Case Study:
Equity and Affordability in Water Conservation

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Introduction: Equity and Affordability in Water Conservation

Climate change impacts like more intense storms and more frequent droughts strain water supplies, damage infrastructure, and make it increasingly difficult for utilities to provide affordable, safe, and reliable water supplies. Many water utilities have identified water conservation and water use efficiency as key climate adaptation strategies—recognizing that such measures can preserve scarce resources and delay or reduce the need to invest in new and potentially more expensive water supplies, which are not only costly to develop but also to operate and maintain. Moreover, conservation and efficiency programs reduce utilities' current operating costs by decreasing water treatment and distribution volumes, thereby saving on energy, chemical usage, and maintenance expenses.[1]

The financial benefits of conservation and efficiency programs are significant, helping utilities meet rising resource demands and decrease greenhouse gas emissions from water treatment while ensuring access to safe, reliable, and affordable water and maintaining fiscal health. These programs also offer financial relief at the household level, where many across the United States face challenges paying bills and expenses.

There is tremendous potential for demand-side water conservation strategies in households whose toilets, lawns, gardens, and undetected leaks are primary drivers of inefficient water use.[2] When these savings are realized, not only does the household benefit from lower monthly bills, but the whole system benefits as well. Importantly, these programs foster a relationship between utilities and their communities regarding the importance of conservation, leading to community-wide climate resilience and long-term water sustainability by mobilizing residents to reduce demand.

Historically, conservation and efficiency programs have been optional, primarily focused on outdoor water usage, contained discounts limited to rebates, and only provided difficult-to-access educational resources, resulting in a high barrier to entry. Consequently, they have often been adopted only by moderate- and high-income homeowners already motivated to take action.

Without affordability-focused engagement, conservation programs often overlook low-income households, especially those in older homes with inefficient indoor appliances. Recognizing this, water utilities across the country understand that long-term water security and efficient use require participation from everyone including low- or fixed-income residents, those in historically underrepresented communities, and nontraditional customers like renters and those in multifamily properties.

Water bills can be a significant financial burden for many of these residents who would benefit most from savings through efficient appliance upgrades, leak detection, and knowledge about water-smart behavioral changes. Proactively engaging these residents in conversations about assistance programs is mutually beneficial for utilities and their communities, ensuring equitable, affordable, and resilient water systems.

This case study presents examples from leading utilities across the country that are implementing equitable and affordable water conservation strategies for climate resilience, with insights derived from conversations with utility staff and utility publications. The Additional Resources section at the end of this case study provides opportunities for further reading on this topic as well as existing standards and frameworks for designing and implementing equity and affordability in water conservation.

Examples of Equity and Affordability in Water Conservation

Affordability Assessment—Houston Public Works

Equity analysis by leading water experts on water affordability in the Houston area

Description

Houston Public Works (HPW) partnered with the Alliance for Water Efficiency (AWE) to assess the equity impacts of water and sewer bills on low-income, single-family households in the HPW service area. The resulting report, *An Assessment of Water Affordability and Conservation Potential in Houston, Texas*, may assist HPW in their effort to draft the updated 2024 Water Conservation Plan and to further incorporate equity and affordability into the development and implementation of their One Water plan, which includes an equity roadmap.

The report examines affordability using industry-standard metrics that focus on the Household Burden Indicator (HBI). The HBI measures the economic burden that relatively low-income households face in paying for water distribution and wastewater collection service costs by focusing on the percentage of these costs to the twentieth percentile income. The assessment shows that for many low-income, single-family households in Houston, water distribution and wastewater collection costs present a minimal burden. However, some census tracts spend over 20 percent of their salary on these services despite low-to-moderate water usage. As the utility continues to invest in providing resilient and sustainable services in the coming years, its water and wastewater service rates are projected to increase, which may result in placing low-income households under further economic stress. HPW is committed to maintaining customer assistance programs to help these communities alongside its current conservation credit program—both of which need to be expanded to reach more households in the future.

