

Water and Sewer Affordability in 10 US Cities

McKenna Farmer¹, Katie Spahr, PE², Terri Hogue, PhD²

¹University of Wisconsin-Platteville, ²Colorado School of Mines

INTRODUCTION

Water and sewer rates have risen faster than inflation in the last 20 years. Utilities must make difficult financial choices as per capita water use decreases, water-related infrastructure deteriorates, and regulations for water and wastewater quality become more stringent. Thus, concern over the ability of customers to consistently pay monthly water and sewer bills, known as water and sewer affordability, has increased on the local, state, and national level¹. While the USEPA regulates the affordability of system-wide infrastructure upgrades on utility finances, no national guidance is in place to keep water and sewer costs affordable for all customers. The United Nations (UN) Development Programme suggests that water costs not exceed 3% of a household's income, while combined water and sewer costs should not exceed 5% of a household's income².

Many utilities have implemented customer assistance programs (CAPs) to assist at-risk customers in their service areas despite the lack of a national consensus on water and sewer affordability. At-risk customers include low income households, seniors, and permanently disabled ratepayers³. Due to the variability of local and state laws, as well as social and political environments, the structure and financing of CAPs vary across the country. To date, no national standards exist to measure the effectiveness of CAPs or the potential impact of CAPs on utility finances⁴. This study will assess the affordability of water and sewer services and examine the impact of CAPs on utilities in ten US cities.

OBJECTIVES AND METHODS

To assess affordability and the impact of CAPs on a national level, ten US cities were chosen based on geographic spread and availability of information in relation to the Census year of 2010 (Figure 1). The first objective was to track water and sewer rate trends to determine if water and sewer rates increased over time. Water, sewer, and combined monthly rates for water use increments of 3,750 gal/month, 7,500 gal/month, and 15,000 gal/month were compiled from surveys published by Black & Veatch⁵ from 2001 to 2016 and adjusted to 2016 inflation.

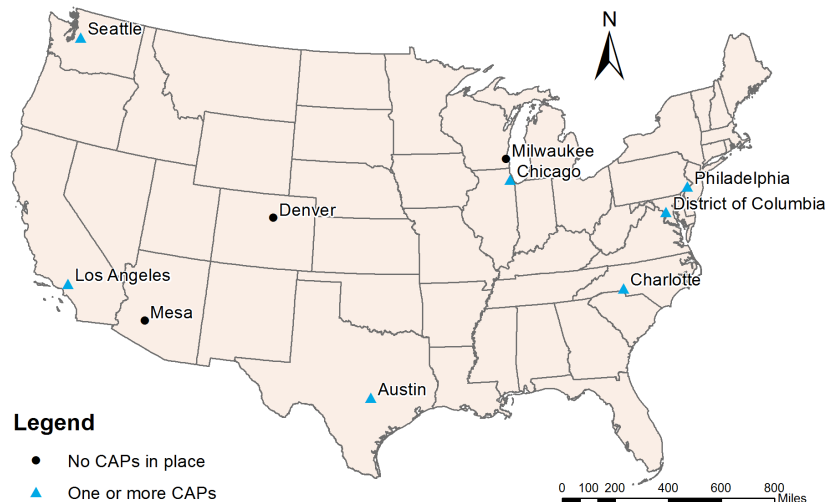


Figure 1. Map of rate affordability study cities

The second objective was to determine the affordability of water and sewer services in each city based on the UN affordability criteria (3% annual income for water, 2% annual income for sewer, 5% annual income for combined). Affordability was measured by the proportion and number of households below a calculated acceptable income. To accurately compare cities with varying water use, county level water use data from the US Geological Survey and typical household sizes from the 2010 Census were used to assign each city a water use volume matching the provided rate data^{6,7}. Monthly water, sewer, and combined rates were converted into annual rates to calculate the minimum acceptable annual income for each city based on the UN affordability criteria listed above. The largest of these acceptable annual incomes across water, sewer, and combined rates was used as the threshold annual income. The proportion and number of households below the acceptable income of each city were calculated using 2010 American Community Survey (ACS) income data⁸.

