Water and Sewer Pricing Policy Considerations

August 3, 2017

Affordability

Pricing Policy Consideration: The rate structure should help ensure that all customers can afford essential service.

Affordability is the ability of individual customers to pay for water and wastewater services that are adequate to meet their basic human needs, while maintaining the ability to pay for other essential costs. Affordability is a customer-level phenomenon that must be evaluated at the customer level.

Affordability is central to a utility's public health mission. Customers — especially low-income customers — must be able to pay for these services without sacrificing other essential needs if a community is to maintain the full benefits of water and wastewater services. If customers are faced with utility bills that they find burdensome, the result may be excessive account delinquencies, customer complaints, and utility theft. If a significant percentage of customers begin to perceive their utility bills as burdensome, actual revenues collected are likely to fall short of projected revenues. When combined with the higher costs of managing disgruntled and delinquent customers, this revenue shortfall poses a distinct problem for financial managers. More broadly, water and wastewater affordability can also play a role in a community's economic development and quality of life.

Resources

"Measuring Fairness: Assessing the Equity of Municipal Water Rates."; Teodoro, Manuel P.; Journal AWWA 97.4 (2005): 111-124.

WEF Manual of Practice No. 27 *Financing and Charges for Water Systems*, Chapter 12

"Water and Wastewater Finance and Pricing – The Changing Landscape", Raftelis, George A.; 4th Edition, 2015

Pricing and Affordability of Water Services: US EPA; https://www.epa.gov/sustainable-water-infrastructure/pricing-and-affordability-water-services

Affordability Assessment Tool for Federal Water Mandates; AWWA and WEF; http://www.awwa.org/Portals/0/files/legreg/documents/affordability/AffordabilityAssessmentTool.pdf

Water Utility Options for Low-Income Assistance Programs (Journal AWWA); Hasson, DS; https://www.awwa.org/publications/journal-awwa/abstract/articleid/14568.aspx

Policy Objectives in Designing Water Rates (Journal AWWA); Gaur, S; https://www.awwa.org/publications/journal-awwa/abstract/articleid/15651.aspx

"Compendium of Drinking Water and Wastewater Customer Assistance Programs"; US EPA; https://www.epa.gov/waterfinancecenter/compendium-drinking-water-and-wastewater-customer-assistance-programs

Water Conservation, Demand Management, and Efficiency

Pricing Policy Consideration: The rate structure should discourage wasteful use of all resources and encourage and efficient water use, as well as assisting in the management of system demands

In recent years, the objective to encourage water conservation has become a higher priority for many communities in response to increased pressure on available water supply and significant short-term shortages due to persistent droughts. It is also recognized that both water and wastewater treatment and transportation require significant energy resources that can contribute to the utility's carbon footprint. In general, this objective addresses the degree to which the rate structure promotes the optimal use of available water resources. Conservation goals, as stated by different utilities or communities, might include elements of several related, but separate objectives such as increasing the efficiency of water use (e.g. reducing waste and lost water), reducing peak demand levels, and/or reducing the average consumption per customer. Pricing structures that send the right signals to customers are an integral part of a broader water resource management programs. However, it is important to emphasize that pricing signals and rate structures are only one part of an effective resource conservation program, and that pricing alone is not likely be as effective without other program elements. A broad-based approach, emphasizing customer education, is necessary to achieve real, long-term reductions in usage by customers.

Resources

Water Conservation Briefing Memo-Final prepared by Jay Sakai

"Water and Wastewater Finance and Pricing – The Changing Landscape", Raftelis, George A.; 4th Edition, 2015; Chapter 11

"A Balanced Approach to Water Conservation in Utility Planning"; Chesnutt, T.J.; Journal AWWA; February, 2015

"Water Conservation Keeps Rates Low in Tucson, Arizona Demand Reductions Over 30 Years Have Dramatically Reduced Capital Costs in the City of Tucson"; Alliance for Water Efficiency; June 2017

"Comparing Price and Non-Price Approaches to Urban Water Conservation";
Olmstead, Sheila and Stavins, Robert; John F. Kennedy School of Government - Harvard University
June 2008

Cost Based Rates

Pricing Policy Consideration: The rate structure should ensure that each customer class is contributing equitably towards revenue requirements based upon the costs of providing service to each customer class

The process of determining the total annual revenue requirement to be recovered from each customer based on the costs of providing them service. That is, the cost of providing service to each customer should be recovered from that customer. Different types of customers generate different costs because their usage characteristics are different. The cost of service analysis allows for the matching of rates charged to each group to the cost of servicing them.

AWWA Manual M-1 *Principles of Water Rates, Fees and Charges* and WEF Manual of Practice No. 27 *Financing and Charges for Water Systems* provide detailed descriptions and guidance with respect to developing cost of service water and wastewater rates.

Resources

AWWA Manual M-1 *Principles of Water Rates, Fees and Charges*

WEF Manual of Practice No. 27 *Financing and Charges for Water Systems*

"Water and Wastewater Finance and Pricing – The Changing Landscape", Raftelis, George A.; 4th Edition, 2015; Chapters 6-10

Ease of Implementation

Pricing Policy Consideration: The rate structure should be compatible with the existing billing system, not take an inordinate amount of employee time to implement and should be based on readily available data.

The difficulty of implementing a new rate structure should be carefully considered. Possible implementation issues include the availability of data for initial and future rate structure changes, the ability to modify the customer-billing system to accommodate a new rate structure, changes to customer service procedures and policies, and the additional effort to perform future rate updates.

Resources

WSSC FY 2019 Rate Structure-Technical and Legal Considerations; prepared by WSSC staff

Ease of Understanding

Pricing Policy Consideration: The rate structure should be easy for customers to understand. In addition, the rate structure should be able to be effectively maintained by staff in future years

The ability for the rate structure to be explained in a manner that can be understood by customers, as well as elected officials and other stakeholders, can have important impacts on the ability to build consensus around rate adjustments. Additionally, a rate structure that is not easily understood by customers can impact customer service and collections functions leading to increased costs and more delinquent accounts.

Resources

"Water and Wastewater Finance and Pricing – The Changing Landscape", Raftelis, George A.; 4th Edition, 2015; Chapters 10 and 16

AWWA Manual M-1 *Principles of Water Rates, Fees and Charge;* Section III

WEF Manual of Practice No. 27 *Financing and Charges for Water Systems,* Chapter 11

Minimization of Impact on Customers

Pricing Policy Consideration: The rate structure should be developed such that adverse rate impacts on each customer class are minimized

This objective includes the extent to which customers or customer classes will be impacted after implementing a rate increase, and recognition that if the rate structure is changed, some types or classes of customers may be impacted more than others. Being able to explain and justify the variability in customer impacts that result from a rate structure change may be as important, or more important, than providing justification for an overall cost increase.

Resources

"Water and Wastewater Finance and Pricing – The Changing Landscape", Raftelis, George A.; 4th Edition, 2015; Chapters 1-5 and 14

WEF Manual of Practice No. 27 *Financing and Charges for Water Systems,* Chapters 2-4

Rate Stability

Pricing Policy Consideration: The rate structure should be developed such that dramatic year-to-year rate increases or decrease can be avoided.

This objective addresses concerns about maintaining rate continuity and consistency over time and avoiding large, one-time increases in rates. Careful capital and financial planning are important to insure rate stability and avoid erratic changes in rates and charges from one year to the next. Also, a steady or consistent program of smaller annual rate adjustments is generally recognized as preferable to a significantly larger increase once every three or four years. Not only does this avoid customer issues associated with rate shock, but it provides for a more stable and credit-worthy stream of revenues.

Resources

"Water and Wastewater Finance and Pricing – The Changing Landscape", Raftelis, George A.; 4th Edition, 2015; Chapters 1-5 and 14

WEF Manual of Practice No. 27 *Financing and Charges for Water Systems,* Chapters 2-4

Revenue Stability

Pricing Policy Consideration: The rate structure should provide for a steady and predictable stream of revenues.

The ability of the rate structure to generate stable and predictable revenues from year to year is an important consideration. Stable predictable revenues alleviate short term cash flow concerns and help ensure the utility can pay wages and vendor invoices in a timely manner. Additionally, bond rating agencies place a high value on revenue stability thereby making revenue stability a key objective of utilities that have a need to borrow money to address capital investment needs.

Measuring revenue stability is rather simple and involves tracking revenue on a regular basis. It is also important to assess the extent to which monthly revenue matches monthly expenses and the degree to which the relationship between revenue from fixed and variable sources is consistent with the relationship between fixed and variable costs. It has been determined that somewhere between 75% and 90% of most water utility costs are fixed, at least in the short term. Conversely, only between 15% and 30% of most water utility revenue comes from fixed revenue sources such as base or service charges

Resources

Decision 16-12-026 before the Public Utilities Commission of the State of California DECISION PROVIDING GUIDANCE ON WATER RATE STRUCTURE AND TIERED RATES; December 1, 2016

"Designing Water Rate Structures for Conservation & Revenue Stability" Environmental Finance Center at the University of North Carolina, Chapel Hill School of Government, 2014

"Strategies and Practices for Revenue Resiliency" Alternative Pricing Structures Webinar; Tiger, Mary; Environmental Finance Center at the University of North Carolina, Chapel Hill School of Government

WSSC FY 2019 Rate Structure
Technical and Legal Considerations

I. TECHNICAL CONSIDERATIONS

WSSC is currently in the process of upgrading its legacy billing system to the Oracle C2M system. The C2M billing system is widely utilized in the utility industry and can accommodate a variety of rate structure types. WSSC does not expect to transition to this system, however, until July 1, 2019.

The new rate structure effective July 1, 2018 must therefore be implemented within WSSC's current billing system. This system, known as the Customer Service Information System or "CSIS" was built in the late 1980's and runs on WSSC's IBM mainframe system. Put into production on May 29, 1990, CSIS was designed specifically for WSSC's tiered rate structure and is programmed largely in COBOL and ADSO. These programming languages are outdated, and it is therefore difficult to hire employees or contractors who possess the requisite knowledge and skillset to make necessary upgrades and changes. Due to these limitations, even minor changes to CSIS require a significant amount of time and effort to implement and test.

Notwithstanding these challenges, the WSSC Information Technology Department (IT) is currently working on upgrades to the CSIS system in advance of the new rate structure. Specifically, IT is working on reprogramming the tiered billing structure to ensure that in the event that WSSC adopts a tiered rate structure (either increasing or decreasing) that CSIS has the capability to bill customers incrementally through each tier. This is significant because with the current 16 tiered rate structure, WSSC bills customers for ALL usage at the rate that corresponds to the highest tier reached. This programming change to incremental tiered billing requires the development of complex logic, and months of testing is necessary to ensure that WSSC transmits accurate bills to its customers.