Houston Public Works provided AWE with data for this assessment. This partnership, built on past coordinated efforts, has assisted HPW in highlighting areas in existing water assistance programs that may benefit from additional assessments and conversations to ensure that these

programs are accessible and provide value to their customers. As a result of the study, HPW is piloting the direct installation of water-efficient products in low-income households.

Insights

- **Building internal momentum for equity and affordability is integral.** Getting the right people to contribute is one of the most crucial steps for implementing equity across the utility service area. Buy-in and partnerships between related departments and leadership are necessary for these projects to achieve lasting solutions.

- **A One Water integrated strategic plan can help set organization-wide priorities and actions.** A holistic plan that leverages available information across an organization and incorporates internal, external, and community stakeholder input is necessary to create a sustainable, long-term, and equitable plan.

- **Outside experts can provide technical data analysis and recommendations to support equity goals.** Independent organizations can provide supplementary technical capacity and national expertise to generate program and/or community-specific recommendations to assist the utility in developing sustainable, equitable solutions.

Learn More

For more information about Houston Public Works and this project, please contact Amanda Siebels, Houston Public Works, at Amanda.Siebels@houstontx.gov, or visit www.houstonpublicworks.org.

Multifamily Property Toilet Replacement Program—Metropolitan Water District of Southern California

Creative criteria to achieve widespread water efficiency in multifamily residential buildings

Description

Metropolitan Water District of Southern California (MWD) serves 26 public water agencies that deliver water directly or indirectly to 19 million people in Southern California. In addition to its large investments in supply-side water conservation incentives and programs to support conservation by industrial and commercial water users, residential water conservation programs remain critical to helping MWD achieve its climate adaptation and water use goals.

MWD launched its Multifamily Property Toilet Replacement Program in 2019. This is one component of an initiative developed as part of the utility's efforts to increase water efficiency in historically underrepresented communities in its service area. The program, now in its fourth cycle, targets the replacement of older and inefficient toilets installed in multifamily properties built before 1994. To help cover the cost of the product and installation of premium high-efficiency toilets (1.1 gallons or less used per flush) in these properties, the program offers a $250 per toilet rebate, much higher than the normal $40 per toilet rebate—both offered through the SoCal Water$mart program. A little over 70 percent of the toilets inspected for participation in the program were eligible for the rebate, with the remaining already considered high efficiency. Rebate applications are submitted by multifamily property owners and managers with assistance from plumbing contractors who perform toilet replacement work. Contractors typically deliver program information to property owners/managers to market the program and encourage participation.

The program's construction date and property type qualifications allow MWD to capitalize on clear opportunities for water savings while providing services to low-income and renter communities who might not have received water efficiency upgrades at the same rate as others. The rebates for multi-family buildings accelerate investments in the properties by landlords or rental agencies who directly benefit from water bill savings and provide upgraded appliances to residents. Though not directly targeting

these communities, about 45 percent of the properties in the program are located in disadvantaged communities.

Since 2019, the utility has incentivized the retrofit of nearly 20,000 toilets in multifamily properties across Southern California and aims to replace another 8,000 to 10,000 toilets this fiscal year. MWD is also working directly through Southern California Gas Company and indirectly through Southern California Edison on additional direct install programs for low-income, single-family homes across Southern California.

Insights

- **Capitalize on the scope of regional wholesale water distributors to implement standardized conservation programs with greater collective impact.** Wholesalers can work across traditional utility jurisdictions to coordinate more unified messaging and programming than individual utilities could produce on their own.

- **Deploy creative solutions to reach residents who might benefit most from water bill savings.** Thinking creatively about program qualifications can help utilities achieve affordability outcomes in target demographics despite restrictions on funding allocations.

- **Research the product and installation cost to ensure rebate amounts either incentivize new customers or drive contractors to proactively seek out customers.** If too low, rebates may not overcome traditional financial barriers to participation experienced by disadvantaged communities or may not incentivize contractors to participate.

- **Find partners in the community and other utility departments that have experience implementing similar programs.** Consulting or partnering with other local agencies that operate successful customer assistance programs or sharing assistance information lowers the time and cost of program design and implementation.