The third objective was to determine the impact of existing CAPs on utilities with one or more programs. This impact was measured by the proportion of households in each city that would qualify for existing CAPs. Qualification criteria for each CAP were gathered and compared to 2010 Census and ACS data. The CAPs across

all cities were grouped into the following categories: emergency funding, free fixture replacement, low income discount, modified billing, and senior citizen/disability discount.

The final objective was to determine the potential impact of CAPs on utilities with no existing programs. The impact was measured by the proportion of households in each city without any CAPs that would qualify for hypothetical CAPs. To create these hypothetical CAPs and their qualifications, similar criteria for each CAP type were compiled from the CAPs gathered in the third objective.

RESULTS

Water, sewer, and combined rates exhibited a clear increase over time (Figure 2). The variability of rates between cities also increased over time. Based on these findings, rates are likely to continue increasing.

For the 2010 data, the proportion and number of households below each calculated affordability income varied greatly between cities. The magnitude of these differences can be attributed a wide range of factors, including the age of water infrastructure, undertaking of large improvement projects, varying socioeconomic conditions, and differing rate structures.

The impact analysis of existing CAPs indicates the complexity of administering and financing these programs. Two categories of CAPs, low income discount and senior/disability discount, had corresponding Census or ACS data to determine the proportion of households eligible (Figure 3). While this analysis suggests that utilities are mindful of the needs of at-risk customers, utilities are unlikely to have the financial or administrative capacity to enroll a quarter or more of their customers into discount programs. The categories of emergency funding, free fixture replacement, and modified billing presented challenges as well, as enrollment in these programs depended on circumstances not captured by the Census, such as sudden personal or financial losses, age of fixtures in a home, or standing with the utility. These CAPs would likely need to be examined with city and utility data outside the scope of this project.

Hypothetical criteria for low income and senior/disability CAPs were created based on the information gathered from existing CAPs.

The results of the impact analysis suggest that utilities can use Census and ACS data to perform basic analyses of potential customer needs. Additionally, utilities without CAPs have many working examples in cities of various sizes and locations.

