Exhibit No. 25

MAWC – Exhibit 25
Charles B. Rea
Direct Testimony
File No. WR-2022-0303

Exhibit No.:	
Issues:	Rate Design, Affordability, Total Sales and System Delivery, Declining Usage, Total Revenues, and Revenue Stability Mechanism (Policy)
Witness:	Charles B. Rea
Exhibit Type:	Direct
Sponsoring Party:	Missouri-American Water Company
Case No.:	WR-2022-0303 SR-2022-0304
Date:	July 1, 2022

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2022-0303
CASE NO. SR-2022-0304

DIRECT TESTIMONY

OF

CHARLES B. REA

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

AFFIDAVIT

I, Charles B. Rea, under penalty of perjury, and pursuant to Section 509.030, RSMo, state that I am Senior Regulatory, Rates & Regulatory for American Water Works Service Company, Inc., that the accompanying testimony has been prepared by me or under my direction and supervision; that if inquiries were made as to the facts in said testimony, I would respond as therein set forth; and that the aforesaid testimony is true and correct to the best of my knowledge and belief.

Charles B. Rea
____
Charles B. Rea

July 1, 2022
Dated

DIRECT TESTIMONY
CHARLES B. REA
MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR-2022-0303
CASE NO. SR-2022-0304

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DIRECT TESTIMONY

CHARLES B. REA

I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Charles B. Rea. My business address is 5201 Grand Avenue, Davenport, IA 52801.

Q. By whom are you employed and in what capacity?

A. I am employed by the American Water Works Service Company, Inc. ("AWWSC"). My title is Senior Director, Rates & Regulatory.

Q. Please summarize your educational background and business experience.

A. I received a Bachelor of Arts degree in Computer Science from the University of Illinois at Springfield in 1986 and a Master of Science degree in Statistics and Operations Research from Southern Illinois University at Edwardsville in 1990.

I have been employed by AWWSC since January 2018 in my role as Senior Director, Rates and Regulatory. Previous to my employment with AWWSC, I was employed by MidAmerican Energy Company from June 1990 through January 2018. I have more than thirty years of utility experience covering a wide range of issues including electric system planning, sales and revenue forecasting, electric load research, marketing, rates, class cost of service, and energy efficiency. Most recently at MidAmerican, I was Director, Energy Efficiency and Regulatory Analytics. In that position, I had responsibility for planning, evaluation, and operational management of MidAmerican's energy efficiency and demand response programs in Illinois, Iowa, and South Dakota, as well as direct responsibility for electric and natural gas sales and revenue forecasting, electric peak demand forecasting, load research, retail pricing of electric and natural gas products, and electric and natural gas cost of service and rate design.

Q. What are your current employment responsibilities?

A. My primary responsibility in my role as Senior Director, Rates and Regulatory is to serve as a subject matter expert on rate design, revenue, and affordability of service issues for AWWSC's operating company affiliates, including Missouri-American Water Company ("MAWC" or the "Company"). I am responsible for the development and preparation of rate design analyses and filings, as well as rate design proposals to our internal and external stakeholders. I am also responsible for projections of revenues for rate case purposes, and I am responsible for developing and presenting information on the affordability of our water and wastewater service to our customers.

Q. Have you previously testified before a regulatory body?

A. Yes. During my employment with AWWSC, I have provided testimony regarding the cost of service, rate design proposals, revenue projections, and affordability analyses for New Jersey-American Water Company, Virginia-American Water Company, Pennsylvania-American Water Company, Maryland-American Water Company, West Virginia-American Water Company, Iowa-American Water Company, Missouri-American Water Company, Indiana-American Water Company, and Illinois-American Water Company. I also have testified on numerous occasions in Iowa, Illinois, and South Dakota on issues regarding energy efficiency and electric and natural gas cost of service and rate design.