Learn More

For more information about MWD and this project, please contact Elise Goldman, Metropolitan Water District of Southern California, at egoldman@mwdh2o.com.

Direct Install Program—San Diego County Water Authority

Providing no-cost water- and energy-saving measures to qualifying households and underrepresented communities

Description

San Diego County Water Authority is a wholesale water provider that serves 23 member agencies in the county of San Diego. The Water Authority has a long history of supply diversification and water use efficiency programs that focus on building water resilience in the face of climate-driven water scarcity. This is the result of the proactive inclusion of all residents in conservation activities, strong collaboration between energy and water utilities, and a county-wide ethos that prioritizes water-smart living.

The Water Authority's current Direct Install Program provides no-cost replacement of inefficient toilets (1.6 gallons or more used per flush) with premium high-efficiency toilets (1.1 gallons or less used per flush) and installation of smart irrigation controllers in disadvantaged communities including manufactured housing communities, deed-restricted multifamily properties, and single-family homes. Residential customers who have previously or are currently participating in income-qualifying energy efficiency programs are also eligible. The program began in 2021 and has already installed over 5,000 premium high-efficiency toilets in these communities. Like most of the Water Authority's water use efficiency programs, the Direct Install Program is funded entirely by grants and Metropolitan Water District of Southern California programs, which includes over four million dollars from the California Department of Water Resources Integrated Regional Water Management and Urban Community Drought Relief programs. Grant funding allows the Water Authority to invest in solutions that will benefit the entire community and more evenly allocate support for its residents.

While the current program has been in place since 2021, the Water Authority is in the process of finalizing a new addition to its Direct Install Program. This added element will support a community-based "WaterSmart" landscaping education and efficient irrigation assistance pilot project. Several commercial landscape direct installations will be implemented, supporting new California state legislation that will ban non-functional turf on commercial properties starting in 2027. The goal of this program element is to showcase ways to enhance climate resilience through landscape changes

that promote efficient water and energy use, reduce stormwater runoff, and incorporate education and workforce development to support growth and success.

Insights

- **Income-based qualifications allow programs to reach a wider range of participants, regardless of their address.** Many low-income households are in disadvantaged communities, but others may be in high-income and low-social vulnerability neighborhoods. Income provides a simplified metric of need that is universal and household specific.

- **Use state and local regulatory conditions to forge unlikely partnerships for water conservation.** Utilities and departments are often bound by the same or similar state and local mandates and policies, both requiring actions and programs with little to no funds. This shared regulatory reality can facilitate creative and productive connections and communication.

- **Leverage diverse funding sources to support conservation work in underserved communities.** In areas where water use efficiency programs are not grant-funded or supported by state and regional programs, utilities might look to partner with other utilities, local or national philanthropy groups, and/or nonprofits.

- **Lean on established strategic partnerships when developing new programs.** Look into other agencies' established programs to see if they can be expanded to incorporate your agency's needs and goals. These mutually beneficial partnerships can create bigger impacts with smaller budgets.

Learn More

For more information about San Diego County Water Authority and this project, please contact Lisa Prus, San Diego County Water Authority, at LPrus@SDCWA.org, or Debby Dunn, San Diego County Water Authority, at DDunn@SDCWA.org.

Image courtesy of San Diego County Water Authority

Defining Affordability

The term "affordable" as it applies to water is calculated using a variety of metrics. All metrics of affordability seek to assess the economic burden of water and wastewater services.

The method developed by the US Environmental Protection Agency (EPA) for evaluating the affordability of a water utility bill is the most widely used. It was proposed in 1995 in the EPA's *Interim Economic Guidance for Water Quality Standards* and assesses the affordability of a utility's average bill as a percentage of the community's median household income (%MHI).[3] If the cost of water and combined water and wastewater services for a household exceeds 2.0 and 4.5 percent, respectively, the water rate is considered "unaffordable." This metric is contested because it does not provide much detail about the financial realities that low-income households face.