Due to the complexities inherent in making upgrades to CSIS, and the extensive testing that is required to ensure programming changes are accurate, there are limits to the types of rate structures that can be implemented within WSSC's CSIS system in a timely manner. For example, a rate structure that includes a seasonal component would be challenging to implement. At a minimum, a seasonal rate table would have to be added to CSIS to calculate special rates for summer versus winter months. This programming change would require scheduled system outages as well as additional developers to support coding and a lengthy testing period.

Once WSSC implements the Oracle C2M billing system, more complex options, such as seasonal rates, will be feasible.

II. LEGAL CONSIDERATIONS

As mandated by the statutory law that governs WSSC, the service rate set by WSSC must be "uniform" throughout the WSSC service area. *See* Maryland Annotated Code, Public Utilities Article (PUA), § 25-501(b). There are two limited exceptions to the uniformity requirement. One exception, as set forth in PUA §25-101(b), allows WSSC to set a different rate for all customers within a specific area or "subdistrict" if WSSC determines that the conditions for providing service to the "subdistrict" are "substantially different" from the conditions present generally throughout the WSSC service area. The second exception allows WSSC to set a higher rate for its industrial users if WSSC determines that conditions for service for industrial users are substantially different from the conditions for service generally within the WSSC service area. *See* PUA §25-101(c).

WSSC is restricted by the "uniformity" requirement from establishing a rate structure wherein different rates are charged to different classes of customers. Therefore, WSSC may not establish separate residential and commercial rates. In 2017, legislation was introduced in the Maryland General Assembly to modify the uniformity requirement to allow WSSC to establish classes of customers. While WSSC supported the legislation, it did not pass.

Even if the legislation in the 2018 session of the General Assembly is successful, the technical limitations of WSSC's current CSIS billing system (as set forth in Section I above) would prohibit WSSC from moving forward on July 1, 2018 with a rate structure based on different classes of customers. The legislative timeline is such that WSSC would not know until April of 2018 whether the legislation passed, and the earliest effective date for the legislation would be June 1, 2018. This short window from passage of legislation to the adoption of a new rate structure is simply not enough time to implement and test the necessary programming changes. Moreover, the WSSC IT Department must focus on effectuating the programming changes for the rate structure that WSSC will recommend in December of 2017 based on the current uniformity requirement.

WSSC FY19 Rate Structure

Water Conservation Considerations

Water conservation objectives are an important consideration in WSSC's review of rate structure alternatives. WSSC's current 16 tier inclining rate structure was intended to promote water conservation and there is some evidence that the utility has achieved significant reductions in customer usage since this structure went into effect.

WSSC was one of the first large water utilities to incorporate a conservation based rate structure, adopting in 1978 a new rate structure that provided pricing incentives for customers who lowered their usage. In the 1970's, the primary drivers for WSSC's conservation efforts were projected water resource scarcity, concerns about planning and growth within the Washington metropolitan area, and a growing "conservation ethic" within the customer base. [1] In today's operating environment, the need for water conservation is based on several factors, including

1. Limiting withdrawals from the Potomac River is an explicit requirement under cooperative management agreements that WSSC has entered into under the auspices of the Interstate Commission on the Potomac River Basin (ICPRB) framework.
2. Implementation of water conservation plans is required under Maryland water appropriation regulations. Both the Potomac and Patuxent Water Filtration Plants have permit requirements that require the development and implementation of a water conservation plan as a condition of withdrawals.
3. State and Federal environmental policies encourage water conservation as a stewardship practice that protects ecology and habitat.
4. Water conservation is an integral component of current long range planning for regional water supplies.
5. WSSC's ability to meet system demands through the 2040 planning period rely on assumptions that reduced customer usage that has been achieved through past water conservation efforts will be continued.
6. Water conservation is needed to ensure that growth throughout the Washington metropolitan regional can be accommodated while ensuring that the ecological health of the Potomac and Patuxent Rivers is maintained.

Relevant documents related to each of these topics are listed below. This information is intended to provide background and context for the consideration of WSSC's water conservation goals and objectives during the review of the current rate structure.

Document Summaries

1. **Limiting withdrawals from the Potomac River is an explicit requirement under cooperative management agreements that WSSC has entered into under the auspices of the ICPRB framework.**

- 1978 Potomac Low Flow Allocation Agreement & 1982 Water Supply Coordinating Agreement

  Synopsis:

  As a signatory of the 1978 Potomac Low Flow Allocation Agreement (LFAA) and the 1982 Water Supply Coordinating Agreement, WSSC agreed, with other Potomac River Basin stakeholders, to work cooperatively to ensure that the resource was effectively managed for the benefit of all upstream and downstream users. These agreements, managed collectively under the auspices of the Interstate Commission on the Potomac River Basin Commission's Section for Cooperative Water Supply Operations (CO-OP) , impart a stewardship responsibility on the WSSC and other major suppliers that links the ecological health of the basin with the interests of the utilities.

  Water conservation is an important principle in this stewardship responsibility. The LFAA, for instance, considers "the nature and effectiveness of water conservation methods put into effect" in the determination of each utility's allocation of water from the Potomac River.

  In addition, the general requirements of both the LFAA and the CO-OP Agreement require signatories to manage day-to-day operations related to their use of the Potomac by making "the most efficient use of all water supply facilities…" and "minimize the chances that the allocation provisions of the LFAA will need to be implemented". Taken together, these agreements compels all signatories to minimize their use of the Potomac River, particularly during times of drought.

2. Implementation of water conservation plans is required under Maryland water appropriation regulations. Both the Potomac and Patuxent Water Filtration Plants have permit requirements that require the development and implementation of a water conservation plan as a condition of withdrawals.

- Maryland Water Conservation Act of 2002 (MWCA)

  Synopsis

  In response to severe droughts experienced in the region between 1999 and 2002, the Maryland General Assembly enacted House Bill 693 – Maryland Water Conservation Act. The need for this new law was enumerated in the bill's preamble, which stated:

  > -*WHEREAS, Greater efficiency in water use and conservation can reduce the financial costs associated with treatment, storage, and transmission of water and wastewater necessary for Maryland's growing population, thus making better use of the limited financial resources available for such improvements; and*

-WHEREAS, Data compiled by the State and published by the United States Environmental Protection Agency show that in the next 20 years, more than $2,000,000,000 will have to be invested by public water systems, wastewater treatment plants, and State agencies in order to accommodate growth and to improve the quality of drinking water and the treatment, storage, and transmission of wastewater; and

-WHEREAS, Improvements in efficient use of water and overall water conservation measures will limit negative environmental impacts on Maryland's aquatic resources, which are associated with withdrawing surface water and groundwater and discharging wastewater; and

-WHEREAS, More efficient use of limited financial resources available for improving wastewater treatment will accelerate achievement of water quality goals, including the goals of the Chesapeake Bay Agreements;

The MWCA requires the Maryland Department of the Environment (MDE) to require public water systems to submit a plan for implementing water conservation measures, or best management practices, when applying for a water appropriation and use permit (WAUP) or State financial assistance.

- <u>MDE GUIDANCE FOR DEVELOPING & IMPLEMENTING A WATER CONSERVATION PLAN - Best Management Practices for Water Conservation & Water Use Efficiency for Maryland Public Water Systems</u>

Synopsis:

The Maryland Water Conservation Act of 2002 require MDE to issue guidance for public water systems on best management practices for improving water conservation and efficiency in water use, treatment, storage, and transmission. [2] This document constitutes guidance as required under the Maryland Water Conservation Act.

MDE's regulatory guidance identifies the following required elements:

1. *Metering. Plans should describe the metering method(s) used, and establish protocols for maintaining meter accuracy, conducting calibration and repair, and replacing old or inaccurate meters. Inaccurate meters often result in lost revenue for the utility.*
2. *Water Accounting and Loss Control. A well-designed loss-prevention program should target both real and apparent losses. Real losses are physical losses including leaks, bursts, and overflows. Apparent losses are non-physical losses that include meter inaccuracies and unauthorized consumption, such as theft or illegal use.*
3. *Pricing. Water conservation will prove to be most cost effective when rate structures are modified to encourage customers to conserve water. There are several pricing strategies that can encourage water conservation.*
    - *Repeal volume discounts to eliminate any disincentive for conservation.*
    - *Charge a higher unit price as use rises (i.e. increasing block rates).*
    - *Implement higher rates during seasons when water use is higher.*

- *Charge excess use fees where appropriate for high-use consumers*

4. *Information and Education Program. A good information and education program can be very effective in reducing consumer demand.*

The current water appropriation and use permits for WSSC's Patuxent and Potomac Water Filtration Plants contain explicit provisions to submit water conservations plans to MDE and implement the provision of each plan.

- MDE State Water Appropriation Permit No. PG1938S001(08) Patuxent WFP

  Synopsis:

  Water appropriation and use permit for WSSC's withdrawal from the Patuxent River. The permit authorizes WSSC to withdraw up to 72 million gallons per day (MGD) on a daily average basis and 120 MGD on a maximum day basis from the Patuxent River for the purposes of municipal water supply. The permit was issued on October 1, 2013 and expires on October 1, 2025.

  Key Provisions:

  - Water may be restricted by MDE during emergency drought conditions.
  - WSSC is required to conduct a water audit. The results of the audit will be used as the basis for the development of a water conservation plan to be implemented by the second year anniversary of the permit.
  - Establishes a minimum flow-by requirement at the Rocky Gorge Dam of 7,500 gallons per minute under normal conditions and not less than 5,000 GPM during low flow conditions.

- MDE State Water Appropriation Permit No. MO1957S001 (07) Potomac WFP

  Synopsis:

  Water appropriation and use permit for WSSC's withdrawal from the Potomac River. The permit authorizes WSSC to withdraw up to 170 MGD (daily average) and 300 MGD (maximum day) from the Potomac River for the purposes of municipal water supply. The permit was issued on August 1, 2010 and expires on August 1, 2022.

  Key Provisions:

  - Water may be restricted by MDE during emergency drought conditions.
  - WSSC is required to conduct a water audit. The results of the audit will be used as the basis for the development of a water loss reduction plan if unaccounted for water exceed 10%.
  - WSSC must submit a water conservation plan to MDE in accordance with the MDE guidance.

- Requires WSSC to reduce withdrawals from the Potomac River in accordance with the terms of the Low Flow Allocation Agreement.
- Permit requires WSSC to coordinate withdrawals with other regional supplies to maintain a flow-by of 100 MGD below the Little Falls Dam, in accordance with the Cooperative Water Supply Operating Agreement.

3. **State and Federal environmental policies encourage water conservation as a stewardship practice that protects ecology and habitat.**

- Final Report of the Maryland Advisory Committee on the Management & Protection of the State's Water Resources.

