is to protect the company and its customers from changes in costs that are beyond the control of the utility, and to ensure that rates accurately reflect the costs of providing water service. Once a year, the CPUC reviews the balances of the accounts to determine whether these costs were higher or lower than reflected in the water rates. If the costs were higher, the CPUC may authorize a

surcharge on the water bill; if the costs were lower, the CPUC may authorize a customer credit on the water bill.

SJWC’S customer classes are residential, small business, industrial, public authority, and resale. All customer classes are charged the same rate on all water purchased.

Subsidies/Transfer Payments

SJWC currently has two Drinking Water State Revolving Fund loans, which amount to about 2 percent of its overall outstanding debt.

Rates

SJWC has a monthly service charge per meter that varies by meter size, a uniform rate for every 100 cubic feet of water used, and a surcharge for unanticipated water supply costs, if required, as allowed by the CPUC. In addition, a reimbursement fee of 1.4 percent of the total water bill is charged to fund the CPUC. The CPUC rate design for water utilities allows 50 percent of the utility’s fixed costs to be recovered in the service charge, while all other costs (50 percent of the fixed and 100 percent of the variable costs) are recovered through the usage charge.

Rate Structure: Monthly service charge plus a uniform usage fee.

Lifeline Rate/Program: The system has a Water Rate Assistance Program (WRAP) for low-income customers. The WRAP provides a 15 percent discount on the total water bill for customers eligible for the program. The cost of the program is recovered from all non-WRAP customers through a surcharge of \$0.41 per month.

Implementation: SJWC undertakes a number of public information activities related to water rates throughout the year and particularly when its rates are adjusted. These activities include providing bill inserts, publishing notices in the local newspapers, and posting information about the rate adjustments the on company’s Web site. These efforts are in addition to the CPUC’s legal requirement to notify customers when the system files a rate case with the commission.

Other

SJWC provides a range of water conservation services, the cornerstone of which is its water audit program. During the free water audits, a trained water conservation inspector detects leaks, estimates the volume of water lost to the detected leaks, and shows customers how to read their water meters. At the end of the audit, customers receive additional conservation tips based on the results of the audit and are referred to other programs, if applicable. SJWC also provides conservation devices, such as low-flow showerheads and faucet aerators, to its customers free of charge.

Current Rates

Meter Size/Customer Class	Fixed Fees/Charges	Usage Fees/Charges
5/8-3/4"	\$12.02/month	\$2.0307/CCF
1"	\$20.01/month	\$2.0307/CCF
1-1/2"	\$40.03/month	\$2.0307/CCF
2"	\$64.07/month	\$2.0307/CCF
3"	\$120.14/month	\$2.0307/CCF
4"	\$200.24/month	\$2.0307/CCF
6"	\$400.53/month	\$2.0307/CCF
8"	\$640.88/month	\$2.0307/CCF
10"	\$921.28/month	\$2.0307/CCF

Note: One CCF is 100 cubic feet or 748 gallons.

Conclusion

These case studies illustrate that there are many routes to developing and implementing sustainable pricing practices—and many benefits as well. The variety of approaches profiled in the case studies show that by adopting a sustainable approach to pricing, water and wastewater systems can:

- send customers appropriate price signals about the value of their water and wastewater service;
- divert fewer valuable public resources to subsidize water and wastewater rates;
- meet the needs of a growing population in an equitable and sustainable manner;
- recover water rights costs;
- merge water demand management and full-cost recovery;
- account for changes in their customer base and customers' consumption patterns; *and*,
- secure a stable source of funds that covers their costs of operation and infrastructure investment needs.

Contact Information

The following system representatives have graciously provided their contact information for readers who would like more information about their system's approaches and experiences.

- Donna Davis, Stanly County Utilities, 704-986-3691, ddavis@co.stanly.nc.us
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- Will Baker, Chatham County, 919-524-8238, will.baker@ncmail.net
- Palle Jensen, San Jose Water Company, 408-279-7970, palle_jensen@sjwater.com

Further Information

More information on water and wastewater pricing and EPA's Sustainable Infrastructure Initiative can be found on EPA's Water Infrastructure Web site: <http://www.epa.gov/water/infrastructure/index.htm>, by calling the Safe Drinking Water Hotline at 1-800-426-4791, or by mailing us at:

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