Q. What is the purpose of your Direct Testimony in this proceeding?

A. The purpose of my Direct Testimony is to sponsor MAWC's rate design proposals, affordability analyses, revenue projections including adjustments to MAWC's historical billing determinants, and the policy reasons supporting MAWC's proposed Revenue Stabilization Mechanism ("RSM"). Specifically, I will address the following issues:

- Rate Design
- Affordability
- Analysis of MAWC Water Consumption
- Revenue Calculations
- Revenue Stabilization Mechanism (Policy)

Q. Please identify the schedules you will be sponsoring and for which you will be providing testimony.

A. I am sponsoring the following Company Schedules attached to my Direct Testimony:

- Schedule CBR-1: Water Rate Design
- Schedule CBR-2: Wastewater Rate Design
- Schedule CBR-3: Water Affordability Analysis
- Schedule CBR-4: Residential Usage Analysis
- Schedule CBR-5: Commercial Usage Analysis
- Schedule CBR-6: Public Authority Usage Analysis
- Schedule CBR-7: NARUC Resolution

II. RATE DESIGN

Q. Please discuss some of the important guiding principles associated with sound rate design.

A. There are a number of important principles that pricing analysts and policymakers consider when developing appropriate rate design mechanisms for retail water and sewer service:

- **Cost Basis:** An important goal of rate design is to develop prices for water service to retail customers that are intended to recover the Company's approved revenue requirement and that reflect the cost of providing service to retail customers. Cost of service results inform pricing decisions and guide how rates should be set such that each customer class contributes to the revenue requirement commensurate with their cost to serve. Company witness Wesley Selinger presents the Company's cost of service studies in this case.

- **Revenue Stability:** Rates should be designed in a way that provides revenue stability to the utility and that can be reasonably expected to recover the utility's revenue requirement over the long run. Consistent recovery of the approved revenue requirement through well-designed rates helps the utility to prudently manage and invest in the water delivery system, while poor rate design decisions can hamper the utility's ability to make investments, operate, and maintain the water delivery system in a manner consistent with the long-term interest of its customers.

- **Efficiency of Use:** Rates should be designed to encourage the efficient use of water resources by customers. The volumetric charges for water service should appropriately reflect the variable cost of providing water service while also providing customers an appropriate incentive to conserve water and manage their bills. Rates should communicate to customers the full cost of providing water service.

- **Gradualism:** Changes in rate design should be made in a manner that avoids inappropriate levels of rate shock. Rate shock can come both from general increases in revenues that can affect all customers and from changes in rate designs that can cause large increases to specific pockets of customers. Drastic changes in rates can cause customer confusion and dissatisfaction and have adverse effects on the utility's ability to provide quality customer service.

- **Avoidance of Discrimination:** Rates should not unduly discriminate between particular customer groups or provide different price signals to similarly situated customers taking similar services from the utility.

- **Simplicity and Feasibility:** Rate designs should be relatively simple and easy to understand and easy to communicate, manage, and should result in bills that are clear and understandable.

Q. Please describe the Company's current rate design for water service.

A. MAWC's current rate design for water service primarily consists of a two-part rate design that features a flat volumetric rate (in most cases) with a monthly fixed charge that varies with the size of the meter.

Q. Does the Company have different pricing structures in different geographic locations?

A. Yes. Currently, rates are split into two primary pricing districts:

- St. Louis County
- Non-St. Louis County

Q. Please describe the rate structures currently in place for St. Louis County and non-St. Louis County customers.

A. The Company offers the following rates to St. Louis County and non-St. Louis County customers:

- **Rate A:** Rate A is a volumetric rate with fixed monthly charges for residential and most non-residential customers.
- **Rate J:** Rate J is a volumetric rate with fixed monthly charges for certain customer types defined as large water users. This rate applies to:
  - customers using more than 450,000 gallons per month, where
  - usage is fairly constant throughout the year (language per tariff), and
  - usage is not for residential, irrigation, or construction use.

  In every month, the amount of water billed to each customer under Rate J is the maximum of a) 450,000 gallons, b) the customer's actual metered use for the month, or c) 60% of the customer's highest summer period monthly use in the twelve months before the current month's billing. Customers are removed from the rate for a period of twelve months if their monthly metered usage falls below 450,000 gallons per month twice during a twelve-month period.
- **Rate B:** Rate B is a volumetric rate with fixed monthly charges for customers that are sales for resale customers.