  Synopsis:

  Maryland has long recognized the need for water conservation within the context of its state-wide water management policy. Although Maryland has a relative abundance of water resources, growing demands and the impacts of historical droughts have highlighted the need for water conservation in this region in order to protect existing water resources from degradation and overuse, as well as ensuring that an adequate supply can support Maryland's growing needs. As a result of severe droughts in 1999 and 2002, the State established through executive order, the Maryland Advisory Committee on the Management & Protection of the State's Water Resources. This committee was chaired by M. Gordon Wolman, Ph.D, professor emeritus of water resource engineering at Johns Hopkins University and a recognized national expert on water resource management. Other committee members included elected officials, planners, state and local officials, industry representatives and other stakeholders. The Committee issued its final report to the Governor of Maryland on July 1, 2008.

  Key findings of this report included the following:

  - Maryland must develop a more robust water resources program based on sound, comprehensive data.
  - The Maryland Department of Planning forecasts that the State's population will increase by another 1.4 million Marylanders between 2000 and 2030, an additional 27 percent.
  - The projected growth will result in about 670,000 new Maryland households between 2000 and 2030.
  - Agricultural water use is expected to increase.
  - Marylanders will increasingly compete for water.
  - Water quality concerns may reduce the available supply of water.
  - Climate Change will create additional challenges for Maryland's water supply systems.

  Among the key recommendations that the Committee made to the Governor was an explicit call that "State and local governments should strengthen their programs for *water conservation,* water reuse, and *demand management.*"

From a State-agency perspective, the recommendations of the "Wolman Committee" report, which have been presented to the General Assembly [3], represent a framework for further strengthening of State management and regulatory programs related to water supplies and water appropriation. As a result, utilities can expect greater emphasis on water conservation in permit requirements and future rulemaking.

- U.S. Environmental Protection Agency WATER CONSERVATION PLAN GUIDELINES August 6, 1998

Synopsis:

The Safe Drinking Water Act (SDWA, 42 U.S.C. 300j-15), as amended in 1996, requires the United States Environmental Protection Agency (EPA) to publish guidelines for use by water utilities in preparing a water conservation plan. Properly planned and implemented, water conservation programs can defer, reduce, or eliminate the need for not only water supply facilities but wastewater facilities, as well. Significant capital cost savings can result, which in turn translates to smaller loan amounts for SRF Programs. This frees up money in limited loan funds to finance more projects to help achieve a state's compliance and public health goals. While the capital cost savings effects of water conservation are compelling enough, the potential benefits do not end there and also apply to customers. Water conservation extends water supplies, but it can also reduce utility operating costs. Energy use by customers and utilities can be reduced, which saves money and reduces greenhouse gas emissions. Reducing water withdrawals also helps improve water quality, maintain ecosystems, and protect water resources.

Key concepts:

- Efficient water use can have major environmental, public, health, and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water resources
- The Water Conservation Plan Guidelines emphasize goal- oriented planning which can help water systems improve their capacity to provide safe and reliable water service, as well as to eliminate, downsize, or delay infrastructure projects.
- the following characteristics tend to suggest a strong rationale for conservation planning:
    - State-designated critical water or stressed areas
    - Frequent droughts, supply emergencies, or safe yield problems
    - Excessive water leakages or losses
    - Entrance into major construction programs
    - Rapid growth in water demand
- The conservation measures most frequently mentioned in the statutes and guidelines are:
    - Metering and meter repair
    - Leak detection and repair
    - Rate design and conservation pricing [4]
    - Plumbing retrofits and promotion of water-saving fixtures
    - Public information and education

- Landscaping

- Level 1 Water Conservation Measures
  - Universal metering
  - Water accounting and loss control
  - Costing and pricing
  - Information and education
- Level 2 Water Conservation Measures
  - Water-use audits
  - Retrofits
  - Pressure management
  - Landscape efficiency
- Level 3 Water Conservation Measures
  - Replacements and promotions
  - Reuse and recycling
  - Water-use regulation
  - Integrated resource management

4. Water conservation is an integral component of current long range planning for regional water supplies.

- Montgomery County Ten-Year Comprehensive Water Supply and Sewerage Systems Plan, Chapter 3 Water Supply Systems

  Synopsis:

  Maryland counties are required by State law to prepare comprehensive water and sewerage master plans. The purpose of these plans is to ensure that counties plan for adequate water supply and sewage treatment to support planned growth. Both Montgomery and Prince Georges Counties have fully adopted and updated water and sewer plans. WSSC works closely with each of the counties during the updating of these plans to ensure that the regional planning process is closely integrated with WSSC's capital planning process. Montgomery County's current Water & Sewer Master Plan is listed in this document summary because it contains explicit references to WSSC's water conservation and waste reduction programs, which is a clear indication that WSSC's water conservation programs have been incorporated into a formal planning document. These references, beginning on page 3-24 of the Plan, are shown below:

  "c. Programs for Sustained Water Conservation and Waste Reduction - WSSC has a variety of programs to promote water conservation. These efforts include:

  i. Public Outreach and Education Programs -- WSSC provides educational brochures which promote the importance of water conservation (including its relationship to reduction of waste water loads) and to acquaint County citizens with the "tools" available to accomplish

conservation. Special projects focus on water-saving and to promote the use of "common sense" tools of conservation in existing customer units. These projects include the distribution of WSSC's Bottle Kit/Dye Pill distribution and 3 gpm shower flow controls, water-saving idea and conservation poster contests, sponsorship in cooperation with the Montgomery County Recreation Department of "Plumbing Repair Clinics"; and other activities timed to reinforce and to support the WSSC's public education efforts.

WSSC is also a partner in COG's Wise Water Use campaign, a regional program which is coordinated with the 2002 Metropolitan Washington Water Supply and Drought Awareness Response Plan for the Potomac River System. The campaign represents the plan's response to "normal" water supply conditions and includes many ideas for water conservation by users. WSSC provides the largest single source of funding for the regional campaign.

ii. Plumbing Code - Federal regulations require the installation of water saving fixtures (e,g., toilets, shower heads, and sink faucets) in new installations and in applications where plumbing fixtures are being replaced. The WSSC is proceeding with adoption of a model plumbing code that will enable greater regulatory consistency with surrounding jurisdictions.

iii. Rate Structure -WSSC uses a conservation-oriented water/sewer rate structure, which is based on Average Daily Consumption (ADC) in each metered billing period. The rate structure, in effect, charges lower rates per 1,000 gallons for the individual customer unit's total volume of consumption in the lower level of ADC. The billing rates are scaled up on progressively increasing 16 steps as the customer unit's ADC moves up.

iv. Total Water Management Study- In 1999, WSSC conducted a Total Water Management Study, with the objectives of identifying and developing strategies to conserve water resources, extending the life of available capacity in existing capital facilities, and reducing future capital and operating costs. The study examined a variety of potential conservation measures and projects, including the promotion of and financial incentives for installing water-efficient appliances and fixtures, water-efficient retrofits for existing housing stock, and public education programs. The study's conclusion indicated that WSSC can best meet these objectives through programs designed to improve public education and community outreach concerning water conservation measures and programs."

- Prince George's County Water Resources Functional Master Plan September 2010

  Synopsis:

  This plan fulfills the provisions of the Water Resources Element, one of several state planning requirements signed into law in Maryland on May 2, 2006, and mandated in HB 1141, Section 1.03 (iii) of Article 66B of the Annotated Code of Maryland. The Water Resources Plan shows how drinking water supplies, wastewater effluents, and stormwater runoff can be anticipated and managed to support existing and planned growth. Policy guidance for this plan came from the 2002 Prince George's County Approved General Plan. It contains recommendations for growth policies; land use; environmental conservation and preservation; water resource protection and restoration; water resource conservation and efficiency; interagency and intergovernmental communication and coordination; outreach and education; community engagement; regulatory revision; and data and systems management. This plan organizes an approach to water resource sustainability

that clarifies the county's intent to prioritize water resource protection; identifies issues and regulations critical to water resource preservation and restoration; and provides a framework for establishing the criteria necessary to achieve and evaluate our success toward meeting these objectives.

Key Strategies related to Water Conservation:

- Establish, coordinate, and maintain a county interdepartmental education and outreach program to address water conservation and water quality protection goals.
- Encourage and foster school programs, integral to curricula, that promote increased student involvement and engagement in forest and tree planting, water conservation, and stormwater prevention programs within their communities.
- Modify codes and regulations to remove impediments for existing development, new development, and redevelopment to implement water conservation and reuse practices and technology.

5. WSSC's ability to meet system demands through the 2040 planning period rely on assumptions that reduced customer usage that has been achieved through past water conservation efforts will be continued.

- WASHINGTON SUBURBAN SANITARY COMMISSION Interoffice Memorandum SUBJECT: 2016 WATER PRODUCTION PROJECTIONS DATE: JUNE 15, 2016 FROM: KAREM CARPIO, PLANNING MANAGER II, PLANNING GROUP TO:THOMAS C. HILTON, GROUP LEADER PLANNING GROUP

Synopsis:

The WSSC Planning Group is responsible for updating the water production projections every five years. The last water production projections report was completed in 2011. This report updates these projections with data from 2011 to 2015 using a different methodology to calculate the projected demands than in previous reports. Historically, the demands for the production projections were calculated by multiplying the Metropolitan Washington Council of Governments (MWCOG) demographic projections for total housing units (single-family and multi-family) and employees for various future time periods by the average consumption for that type of unit. The new methodology for calculating the 2016 production projections uses the 2013 billed consumption as a starting point (baseline demand) and then adds in demographic growth by type of unit (based on the MWCOG projections) multiplied by the appropriate water consumption rate to determine total water demand projections for future years.

Key Findings of this report:

- An analysis of recent consumption data finds that overall, *residential water use is in decline* with different rates of change associated with different types of housing units. Therefore an analysis of the trends in water use and selection of an appropriate water consumption rate for each type of user was required for this report.
- In 2010, the mid-Atlantic region experienced a string of months characterized by record warmth and below-normal rainfall that continued into the fall. The warmest spring and summer on record caused unprecedented peak water demands for many water utility owners. As a result, the average water production of 175.3 million gallons per day (mgd) in 2010 remains the highest in WSSC history.

- The average consumption as measured by DAC for all existing single-family (SF) units has declined slowly over the past five years, with the exception of 2014 in which it remained high. The total decrease from 2010 to 2015 has been 5.9% for all SF units.

- The DAC per employee has fluctuated from year to year but the values do not show any increasing or decreasing trend overall.