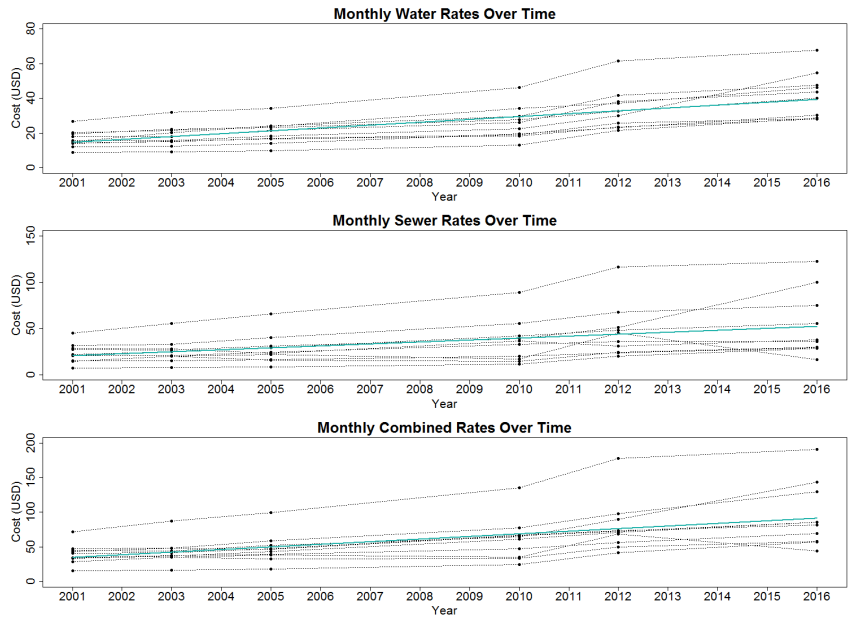


Figure 2. Monthly rates over time at 7500 gal/month adjusted for 2016 inflation

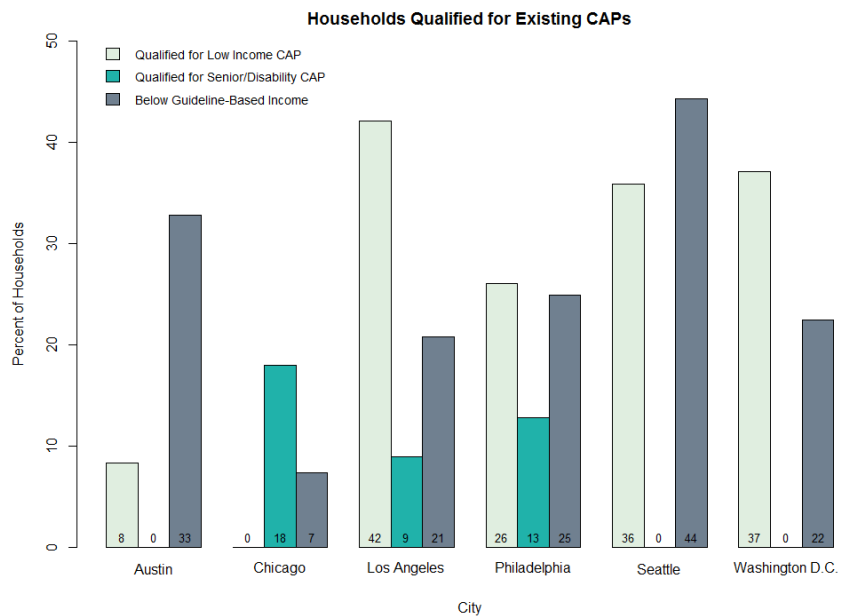


Figure 3. Existing CAP analysis

CONCLUSIONS

These results confirm the importance of affordability for both utilities and ratepayers. As water and sewer rates continue to increase, more ratepayers may depend on CAPs to pay for their monthly bills. Utilities with CAPs can use readily available Census data to perform basic analyses of customer eligibility and CAP effectiveness. Additionally, utilities without CAPs can use these methods to identify at-risk customers in their service areas and perform basic feasibility analyses for new CAPs.

FUTURE WORK

This project could be expanded upon in multiple ways. First, tracking the implementation of CAPs over time would offer insights into the driving factors of implementing these programs. Second, gathering data from utilities comparing CAP eligibility to enrollment would provide context for how the programs are administered and advertised to ratepayers. Finally, examining the existence of formal or informal CAPs in rural and suburban areas would offer a more complete picture of affordability and CAPs on a national scale.

SOURCES

- (1) Rubin S. (2002). *Affordability of Water Service*, Rural Water Partnership Fund.
- (2) Smets, H. (2009). "Access to drinking water at an affordable price in developing countries." *Technological Perspectives for Rational Use of Water Resources in the Mediterranean Region*, CHIEAM, 57-68.
- (3) Hasson, D. S. (2002). "Water Utility Options for Low-Income Assistance Programs." *Journal American Water Works Association*, 94(4), 128-138.
- (4) USEPA. (2016). *Drinking Water and Wastewater Customer Assistance Programs*.
- (5) Black & Veatch Management Consulting, LLC. 2010 50 Largest Cities Rate Survey.
- (6) USGS. (2014). Estimated Use of Water in the United States County-Level Data for 2010. <<https://water.usgs.gov/watuse/data/2010/index.html>> (June 28, 2018).
- (7) U.S. Census Bureau. (2011). 2010 Summary File 1. <<http://factfinder.census.gov>>.
- (8) U.S. Census Bureau. (2011). 2006-2010 American Community Survey 5-year estimates. <<http://factfinder.census.gov>>.