For all of the above rates, the monthly meter charges are the same. The volumetric charges are lower for St. Louis County customers than for other customers for Rate A and Rate J, but are identical for Rate B. In addition, the Company has an inclining block rate structure in its Mexico service territory for residential customers, where volumetric prices increase as the amount of water purchased every month increases (the "Pilot Program"). The Company's volumetric rates for Rates A, B, and J, as well as the inclining block rate structure for Mexico is shown below.

Volumetric Rates	**St. Louis County**	**Other**
Rate A	$0.56290	$0.62469
Rate J	$0.17797	$0.28268
Rate B	$0.26194	$0.26194

Mexico Inclining Block	**Volumetric Rate**
1st 3,000 gal. per month	$0.57266
Next 7,000 gal. per month	$0.71583
Over 10,000 gal. per month	$0.79027

Q. Does the Company offer rates for fire protection service to St. Louis County and non-St. Louis County customers?

A. Yes. The Company offers private fire protection service to all districts under Rate F. This rate provides for monthly service charges by size of service and provides for monthly charges for private fire hydrants. Monthly service fees and hydrant fees are the same for all customers. Volumetric charges for water used for private fire service are charged at the applicable rate for Rate Schedule A. The Company does not charge separate rates for public fire protection service. Public fire protection costs are reallocated back to general service customer classes in the Company's water service rate design and are recovered through general service rates.

Q. Does MAWC have any customers on special contract rates?

A. Yes. MAWC has two large industrial customers on special contract rates with separate volumetric rates specific to those customers. In addition, there are three Sales for Resale customers that take service under special contract rates. In total, these customers account for approximately $3.6 million in revenue.

Q. What changes is the Company proposing to make to its rate design for water service in this case?

A. The Company is not proposing any significant changes to its water service rate design in this case other than to propose the elimination of the inclining block rate Pilot Program in Mexico and return Mexico residential rates to the standard Rate A offering for non-St. Louis County customers. Also, the Company is proposing to equalize volumetric rates for Rate A between St. Louis County and non-St. Louis County customers and to move volumetric rates for St. Louis County and non-St. Louis County customers closer together in the Rate J offering.

Q. Please describe the Mexico inclining block Pilot Program.

A. The Mexico inclining block Pilot Program was approved by the Commission through the Stipulation and Agreement Regarding Inclining Block Pilot Program filed jointly by the Company, the Staff of the Missouri Public Service Commission, and the Missouri Division of Energy in Case No. WR-2017-0285 ("the Stipulation") with rates taking effect on May 28, 2018. The purpose of the Pilot Program was to determine if residential customers in the Mexico service territory that previously took service at a rate that was the same regardless of how much water they used would modify their monthly consumption pattern in response to a rate design that charges more for water as they use more water. To aid the effort to encourage customers to use less water in response to the inclining block rate, the Stipulation allowed for water conservation kits to be offered at no charge to residential customers participating in the Pilot Program. In Case No. WR-2020-0344, the Commission ordered a change in the inclining block rate structure to increase the price differentials between the steps that results in the volumetric rates I outlined earlier in my testimony.

Q. Why is the Company proposing to eliminate the inclining block rate Pilot Program in Mexico and return Mexico residential rates to the standard Rate A offering for non-St. Louis County customers?

A. An analysis of usage data going back to the beginning of the Pilot Program has failed to demonstrate any significant changes in usage over time either in total or between the three different usage blocks in the Pilot Program. In addition, the Mexico service territory is one of the least seasonal areas the Company serves in terms of the amount of seasonal non-discretionary water usage and is one of the lowest income areas served by the Company as shown in the Company's affordability analysis discussed in detail later in Section III of my testimony. Also, the largest residential customer in Mexico that uses the most water in the over 10,000 gallons per month block is a master-metered apartment complex where the ability of individual tenants to change water consumption in response to price changes may be minimal or non-existent. These facts, coupled with the non-response of water usage after implementation of the inclining block rate structure, suggest that it is unlikely there will be significant changes in residential water consumption patterns in response to an inclining block rate structure in Mexico absent more dramatic changes in the rate structure. For these reasons, the Company is proposing to eliminate the inclining block rate Pilot Program in Mexico and return Mexico residential rates to the standard Rate A offering for non-St. Louis County customers.