- Under the High Scenario, the WSSC average water production is projected to reach 180.8 MGD by 2020 and increase to 208.7 MGD by 2040. By contrast, under the Low and Mid-Range Scenarios, the average water production is projected to increase only to 172.3 and 170.7 MGD by 2020 and to 174.7 and 195.4 MGD by 2040, respectively.

- A preliminary analysis by WSSC's Planning Group indicates that if the effects of historical water conservation since 1972 were discounted, WSSC would not have sufficient water treatment capacity to meet maximum day demands out to the 2040 planning horizon. The projected deficit under this hypothetical scenario was approximately 17 MGD. A planning level estimate for expansion of the Potomac WFP to meet this additional capacity need is approximately $200M.

6. Water conservation is needed to ensure that growth throughout the Washington metropolitan regional can be accommodated while ensuring that the ecological health of the Potomac and Patuxent Rivers is maintained.

- <u>2015 Washington Metropolitan Area Water Supply Study -Demand and Resource Availability Forecast for the Year 2040</u>

  Synopsis:

  This study provides forecasts of Washington, D.C., metropolitan area water demands through the year 2040 and assesses the ability of current system resources to meet those demands. The aim of this study is to assess the ability of current water supply resources to meet projected WMA demands over a 25-year forecast horizon, both under conditions similar to

historical droughts and taking into account potential changes in stream flow due to climate change. Forecasts of average annual water demand were developed by combining recent water use information derived from billing data provided by the suppliers and their wholesale customers, information on the current and future extent of the areas supplied, and the most recent demographic forecasts (Round 8.3) from the Metropolitan Washington Council of Governments (MWCOG). This study contains updated estimates of consumptive use upstream of the WMA suppliers' Potomac River intakes. These were derived using ICPRB's new database of Potomac basin water withdrawals and consumptive use, described in Ducnuigeen et al. (2015).

Key findings of this study:

- MWCOG projects that population in the WMA in 2040 will be 5.7 million, a 23 percent increase from 2015 levels. The number of employees in the region is predicted to increase by approximately 1.1 million (36 percent).
- The model estimates a reduction in indoor household use of 25.3 gallons per day between 2015 and 2040.
- WMA demand forecasts have consistently fallen over time. Both the 2035 and 2040 forecasts are 19 percent lower than the forecasts in ICPRB's 2010 study. This significant drop is primarily due to the new estimates for future per household and per employee use reductions.
- Under a repeat of conditions similar to severe historic droughts, assuming no impact from climate change, PRISM model simulations predict that by 2035 the current water supply system will experience considerable stress, with mandatory water use restrictions required in the WMA. *By 2040 there is some likelihood that storage in Little Seneca Reservoir will become exhausted. In both 2035 and 2040 there is a small probability that flow in the Potomac River would drop below the minimum environmental flow level of 100 MGD at Little Falls dam, though the predicted flow deficit is less than 1 MGD. If summer flows fall by 10 percent or more: the decrease in flows would cause mandatory water use restrictions to occur; over the course of the severe drought, most system reservoirs would be drained and on some days the system would be unable to meet demands and the 100 MGD environmental flow-by at Little Falls.*
- Potential Climate Change Impacts
    - *If summer flows fall by 10 percent or more: the decrease in flows would cause mandatory water use restrictions to occur; over the course of the severe drought, most system reservoirs would be drained and on some days the system would be unable to meet demands and the 100 MGD environmental flow-by at Little Falls.*
    - If summer flows change by 0 to +10 percent: the moderate increase in flows would not be enough to prevent mandatory water use restrictions from

occurring during a severe drought; storage in the Patuxent and Little Seneca reservoirs could be seriously depleted.

- If summer flows rise by 20 percent or more: a substantial increase in flows would increase WMA supplies sufficiently to allow the current WMA system to meet forecasted 2040 demands.

- ICPRB Report No. ICPRB-13-4 Cooperative Water Supply Operations for the Washington Metropolitan Area, Karin R. Bencala, Heidi L.N. Moltz, James B. Palmer. March 2013

  Synopsis:

  This 2013 ICPRB report provides a detailed history of the Potomac Low Flow Allocation Agreement and Potomac Cooperative Water Supply Operations framework, and provides a summary of the 2010 Demand and System Reliability Study.

  Key findings of this report:

  - For a 2040 scenario of high demands, model simulations indicate that if the WMA was to experience conditions similar to the worst drought on record (1930) that emergency water use restrictions would be required, *portions of the system could experience water supply shortfalls, and water shortages in the system's water supply reservoirs could occur.*
  - Alternative management guidelines might also allow the system to keep up with increasing demands. Another method that has received some attention in the region is the *adjustment of pricing structures to incentivize reduced water use by consumers*. This approach to reducing demand has been successful in other regions of the country, according to references cited in the report. [5]

- Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System; June 20, 2000, PUBLICATION NUMBER: 20703; The Metropolitan Washington Council of Governments

  Synopsis:

  This document provides a plan of action that would be implemented during drought conditions for the purpose coordinated regional response. The Plan, consists of two interrelated components: (1) a year-round plan emphasizing wise water use and conservation; and (2) a water supply and drought awareness and response plan. The year-round wise water use program applies to the entire region and is under development; what is presented is the basic framework and initial key messages. The Water Supply and Drought Awareness Plan contains four stages and is primarily designed for those

customers who use the Potomac River for their drinking water supply. The Plan will eventually be expanded to incorporate all water supply systems throughout the region.

Key Elements:

- Recommends a common set of triggers and actions to be used by local governments and water utilities to insure a coordinated response to another serious drought event.
- Describes components of a "Wise Water Use" messaging program to promote conservation and awareness.
- Identifies indoor and outdoor water conservation tips.
- Identifies potential communications tools to improve outreach to citizens.

Other References

1. "Proceedings of the National Water Conservation Conference on Publically Supplied Potable Water", NBS Special Publication 624, Department of Commerce, National Bureau of Standards, Government Printing Office, June 1982.
2. Environmental Protection Agency. 2002. Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs. EPA-823-B-02-003.
3. "Water for Maryland's Future: What We Must Do Today"; Presentation to the Senate Education, Health and Environmental Affairs Committee; January 15, 2009; Report on the Governor's Advisory Committee on the Management and Protection of the State's Water Resources.
4. "A Balanced Approach to Water Conservation in Utility Planning"; THOMAS W. CHESNUTT, FEBRUARY 2015 | JOURNAL AWWA • 107:2 | CHESNUTT
5. Mehan III, G.T. and I. Kline. 2012. Pricing as a demand-side management tool: Implications for water policy and governance. Journal of the American Water Works Association 104(2).

WSSC
Where Water Matters

Interoffice Memorandum

TO: COMMISSIONERS

THRU: CARLA A. REID
General Manager/Chief Executive Officer

THRU: MONICA J. JOHNSON, DEPUTY GENERAL MANAGER
Strategic Partnerships

FROM: CRYSTAL KNIGHT-LEE, DIRECTOR
Customer Service Department

DATE: August 3, 2017

SUBJECT: **RATE STRUCTURE SETTING PROCESS: Customer Affordability and Assistance Programs**

In preparation for your next Special Commission Meeting on August 3, 2017, attached is a briefing and materials outlining what the Commission is currently doing to support customers who are having difficulty paying water and sewer bills.

Key need-based customer assistance programs administered by WSSC include:

1. Water Fund including Round Up
2. Customer Assistance Program
3. Bay Restoration Fee Exemption

The attached materials will provide more details including administration, eligibility criteria, and funding sources.

Attachments:

1. Chart Summarizing Key Customer Assistance Programs (Need-based)
2. Summary of Eligibility Criteria for Qualifying Applicants to the Water Fund and Customer Assistance Program (CAP)
3. Presentation Outlining Current Assistance Programs (Need-based)
4. Summary of Drinking Water and Wastewater Utility Customer Assistance Programs and WSSC Case Study, prepared by the US EPA, April 2016

cc: Lynnette Lemon, Division Manager, Customer Service Department

WSSC Customer Assistance Programs

Program Overview						Eligibility Criteria		
Program	**Description**	**Administration**	**# Served**	**Financial Relief**	**Funding Source**	**The MD. Office of Home Energy Programs (OHEP) Certification**	**Salvation Army (Federal Poverty Guidelines)**	**Other**
Customer Assistance Program (CAP)	Helps provide financial relief to customers by providing a credit of the Ready-to-Serve Charge for low-income residential customers. No matter when during the fiscal year the customer qualifies for OHEP, WSSC will give credit back to the beginning of the fiscal year in which the customer qualified as long as the customer was living in the property at that time.	WSSC in partnership with OHEP	8,243	**FY '17:** $858,144	Rate Payers	✓		
Water Fund and Roundup Programs	Helps residential customers who are experiencing hardship pay their delinquent water/sewer bills. The Roundup Program offers all customers a convenient way to contribute to WSSC's Water Fund, which is used to help customers who are having a difficult time paying their past due water and sewer bills. The maximum annual benefit per qualifying customer is $300. Salvation Army collects a 10% Administrative Service fee paid by WSSC funds for administering the program.	The Salvation Army and WSSC	**FY '09-17** : 3,129 **FY '17:** 351	**FY '09-17 :** $738,582 **FY '17**: $70,681	Generous donations of customers, community members and WSSC employees		The eligibility criteria is governed by the WSSC and Salvation Army agreement	
Bay Restoration Fee Exemption	Provides an exemption/waiver of the Bay Restoration Fund Fee that WSSC is required to collect pursuant to State law to help improve water quality in the Chesapeake Bay.	WSSC	8,363	$183,720	N/A	✓		WSSC also certifies customers who do not seek OHEP certification.
Billing Adjustments for Charitable Institutions	Pursuant to State law, WSSC provides charitable institutions with up to 100 gallons of water a day per resident without cost. To qualify for the WSSC charitable credit, the institution must be one which provides residential 24 hour care for indigent persons without regard to ability to pay and without regard to whether the person is a resident of Montgomery or Prince George's County.	WSSC	388	$715,212	Rate Payers			From time to time, but not more frequently than once a year, WSSC may require a charitable customer to certify that it continues to meet the criteria required by State law and the WSSC SP.
Payment Arrangements	Extend generous payment plans to customers facing service disconnects or managing high water and sewer bills.	WSSC	N/A	N/A	N/A			All customers who request assistance.

Delayed Assessment of Late Fees	To assist customers who have difficulty making timely bill payments, upon request, WSSC will delay the assessment of a late payment or generation of a disconnect notice for seven calendar days.	WSSC	N/A	N/A	N/A			Customer account must be in good standing for the past 12 months.