A few alternative metrics for assessing the affordability of water for low-income households have been proposed and employed:

- **Affordability Ratio (AR):** The "ratio of basic water and sewer costs to disposable household income for a low-income customer," which was proposed by Teodoro in the 2018 article, *Measuring Household Affordability for Water and Sewer Utilities.*[4] An analysis of AR at the twentieth income percentile, a common measure of community poverty, helps assess the economic conditions of lower middle-class and working-poor households.

- **Hours of Labor at Minimum Wage (HM):** Also proposed by Teodoro in the 2018 article highlighted above, this metric assesses affordability as a percentage of hours worked at the prevailing minimum wage required to pay for basic water and sewer services.

- **Household Burden Indicator (HBI) and Poverty Prevalence Indicator (PPI):** Developed by Raucher et al., HBI assesses basic water service costs as a percentage of the twentieth percentile household income while PPI is a measure of the percentage of households below 200 percent of the federal poverty level.[5]

Additional Resources

Affordability

- **The US Water Alliance's *The Path to Universally Affordable Water Access: Guiding Principles for the Water Sector* (2022).** This insights report from an 18-month US Water Alliance Recovering Stronger pilot project, Preventing Water Shutoffs for Low-Income Households, engaged eight cities from the Water Equity Network to explore policies and approaches to prevent shutoffs for low-income residential customers. The report is accompanied by a set of five fact sheets that include more in-depth policy recommendations and affordability strategies.

- **The US Water Alliance's *A Promising Water Pricing Model for Equity and Financial Resilience* (2023).** This study, conducted by the US Water Alliance and Stantec Consulting Services, Inc., evaluates a pricing model that uses property-based characteristics to recover certain utility costs. The study used real data from two drinking water utilities and engaged community-based partners to weigh in on modeling approaches and verify insights from the data.

- **Natural Resources Defense Council's (NRDC) Water Affordability Advocacy Toolkit (2022).** This toolkit offers a menu of state- and local-level policy solutions that directly address household-level affordability for people served by centralized drinking water or wastewater systems. Also reference NRDC's Water Affordability Business Case Tool (2023) to help utilities assess the business case for implementing a discount program for low-income customers.

Affordability and Conservation/ Efficiency

- **The Alliance for Water Efficiency's Resource Library.**

- **The Alliance for Water Efficiency's assessments of water affordability and conservation potential** in Houston, TX, Detroit, MI, and Long Beach, CA. These make up a collection of water affordability and conservation assessments that the Alliance for Water Efficiency has conducted in partnership with water utilities across the country.

- **The US Environmental Protection Agency's *Assistance That Saves: How WaterSense Partners Incorporate Water Efficiency Into Affordability Programs* (2021).** This document provides a short background on the WaterSense program, which includes case studies about conservation assistance and programs from a wide range of water providers across the country.

- **Pacific Institute's *Advancing Affordability through Water Efficiency* (2022).** This report looks at how water conservation and efficiency improvements support efforts to improve water affordability.

Notes

1 Cooley, Morgan, and DeMyers, *Advancing Affordability through Water Efficiency,* Pacific Institute, 2022, https://pacinst.org/wp-content/uploads/2022/09/WaterCostsWhitePaper_F.pdf.

2 US Environmental Protection Agency, *Best Practices to Consider When Evaluating Water Conservation and Efficiency as an Alternative for Water Supply Expansion,* 2016, https://www.epa.gov/sites/default/files/2016-12/documents/wc_best_practices_to_avoid_supply_expansion_2016_508.pdf.

3 US Environmental Protection Agency, *Interim Economic Guidance for Water Quality Standards Workbook,* 1995, https://www.epa.gov/system/files/documents/2024-01/interim-economic-guidance-water-quality-standards-workbook-1995.pdf.

4 Manuel P. Teodoro, "Measuring Household Affordability for Water and Sewer Utilities," *Journal American Water Works Association* 110, 1 (2018): 13-24, https://doi.org/10.5942/jawwa.2018.110.0002.

5 R. Raucher et al., *Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector,* 2019, https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813.

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