Q. Why is the Company proposing for the St. Louis County and non-St. Louis County groups to equalize the volumetric rates for Rate A and to move the volumetric rates for Rate J closer together?

A. The Company is proposing to equalize the volumetric rates for Rate A between St. Louis

County and non-St. Louis County customers to complete the process of single tariff pricing for those rates that the Commission has considered over the last two rate cases. It is noteworthy that volumetric rates for these groups are nearly identical today, so moving these rates to a single statewide rate does not impose significant additional rate increases or rate shock for either of these groups of customers. The Company is also proposing to move Rate J rates closer together by increasing Rate J for St. Louis County customers by 200% of the increase for non-St. Louis County customers. This is also an attempt to move closer to single tariff pricing for these customers while recognizing the significant differences in those rates that currently exist.

Q. In Case No. WR-2020-0344, the Company proposed significant changes to the Rate J service offering, proposing to create a new large user rate and a transitional rate for customers that would not have been eligible for the new large user rate. Those changes were not included in the settlement agreement concluding that case. Is the Company proposing any changes to the Rate J offering in this case?

A. No. The Company is not proposing any significant changes to its Rate J offering in this case, other than movement in volumetric rates for St. Louis County and non-St. Louis County that I described earlier in this testimony.

Q. Monthly meter charges are the same for all customers regardless of the rate schedule under which they take service with the exception of fire service. Is the Company proposing to change the monthly meter charges in this case?

A. Yes. The Company is proposing to increase the 5/8" monthly meter charge from $9.00 per month to $12.00 per month, which is a 33% increase and is still less than the 5/8" monthly meter charges supported in the class cost of service studies provided in the Direct

Testimony of Company witness Mr. Selinger. Percentage increases for meter charges for meters larger than 5/8" are also approximately 33%.

Q. What acquisitions are included in the Company's water rate design and how are they treated?

A. As explained in the Direct Testimony of Company witness Brian LaGrand, the Company is including the following acquisitions that are anticipated to close by the end of 2022 in its revenue requirements and in its proposed rate design:

- Eureka
- Monsees Lake
- Purcell
- Stewartsville
- Smithton

The Monsees Lake, Purcell, Stewartsville, and Smithton acquisitions are all included in the non-St. Louis County rate design for both present rates and proposed rates. The Eureka acquisition is included in present rates and proposed rates under the St. Louis County rate design.

Q. Please describe how the Company is proposing to allocate its proposed revenue increase for water service to its customer classes.

A. The Company is proposing to allocate its proposed increase in water service revenues according to the following guidelines:

- Increases to Rate J in total are capped at 150% of the overall water revenue increase requested in this case to bring those customers gradually toward cost of service.

- Increases to Private Fire rates likewise are capped at 150% of the overall water revenue increase requested in this case to bring those customers gradually toward cost of service.
- Rate B proposed revenues are set at cost of service.
- The remaining revenue requirement, after calculation of specific contract rates, is spread to Rate A customers by increasing the volumetric rate for Rate A.

Q. Do you have a schedule that provides the Company's complete proposed rate design in this case?

A. Yes. Schedule CBR-1 provides the Company's proposed rate design, which is based on the current rate design as modified by the proposals discussed above.

Q. Please describe the Company's current rate design for wastewater service.

A. The Company currently offers wastewater service under five different rate schedules applicable to five different wastewater districts:

- Tariff RT 1.1 (Arnold)
- Tariff RT 2.1 (Various communities)
- Tariff RT 3.1 (Various communities)
- Tariff RT 3.2 (Taos)
- Tariff RT 4.1 (Hallsville)

The Arnold tariff consists of a monthly flat fee of $37.23 per month for all customers plus a volumetric charge of $7.140 per thousand gallons for usage above 5,000 gallons per month. Tariffs RT 2.1 and RT 3.1 both offer a flat fee for residential customers ($61.64 per month for RT 2.1 and $44.03 per month for RT 3.1) and a graduated monthly charge by meter size for commercial customers with a volumetric charge for commercial customers that applies to all usage above 6,000 gallons per month. Tariff RT 3.2 applicable to customers in Taos consists of a $65.00 per month flat fee for all customers. Tariff RT 4.1 applicable to customers in Hallsville consists of a $38.750 per month flat fee for all residential customers and a bifurcated flat fee of either $48.75 or $159.75 depending on usage.