CUSTOMER ASSISTANCE PROGRAMS ELIGIBILITY & CRITERIA

Program	Eligibility	Criteria
Customer Assistance Program (CAP)	Must be approved for the MD Office of Home Energy Program. (OHEP)	•Must meet OHEP income guidelines. • Must remain actively enrolled in OHEP to continue eligibility to receive the WSSC CAP credit.
Bay Restoration Fee Exemption	Must be certified by OHEP or meet 2 of the 4 criteria.	•Received assistance from the WSSC Water Fund within the last 12 months. •Received public assistance or food stamps within the last 12 months. Confirmation on official letterhead required. •Received Veteran's or Social Security Disability Benefits within the last 12 months. Confirmation on official letterhead required. •Meet required income criteria based on current tax return.
Water Fund and Roundup Programs	The eligibility criteria is governed by the Salvation Army and WSSC agreement.	• Receive water and sewer bills in your name. • Apply to Salvation Army in county of residence. • Present picture ID and proof of income. • Meet income eligibility requirements.

Income Eligibility Guidelines

HOUSEHOLD SIZE	Water Fund Low-Income Guideline	OHEP Income Guideline
1	$24,120	$21,105
2	$32,480	$28,420
3	$40,840	$35,735
4	$49,200	$43,050
5	$57,560	$50,365
6	$65,920	$57,680
7*	$74,280	$64,995
8**		$72,310

April 2016

Drinking Water and Wastewater Utility
Customer Assistance Programs

EPA
United States
Environmental Protection
Agency

Acknowledgments

This compendium is an effort by EPA's Water Infrastructure and Resiliency Finance Center (WIRFC) to document how drinking water and wastewater utilities are implementing customer assistance programs to provide better access to essential drinking water delivery and wastewater management services. EPA values the collaboration and partnership with the following organizations in this effort:

- American Water Works Association (AWWA)
- Association of Metropolitan Water Agencies (AMWA)
- National Association of Clean Water Agencies (NACWA)
- National Association of Water Companies (NAWC)
- Water Environment Federation (WEF)
- Water Research Foundation (WRF)

EPA also thanks the utilities that have shared additional information about their customer assistance programs. EPA hopes the information and details gathered from public websites, documents, and interactions will be valuable to other communities and utilities looking for ways to ensure services to customers having difficulty paying water and/or sewer bills.

Contents

Appendices

Preface

Drinking water and wastewater utilities have the extraordinary task of providing public health and economic sustainability for their local communities. And the price tag to do so is equally extraordinary. Utilities across the country are increasingly seeing the need to invest in aging infrastructure, new technologies, regulatory requirements, and a skilled workforce. They are addressing these needs to uphold their public service duty, all the while keeping in mind their customers' ability to afford these essential services.

Affordability.

This is an important concept that we must consider as public servants. One that our water sector grapples with more and more as increased investments are needed to address complex, and many times competing, social and water quality issues. To address these issues, utilities have been developing household affordability programs that focus on an individual customer's ability to pay for drinking water and wastewater services.

These customer assistance programs are innovative ways to meet specific customer needs, while also meeting the utility's financial needs and obligations. These programs are not a one-size-fits-all approach. Utilities have developed and adapted their own programs to the needs and structures of their local communities. Some households that may have difficulty paying their water and sewer bills include those on fixed incomes or lower incomes, as well as households that face a temporary crisis such as a job loss, illness, or other domestic situation. This document shows the different programs that utilities have initiated, some sophisticated and some common sense, to ensure that all customers receive services and, at the same time, allow the community to benefit from a more sustainable and resilient utility.

We hope that the examples in this compendium show how utilities have addressed affordability matters for their most precious asset – the citizens they serve.

Andrew Sawyers
Director
Office of Wastewater Management

Andrew Sawyers is the director for the Office of Wastewater Management, which leads the Water Infrastructure and Resiliency Finance Center. The Center identifies financing approaches for public health and environmental goals by providing financial expertise to help communities make better-informed decisions about the drinking water, wastewater, and stormwater infrastructure.

Introduction

Drinking water and wastewater utilities across the country are changing the way they do business to help all members of their communities maintain access to vital drinking water and wastewater services, while also protecting the utilities' bottom lines.

In every community across the country, there are some customers that will have difficulty paying their water bills. According to the U.S. Census Bureau, 46.7 million people (14.8 percent of the U.S. population) lived in poverty in 2014 (DeNavas-Walt and Proctor 2015). Other people experience unexpected crises that affect their ability to pay. In response, a number of water and wastewater utilities have developed customer assistance programs (CAPs) that use bill discounts, special rate structures, and other means as an approach to help financially constrained customers maintain access to drinking water and wastewater services (collectively referred to as "water services" or "water utilities" throughout this document). These programs help households address issues with affordability and help protect public health throughout the community. They also help ensure the utility can sustainably provide its core services, price services appropriately, and preserve a broad customer base.

A study by the U.S. Geological Survey found that about 86 percent of the U.S. population relied on a public utility for their drinking water or wastewater services in 2010 (Maupin et al. 2014).

Manuel Broussard/FEMA

The U.S. Environmental Protection Agency (EPA) researched publicly available information to identify drinking water and wastewater utilities in the United States that have developed CAPs. Public websites and public documents were reviewed to compile programs that large drinking water utilities and wastewater utilities (i.e., serving more than 100,000 people) have developed. A separate review was conducted of public websites and public documents developed by a random sampling of medium-sized drinking water and wastewater utilities serving between 10,000 and 100,000 people. Additional utilities reached out to EPA to provide information on their CAPs.

The review effort considered 795 utilities, and found that more than a quarter (228 utilities, or 28.7 percent) offer one or more CAPs. A total of 365 CAPs are currently offered, mostly by large utilities (Table 1). A Quick-Find Matrix, presented in Appendix A, offers brief profiles of all identified programs. More detailed information on each program is presented in Appendix B: Utility Snapshots.

Table 1. Customer Assistance Programs Offered by U.S. Drinking Water and Wastewater Utilities

Type of Drinking Water and Wastewater Utilities Reviewed	Number of Utilities Reviewed	Number of Utilities Found to Have One or More Programs	Total Number of Programs[1] Identified During Review
Large Utilities (>100,000 people)	620	190 (30.6%)	308 (84.4%)
Medium Utilities (10,000–100,000 people)	175	38 (21.7%)	57 (15.6%)

[1] Of 795 utilities reviewed, 228 utilities offer a total of 365 CAPs.

Meeting Expenses – A Neighbor's Perspective

This document does not address the overall utility affordability of developing or complying with drinking water and/or wastewater regulations. Instead, this document focuses on programs that drinking water and wastewater utilities have developed to assist customers that have difficulty paying for drinking water and/or sewer services. This relates to a different context of affordability—that of an individual customer's ability to pay for drinking water and wastewater services. Regardless of a water utility system's rates and rate design, some customers will have difficulty paying for service, no matter the price of the service. Customer assistance programs are tools that help utilities address these affordability challenges.

This document does not suggest what utilities should or must do. Instead it provides examples of hundreds of utilities' proactive efforts to change how they do business, to help ensure all their customers can receive the public health benefits of water service while meeting the utility's financial needs and obligations.

This document is designed to help drinking water and wastewater utilities build on their existing CAPs or adopt new CAPs by learning from the experiences of other utilities. By highlighting what CAPs are meeting which needs within diverse communities across the United States, utilities can see what works, and why.

Why Focus on Customer Assistance Programs?

Under current rate structures, utilities often find approximately 1 percent of their customers are unable to pay at any particular time (WRF 2010).

Households on fixed or lower incomes may sometimes have difficulty paying their bills; plus, any family, regardless of household income, could face an unexpected crisis (e.g., job loss, illness, death, divorce) that puts them in a temporary hardship situation. For some types of utilities, nonpayment would lead to a prompt termination of service, and customers would face inconvenience and might explore substitute options. In contrast, a water service customer facing disconnection also faces immediate health and safety threats. Therefore, water utilities across the United States have demonstrated a commitment to helping low-income customers and customers in crisis delay and avoid disconnection. Many communities have decided that each resident should have the same access to clean and safe water that everyone else in the community enjoys, even if paying for the service is beyond their immediate means. It is water's special status as essential to public health that makes ensuring access more than a charitable cause.

> ***"In every community in the U.S., some households inevitably have difficulty in paying water and wastewater bills. The relative number may be large or small, but there are always some that find public utility service unaffordable. This is true whether the community as a whole is wealthy or poor, whether the average cost of water and wastewater service is high or low, and whether the utility's collections policy is strict or lax."***
>
> —Environmental Financial Advisory Board (EFAB)

CAPs Benefit Customers and Communities

Utilities use CAPs to help customers and strengthen their local communities. Community members are able to:

- Address issues with affordability,
- Retain or restore access to water services crucial to their daily life,
- Avoid penalties and fees, and
- Avoid the health threats, inconvenience, and stigma of water service disconnection.

According to the Water Research Foundation, low-income households are three times more likely to have their water and/or sewer service disconnected than other households (WRF 2010).

CAPs Benefit Utilities

Utilities have also discovered that CAPs support their business in three key areas:

1. **Offers an Opportunity to Practice Social and Corporate Responsibility** – Taking care of the less fortunate in our communities is the right thing to do. Utilities have a unique opportunity to help neighbors in need.

2. **Improves Public Relations** – From a business standpoint, CAPs allow utilities to:
   - Improve public health and environmental quality,
   - Continue their critical role in the community and local economy,
   - Improve their standing with customers, and
   - Bolster their reputation with other key stakeholders in the community.

   A water sector utility that finds ways to serve its entire customer base will be championed as a critical asset to the community.

3. **Improves Financial Health** – Utilities can save on administrative and legal costs associated with collecting on debts, disconnection, and reconnection of water services.

Because of these benefits to the utility, its customers, and the community, many utilities have voluntarily developed a CAP (or in many cases, CAPs) tailored to meet customers' needs. The variety of CAPs across the country (highlighted in the Quick-Find Matrix and Utility Snapshot sections provided at the end of the document) show that utilities are developing innovative and creative custom solutions.

Household-level affordability problems often result in increased costs and decreased revenues for water and wastewater utilities that impact all customers, rich and poor alike. Excessive numbers of disconnections for nonpayment create major inconvenience for households and may contribute to public health problems (EFAB 2006).

Costs of Providing Water and Wastewater Services

The business of running a drinking water or wastewater utility is complex, with a variety of fixed costs associated with providing public services. Utilities must cover the cost of daily operation and maintenance expenses (including energy, labor, chemicals, and other supplies) to ensure continuous service that meets applicable federal and state public health and environmental standards. In addition, utilities plan for long-term capital and operational investments such as:

- Repairing and replacing aging infrastructure.
- Preparing for drought conditions and water quantity issues.
- Increasing utility resiliency and security.
- Complying with new rules and regulations.

Estimates for repairing and replacing aging infrastructure alone amount to a trillion dollars in investment needs collectively facing the industry in the next 25 years (AWWA 2012). More than $600 billion of this need is eligible for financing under the Drinking Water State Revolving Fund (DWSRF) and Clean Water State Revolving Fund (CWSRF) programs, but the needed investment far outpaces the funds available. As more and more utilities use best management practices such as asset management to forecast costs needed to sustainably manage their utility, these costs may increase. Rising costs for replacing aging infrastructure will be accompanied by higher bills for customers. As a result, the need for affordability programs will increase over the next several decades.

Utilities can tap numerous possible revenue sources to cover costs for providing service, including usage charges, connection fees, and in some cases property tax revenue. Setting rates is usually performed at the discretion of the utility and the local unit of government. Utilities and local governments have the authority to work into their business model a safety net of one or more CAPs that reduce customers' risk of losing water service or incurring financial penalties.

Eligibility Criteria Vary by Utility

As shown in Figure 1, the most common criterion considered for CAPs eligibility is status as a low-income household. Senior citizens are often eligible for assistance, as are households experiencing short-term financial hardships. EPA also found programs targeting assistance to disabled customers, as well as customers that are either active duty or veterans of the military. Specific eligibility criteria (e.g., the income threshold used to qualify) differ across programs. The way utilities determine customers' eligibility also varies, with some utilities conducting application reviews and approvals in-house and others collaborating with social service programs to accept their eligibility determinations.

Who Needs Assistance?

CAPs serve different segments of the population based on factors such as income level (e.g., low- or fixed-income), permanent disability, occurrence of temporary hardship (e.g., recent divorce, death of spouse, recently unemployed), age (e.g., senior citizens), and/or status as a veteran.

Income is the most common criterion used to determine rate assistance eligibility. Some utilities offer a discounted rate for customers whose income is below a specified threshold. The threshold might be based on the poverty level (e.g., twice the federal poverty level) or on water bill charges exceeding a specified percentage of income (e.g., median household income, or MHI). Some utilities require customers to stay current on their water bills to remain eligible for assistance.

Some utilities determine eligibility according to whether the customer receives assistance from other social aid programs. Under this criterion, eligibility for utility billing assistance is based on successful enrollment in assistance programs offered by other agencies or organizations, which lowers the administrative costs to the water utility, makes the process easier for recipients, and generally accelerates the reach of the water CAP.

EPA's review of 795 utilities across the nation showed that almost 30 percent of utilities offer one or more CAPs, for a total of 365 active programs. Some CAPs provide assistance to more than one group of customers. Overall, the customers most frequently targeted by CAPs were those in low-income households (Figure 1).

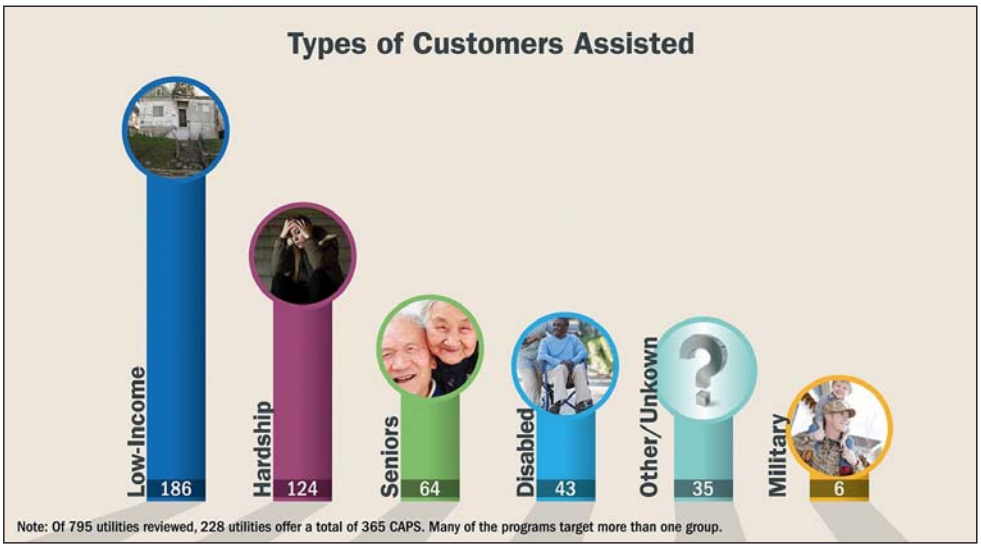


Figure 1. Types of customers assisted by CAPs at U.S. drinking water and wastewater utilities.

Types of Customer Assistance Programs

Utilities offer a variety of assistance programs to meet the needs of their customers. (See Appendix B: Utility Snapshots for more information on specific programs described in this section and their materials.) Common program types include:

Bill Discount – Utilities reduce a customer's bill, usually long-term. Can be applied to nearly any type of rate structure or aspect of the bill (e.g., variable rate structure, fixed service charge, and volumetric charge). Also known as **write-off, reduced fixed fee.**

Flexible Terms – Utilities help customers afford services and pay bills through arrearage forgiveness (e.g., rewarding timely bill payments by partially forgiving old debt and establishing a payment plan for future payments), bill timing adjustment (e.g., moving from quarterly to monthly billing cycles), or levelized billing (e.g., dividing total anticipated annual water and sewer bill by 12 to create a predictable monthly bill amount). Common categories of different program types include **payment plans, connection loans, managing arrears, levelized billing, bill timing.**

Lifeline Rate – Customers pay a subsidized rate for a fixed amount of water, which is expected to cover that customer's basic water needs. When water use exceeds the initial fixed amount of water (i.e., the lifeline block), the rates increase. Also known as **minimum bill, low-income rate structure, single tariff, water budget.**

Temporary Assistance – Utilities help customers on a short-term or one-time basis to prevent disconnection of service or restore service after disconnection for households facing an unexpected hardship (e.g., death, job loss, divorce, domestic violence). Also known as **emergency assistance, crisis assistance, grant, one-time reduction.**

Water Efficiency – Utilities subsidize water efficiency measures by providing financial assistance for leak repairs and offering rebates for WaterSense-certified fixtures, toilets, and appliances. Also known as **water conservation.**

EPA's review of 795 utilities across the nation showed that almost 30 percent offer one or more CAPs; of these, 155 included a bill discount in their CAP. The next two most popular CAP types were flexible terms and temporary assistance (Figure 2).

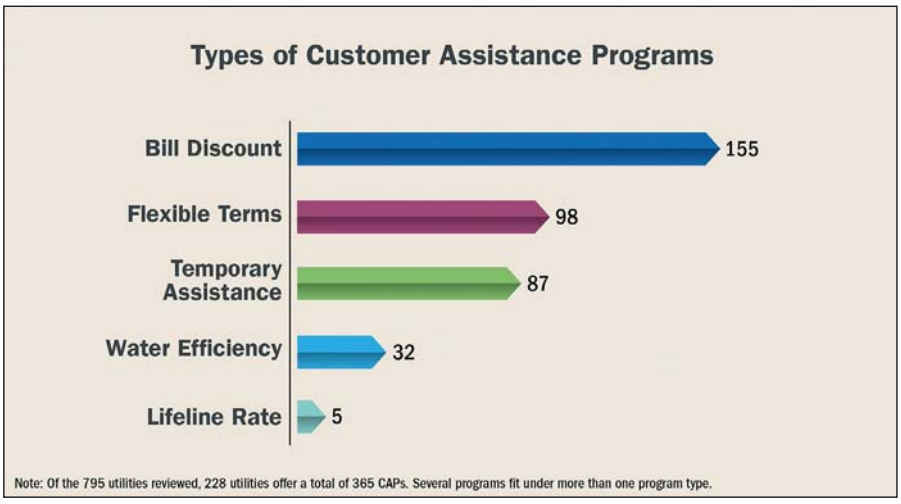


Figure 2. Types of CAPs offered by U.S. drinking water and wastewater utilities.

Washington Suburban Sanitary Commission Expands Assistance Programs

The **Washington Suburban Sanitary Commission (WSSC)** has been in operation nearly 100 years and now serves 1.8 million residents, nearly as many people as in the cities of Pittsburgh and Philadelphia combined. WSSC's 1,000-square-mile service area spans Prince George's and Montgomery counties in Maryland and serves 460,000 customer accounts through approximately 11,000 miles of drinking water and sewer pipes. Over the past 20 years, the system has grown considerably, adding over 1,500 miles of pipe and more than 80,000 new customer accounts serving about 400,000 people. Likewise, over the past decade, the system's operating budget and capital budget have risen (largely due to the need to upgrade aging, failing infrastructure as well as increased regulations), which has put upward pressure on WSSC's rates.

The fixed fee portion of WSSC's rates had been very low – less than 3 percent of total rate revenue – and had not changed in 20 years. In FY2016 the utility increased the account maintenance component of its fixed fee from about $11 per quarter for the typical residential customer to $16 per quarter. At the same time, WSSC introduced a new fixed component, called the Infrastructure Investment Fee, which will add $5 to $6 per quarter to the average residential bill in the first year and is proposed to be fully implemented in FY2017.

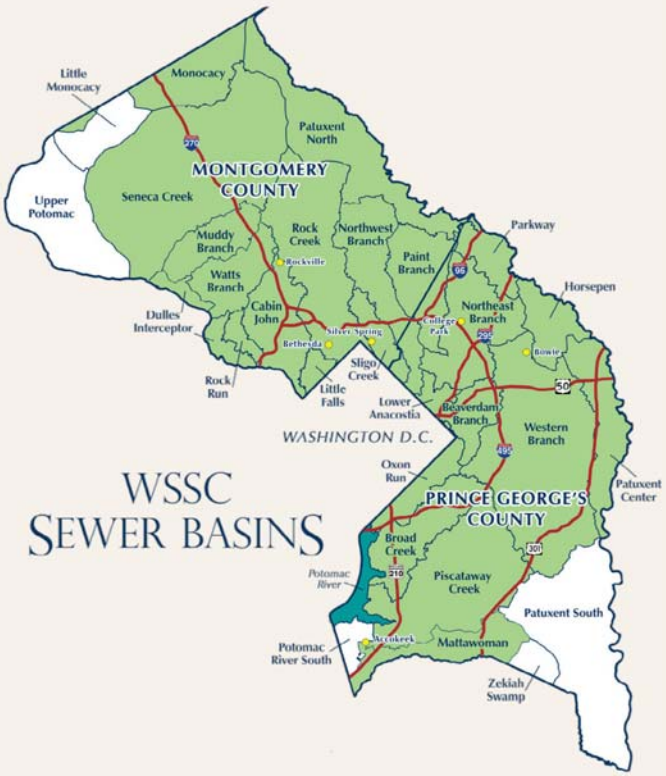
Over the years, WSSC has identified several programs to assist residential customers in need. For example, WSSC has offered residential customers the one-time, donation-financed Water Fund Program to help households facing hardship pay their delinquent water and sewer bills. Working with the state's legislature, the utility also created another ratepayer-financed program, the Customer Assistance Program (CAP), to provide some continual assistance to the 7 to 9 percent of their customers who live below the poverty line. Finally, WSSC developed a program that exempts income-eligible residential customers from the state's Bay Restoration Fee.

Water Fund Program

WSSC's Water Fund Program is funded through donations of customers, community members, and WSSC employees. It is administered by the Salvation Army (which takes a percentage of the assistance funds for its administrative service). The annual donations of $60,000 to $70,000 are primarily from employee payroll deductions and a "roll up" option provided on customers' bills. The maximum assistance provided to each eligible household is $300 in a 12-month period, although exceptions can be made on a case-by-case basis to avoid shut-off of service. The Salvation Army, which qualifies households based on income,

"We are trying to reach everyone who receives a bill from us that needs assistance."

sends a check to the utility and requests that it be applied to a designated delinquent bill. WSSC is seeking companies or other organizations to donate to the Water Fund because the level of need currently exceeds available funding.



Customer Assistance Program

Maryland state law had prohibited WSSC from using ratepayer funds to provide customer subsidies. To help offset rising water bills caused largely by infrastructure renewal programs, WSSC's previous general manager and other staff proactively worked with the state's legislature to remove the regulatory obstacle by changing the law. Effective July 1, 2015, state law now requires WSSC to offer a CAP to eligible customers on the basis of income. The WSSC's new ratepayer-financed CAP provides eligible customers relief from the fixed portions of their quarterly bills, which includes the $16 Account Maintenance Fee, the $6 Infrastructure Investment Fee, and a $15 Bay Restoration Fee charged by the state (see below), for a total quarterly savings of $37 for the average household. This bill discount program generally ensures that eligible households will have lower bills than other customers, and likely also means the overall water bills for eligible customers will be lower than last year, even with the new rate increases. Customers participating in the CAP are still responsible for paying for the drinking water and sewer service they use based on the utility's variable rate structure.

To administer the new program, WSSC is partnering with Maryland's Office of Home Energy Programs (OHEP), which already runs statewide and countywide heating-assistance programs. Working together, WSSC and OHEP identified and enrolled approximately 7,000 OHEP recipients that were eligible, based on income, to receive CAP assistance. Eligibility is based on income and does not require home ownership. However, keeping households enrolled is an ongoing challenge because they must reapply each year. Another challenge is enrolling additional OHEP recipients living in multifamily housing who do not receive a water bill (but do receive an energy bill). Based on data received by OHEP, another 7,000 to 8,000 residents are eligible in this category; WSSC continues to seek ways to provide support for their access to water and sewer services. Because Bureau of Labor Statistics data indicate that additional families live below the poverty line but do not receive OHEP services, WSSC aims to work with OHEP to expand the qualified pool of eligible households.

Bay Restoration Fee Financial Hardship Exemption

Along with other utilities statewide, WSSC collects a Bay Restoration Fee on behalf of the state of Maryland to comply with a 2004 law establishing a Chesapeake Bay water quality restoration fund. WSSC's Bay Restoration Fee Financial Hardship Exemption was recently extended to all CAP customers, increasing the number of exempted customers from 500 to more than 7,000.

For more information, contact Chief Financial Officer Yvette Downs at 301-206-7050 or Yvette.Downs@wsscwater.com or visit www.wsscwater.com/home.htm.

Prince George's and Montgomery County | Washington Suburban Sanitary Commission

1,800,000 population served

Program: **Water Fund** Type: **Temporary Assistance**

Households Targeted: **Financial Hardship**

Program Description

Helps residential customers who are experiencing financial hardship pay their delinquent water and sewer bills by providing a maximum of $300 in a 12-month period. Funded through donations of customers, community members, and Washington Suburban Sanitary Commission employees. Administered by the Salvation Army.

Eligibility Information

- Receive water/sewer bills in their name.
- Supply proof that income falls within the established threshold based on nationwide poverty figures for the number of occupants in a household, multiplied by 75%.
- Must contact Salvation Army to determine eligibility.

More Information

https://www.wsscwater.com/customer-service/low-income-program.html

Program: **Customer Assistance Program (CAP)** Type: **Bill Discount**

Households Targeted: **Financial Hardship**

Program Description

Provides relief from the fixed portions of the quarterly bills, which includes the $16 Account Maintenance Fee, the $6 Infrastructure Investment Fee, and a $15 Bay Restoration Fee charged by the state for a total quarterly savings of $37 for the average household. Administered through a partnership with Maryland's Office of Home Energy Programs (OHEP).

Eligibility Information

- Household income must meet program guidelines starting at $20,598/year for 1 person per household to $56,998/year for 6 persons per household ($7,280 for each additional person).
- Must reapply each year.

More Information

https://www.wsscwater.com/cap

Program: **Bay Restoration Fee Financial Hardship Exemption** Type: **Bill Discount**

Households Targeted: **Financial Hardship**

Program Description

Offers eligible customers exemption from paying the $15 Bay Restoration Fee.

Eligibility Information

- Must be certified by the Office of Home Energy Programs or meet at least two of the following four criteria:
  - Received assistance from the WSSC Water Fund within the last 12 months.
  - Received public assistance or Supplemental Nutrition Assistance Program (food stamps).
  - Received Veteran's Disability or Social Security Disability benefits.
  - Meet required income criteria based on current tax return.

More Information

https://www.wsscwater.com/bayexempt

WSSC
Where Water Matters

Interoffice Memorandum

TO: SHELIA FINLAYSON
Corporate Secretary

FROM: CARLA A. REID
General Manager

DATE: July 7, 2017

SUBJECT: **SUMMARY OF PUBLIC INPUT RECEIVED ON RATE STRUCTURE ALTERNATIVES THROUGH JUNE 2017**

Attached please find a summary and supporting documentation of the public input received on the Rate Structure Alternatives presented at the May and June Public Meetings.

The materials include:

1. Summary of all input/questions
2. Customer questions and feedback at each of the public meetings
3. Statements made on Comment Cards provided at the public meetings
4. Letters and emails received by the Budget Division

As indicated on the attached documents, the most frequently mentioned concerns about the impact of the two example rate structures presented at the public informational meetings was affordability for residential customers and water conservation.

We continue to receive comments and questions and will keep you informed on this matter. If you have any questions or need clarification on these materials, please contact Joe Beach at 301-206-7051 or 240-793-9918.

Copies:
Tom Street, Deputy General Manager for Administration
Monica Johnson, Deputy General Manager for Strategic Partnerships
Chuck Brown, Director of Communications
Jaclyn Vincent, Sr. Staff Director
Letitia Carolina-Powell, Budget Division Manager
Joseph F. Beach, Chief Financial Officer

Summary of May & June Public Comments, Questions, & other Feedback Received

	Category	Meeting Comments	Meeting Questions	Email/Letters	Total	% of Total
1	Impact on affordability for residential customers	38	29	46	113	25.5%
2	Non-Rate Structure: Billing/Customer Service	27	29	18	74	16.7%
3	Conservation: Impact of new rates on water use	9	21	19	49	11.0%
4	Other	18	11	16	45	10.1%
5	Residential customer role in new rate structure	3	12	10	25	5.6%
6	Comments on Presentation	9	16	9	34	7.7%
7	Fixed Fees/Ready to Serve Charges	5	11	9	25	5.6%
8	WSSC Budget & Cost Controls	2	6	4	12	2.7%
9	Law Suit & Future PSC Review of Rates	-	8	6	14	3.2%
10	Location & Venue	7	-	-	7	1.6%
11	Impact on multifamily and condo customers	3	4	3	10	2.3%
12	Support For Example 2 Rates: 4 Tier Increasing Rates	5	2	3	10	2.3%
13	Impact on large families	2	1	4	7	1.6%
14	Impact of new rates on Service & Infrastructure	2	5	3	10	2.3%
15	Support For Example 1 Rates: Phase in to Flat Rate	-	6	3	9	2.0%
	Total	**130**	**161**	**153**	**444**	

Rate Structure Alternatives

Summary of June Public Comments, Questions, & other Feedback Received

	Category	Meeting Comments*	Meeting Questions*	Email/Letters **	Total	% of Total
1	Impact on affordability for residential customers	26	19	20	65	26.5%
2	Non-Rate Structure: Billing/Customer Service	10	12	17	39	15.9%
3	Conservation: Impact of new rates on water use	7	14	7	28	11.4%
4	Other	15	9	2	26	10.6%
5	Residential customer role in new rate structure	-	2	10	12	4.9%
6	Comments on Presentation	6	8	8	22	9.0%
7	Fixed Fees/Ready to Serve Charges	5	5	6	16	6.5%
8	WSSC Budget & Cost Controls	-	2	4	6	2.4%
9	Law Suit & Future PSC Review of Rates	-	2	6	8	3.3%
10	Location & Venue	1	0	0	1	0.4%
11	Impact on multifamily and condo customers	-	2	2	4	1.6%
12	Support For Example 2 Rates: 4 Tier Increasing Rates	3	2	0	5	2.0%
13	Impact on large families	1	0	1	2	0.8%
14	Impact of new rates on Service & Infrastructure	-	3	2	5	2.0%
15	Support For Example 1 Rates: Phase in to Flat Rate	-	3	3	6	2.4%
	Total	**74**	**83**	**88**	**245**	

*Public Meeting comments & questions through for June 2017

** Received through June 30, 2017

	Rate Structure Alternatives					
	Summary of May Public Comments, Questions, & other Feedback Received					
	Category	Meeting Comments*	Meeting Questions*	Email/Letters **	Total	% of Total
1	Impact on affordability for residential customers	12	10	26	48	24.1%
2	Non-Rate Structure: Billing/Customer Service	17	17	1	35	17.6%
3	Conservation: Impact of new rates on water use	2	7	12	21	10.6%
4	Other	3	2	14	19	9.5%
5	Residential customer role in new rate structure	3	10	0	13	6.5%
6	Comments on Presentation	3	8	1	12	6.0%
7	Fixed Fees/Ready to Serve Charges	-	6	3	9	4.5%
8	WSSC Budget & Cost Controls	2	4	0	6	3.0%
9	Law Suit & Future PSC Review of Rates	-	6	0	6	3.0%
10	Location & Venue	6	0	0	6	3.0%
11	Impact on multifamily and condo customers	3	2	1	6	3.0%
12	Support For Example 2 Rates: 4 Tier Increasing Rates	2	0	3	5	2.5%
13	Impact on large families	1	1	3	5	2.5%
14	Impact of new rates on Service & Infrastructure	2	2	1	5	2.5%
15	Support For Example 1 Rates: Phase in to Flat Rate	-	3	0	3	1.5%
	Total	**56**	**78**	**65**	**199**	
	*Public Meeting comments & questions for May 2017					
	** Received through May 18, 2017					

NBS SPECIAL PUBLICATION 624

U.S. DEPARTMENT OF COMMERCE/National Bureau of Standards

Proceedings of the National Water Conservation Conference on Publicly Supplied Potable Water

water conservation '81

APPRAISAL OF 1978 CONFERENCE CASE HISTORY: DO THE BENEFITS ENDURE?

John M. Brusnighan
Assistant General Manager
Washington Suburban Sanitary Commission
Washington, D.C.

In 1978, Bob McGarry, General Manager of the Washington Suburban Sanitary Commission (WSSC), appeared at this conference and presented the story of the WSSC's water and sewer conservation-oriented rate structure. I am here today to update WSSC's experience and answer the question, "Do the benefits endure?" To set the response in proper perspective, I would like to give you some background on who we are, tell you what we have done, give you my answer to the question, and, equally as important, let you draw your own conclusion regarding our success.

The WSSC is an independent water and sewer authority set up by the State of Maryland. We provide service to the two Maryland Counties, Montgomery and Prince George's, immediately adjacent to the Nation's Capital. We serve a population of about 1.2 million, which represents 240,000 accounts. We are currently supplying an average of about 130 million gallons of water a day and operate and/or share seven sewage treatment plants.

In the early 1970's, there were three reasons why a water conservation program was essential for the WSSC: a pending water/sewer shortage, a developing "conservation ethic," and a planning stalemate over future water demands and resultant sewer capacities.

The first reason is obvious; the other two are more subtle but equally as important. These three reasons for our decision are interrelated and will be discussed in that order.

A series of local and Federal studies were initiated as a result of the droughts in the 1960's and revealed that in the Washington, D.C., metropolitan region, water consumption and population were increasing, but the dependable water supply was limited. There were many projections as to how serious the problem would be. Serious water shortages by the 1980's were predicted. The following chart shows a typical projection.

Washington, D.C., Metropolitan Region
Potomac River Supply Versus Demand

Year	Projected Population (million)	Per Capita Consumption (gallons/day)	Potomac River Demand vs Flow (mgd)	
1980	2.9	134	415	535
2000	3.7	141	635	535
2020	5.2	142	855	535

To make matters worse, WSSC was faced with a very serious shortage of sewage treatment and transmission capacity. A State-imposed moratorium on new hookups impacted the majority of our service area.

A successful water conservation program could alleviate both problems. Year-round conservation is essential to relieve sewage treatment limitations, while a reduction in seasonal peak demands would resolve the short-term water supply problem.

At the same time our water and sewer capacity problems were becoming serious, a very real conservation ethic was emerging. Up until the 1970's, the WSSC was like the auto manufacturers and petroleum suppliers -- proud of our record of providing service to meet the public's demand, regardless of how wasteful. Luxurious bath facilities, lawn irrigation systems, and car washes were the water utility equivalents of gas-guzzling cars and total electric homes. In the seventies, this wasteful use of resources was challenged (the energy crisis intensified the challenge, but it existed before the Arab oil embargo), and conservation of all natural resources, including water, became a vigorous theme that prevailed in our jurisdiction. WSSC responded to our public. We altered our entire thinking to encourage water conservation in every way. A serious major objective of the "Corporate WSSC" is to conserve water, because not to conserve is wasteful.

Once we adopted our conservation ethic, the third problem--the planning stalemate over future demand--began to resolve itself. The major reason that a potential water supply problem existed was inability of the region to agree upon a solution. A basic reason for disagreement was the conflict between the traditional water supply approach that would ensure plenty of water for the most unregulated use vs the financial, environmental, and social impacts of facilities to meet such large demands. We had developed feasibility plans to meet our water and sewer needs through reservoir expansions, pumping stations, and massive pipelines. With the expansion of water and wastewater treatment capacities, the traditional demands could be met. The costs and impacts of these plans were simply not acceptable. As time went on, it became apparent that WSSC's public insisted that water supply and sewage treatment planning be based on a far more "conservative" need than had been practiced. Accepting this directive, we have modified our planning to present a

series of vastly reduced water/sewer needs, developed through a conservation and risk analysis. A consensus has been achieved on these sets of reduced needs and the planning stalemate has been resolved. A mid-range water supply (and sewage) plan is approved and under design. Had we not changed our philosophy from "abundant" to "conservative," we would still be studying and debating.

Having adopted conservation as our strategy, we developed a three-phase conservation program to make it work.

- Publicity and education
- Plumbing Code revisions requiring water saving fixtures
- A conservation-oriented rate structure.

A publicity and education program is essential to achieve two results: first, to encourage customers to save; and second, to continuously reinforce our image as a conservation-oriented agency. WSSC seldom misses an opportunity to discourage waste, to point out the savings our customers can achieve by using less water, and to explain how reduced demand benefits the region.

The Plumbing Code for the WSSC jurisdiction was changed in 1972. The revised code required 3.5-gallon toilets, 3.5-gpm showers, and pressure-reducing valves where the pressure is greater than 60 psi. In 1979, the Maryland General Assembly made WSSC's standards applicable Statewide. There have been absolutely no problems with these revisions and they do save water. It appears that there is no reason not to require these water-saving measures in all new construction.

The third major element in our conservation program was a rate structure that would encourage water conservation. Up until 1977, the WSSC had experimented with some pricing elements to reduce peak comsumption, such as a summer surcharge, but essentially the structure was a flat rate applicable to all water consumed. In making a major modification to support our water conservation efforts, two primary objectives were defined:

1. Customers making increased demand should be required to pay for the extra capacity required.

2. The price structure should encourage all customers to conserve.

In its final form, we recommended the elimination of all other elements of the billing structure, such as the summer surcharge and meter service charge, and adopted an increasing schedule applicable to water as well as sewage service. Implementation with respect to single-family residential users, which represent about 90% of WSSC customers, was relatively easy. One unique feature that was added to the structure was a separate billing system for multifamily residential units, which would place them on an equal footing with our single-family customers; that is, an

additional factor was added into the billing formula that placed these multifamily units on a similar unit basis defined by average daily consumption.

The rate schedule had the desired effect; namely, accounts using 100 gpd had their bills cut in half. Customers using up to 350 gpd would remain essentially the same, and customers with high water consumption, which represented approximately 28% of all single-family accounts, would be billed at gradually increasing rates. Seasonal peak demand was also discouraged by the rate structure. A customer using 200 gpd would be billed $23.22 per quarter; however, if the average daily consumption doubled to 400 gpd during the summer, the unit charge would increase, resulting in a quarterly bill of $73.44 or about 3 times the charge for more conservative use. With the added element in the rate structure for multifamily unit accounts, a similar impact was produced; that is, well-managed residential units were rewarded for conservation.

At the 1978 conference, it was reported that the new rate structure as an element in our total water conservation program did begin to show dramatic results after one year. These results were in the quarterly accounts (single-family residential units) as opposed to our commercial and governmental accounts. The initial report between distribution from June 1977 to June 1978 reflected an almost 13% reduction in residential water consumption. This method of comparing distribution of the average daily consumption groupings was continued through the fall and winter quarters. During the peak demand periods, the same results were experienced; however, in the winter quarter, it showed some easing back to prerate structure patterns. In the first year, we labeled the program a success.

However, the question is, "Have the benefits endured?" The following is information relative to 3 full years after adoption of the increasing rate structure. At this juncture, it appears that the effect of an increasing rate structure has been not only to shave peak demands, which, as I said earlier, alleviates short-term water supply problems, but to reduce consumption year-round as well. This latter element favorably impacts on sewage treatment limitations. The following chart compares the average daily consumption (ADC) patterns of over 200,000 WSSC residential customers for the spring and summer quarters combined and the fall and winter quarters combined.

Single-Family Residential:	ADC	1977	1978	1979	1980
Spring & Summer (April-Sept)	101	10.9	12.5	13.1	13.1
	101-200	38.6	43.9	45.3	46.3
	201-300	64.7	70.5	71.9	74.0
	301-400	80.4	84.7	85.4	87.8
	401-500	88.6	91.3	91.5	93.5
	501-1000	98.1	98.5	98.5	98.8
	1000	100%	100%	100%	100%
Fall & Winter (Oct-March)	101	11.6	13.6	13.0	14.7
	101-200	43.5	47.9	47.0	52.3
	201-300	72.0	75.6	75.2	79.6
	301-400	87.0	88.9	88.6	91.4
	401-500	93.3	94.3	94.0	95.8
	501-1000	98.8	98.9	98.7	99.2
	1000	100%	100%	100%	100%

The statistics shown in the chart above represent the cumulative percentage of customers falling within the various average daily consumption (ADC) categories who are consuming at that ADC rate or less. For example, during the spring and summer period of 1977, 38.6% of our residential customers used 200 gpd or less, and 80.4% used 400 gpd or less. Similarly, in 1980, 46.3% used 200 gpd or less, while 87.8% used 400 gpd or less. Clearly, a very marked shift to lower ADC patterns is discernible not only during the spring and summer period in which discretionary water (lawn care, car washing, etc.) is used, but also during the fall and winter months. This is exactly the effect anticipated from an increasing rate structure. These results were also achieved at the full range of a very wet and a very dry year.

The following chart, reinforcing the shift in downward consumption usage, shows actual usage in 1977 consumption vs. 1980.

ADC	Actual 1977		Increased (Deferred)	Actual 1980	
101	10.9%		2.2%	13.1%	
101-200	27.7		5.5	33.2	
201-300	26.1	64.7%	1.6	27.7	74.0%
			9.3%		
301-400	15.7%		(1.9)%	13.8%	
401-500	8.2		(2.5)	5.7	
500-1000	9.5		(4.2)	5.3	
1000	1.9	35.3	(.7)	1.2	26.0
		100%	(9.3%)		100%

As can be seen in the chart, below 300 gallons per unit there was an increase of 9.3% in the various categories, while a corresponding decrease occurred in the higher consumption groupings.

As in our 1978 results, the commercial accounts surveyed showed virtually little measurable reduction. This has generally been the pattern over the full 4-year period also.

In summary, and to answer the question, do the benefits originally experienced under the WSSC's water conservation program endure, the answer is emphatically and resoundingly yes. Water utility managers have had to change their thinking to realize that managing a natural resource means shifting from an "all you want" to an "all you need" philosophy. A successful publicity and education program supported by changes in the plumbing fixtures and innovative pricing techniques can change customer consumption patterns and produce lasting benefits.