Q. Is the Company proposing to make any significant changes to its rate design for wastewater service?

A. No.

Q. Is the Company proposing to collect its entire proposed wastewater service revenue requirement through its wastewater rates?

A. Yes. The Company is proposing to recover its entire proposed wastewater revenue requirement through wastewater rates and does not propose any recovery of wastewater revenue requirements through its water service rates.

Q. What acquisitions are the Company including in its water rate design and how are those acquisitions treated?

A. The Company is including the same acquisitions for wastewater service as it is for water service as I have previously described in my testimony, which are:

- Eureka
- Monsees Lake
- Purcell
- Stewartsville
- Smithton

The Monsees Lake acquisition is included in present rate revenues under their current rate, which is a flat unmetered fee of $58.00 per customer per month. The Purcell acquisition is included in present rate revenues and proposed rates under Tariff Schedule 2.1. The Eureka, Stewartsville and Smithton acquisitions are all included in present rates revenues and proposed rates under Tariff Schedule 3.1.

Q. Do you have a schedule that provides the Company's complete proposed rate design for wastewater service in this case?

A. Yes. Schedule CBR-2 provides the Company's proposed rate design for wastewater service.

III. AFFORDABILITY

Q. How would you define affordable water and wastewater service?

A. The concept of affordability for water and wastewater service is based on the idea that everyone should have access to drinking water and wastewater service that is: (1) safe, meaning it complies with EPA regulations and Safe Drinking Water Act standards; (2) reliable, so that it is resilient in the face of floods, droughts, and other climate risks; and (3) affordable. An assessment of affordability generally compares monthly or annual bills for water or wastewater service to measures of household income.

Q. How can one assess the affordability of water and wastewater service and what information is needed to complete such an assessment?

A. A common way to assess affordability is to compare annual bills for water and/or wastewater service to some measure of household income in the communities that the utility serves. Such an assessment requires two data points – the average monthly or annual bill for water and wastewater service and some measure of household income for the target customer population. For the broader residential customer base, the most common household income measure is Median Household Income ("MHI"), which can be measured at a community level and is paired with a data set that provides the number of customers served in each community to arrive at a weighted number that represents MHI for the Company's entire service territory. Alternative measures of income, such as disposable income or hours of labor at minimum wage needed to cover the cost of water and/or wastewater service have also been suggested.[1]

When an appropriate measure (or measures) of household income is determined, affordability can then be assessed for the average customer, low-income customers, and a full range of households based on their various income levels and bills for water and/or wastewater service. A variety of household income data is readily and publicly available from the U.S. Census Bureau through the American Community Survey ("ACS") at the state, county, and community levels.

Q. What can different measures of affordability for water and wastewater service expressed as a percentage of MHI tell you?

A. Assessing affordability information of water and wastewater service for the entire MAWC residential customer population can tell you whether customers in general are having or would have difficulty paying their water bills under the Company's current or proposed tariff structure. Assessing affordability information of water and wastewater service for lower-income customers can tell you the number of customers that may be having trouble paying their utility bills, where the customers are located in the Company's service territory, and the extent to which those bills are causing customers economic distress. This

[1] Teodoro, Manuel P. "Measuring Household Affordability for Water and Sewer Utilities." Journal AWWA, 2018, doi:10.5942/jawwa.2018.110.0002

can, in turn, inform the utility about the size and scope of low-income assistance programs that may be needed to help these vulnerable customers better afford water and wastewater service, both in terms of rate design proposals and customer assistance programs that may include customer grants, tariff discounts, levelized billing, and outreach programs.

Q. Have you completed an affordability study regarding bills that would arise from proposed rates in this case?

A. Yes. My affordability study for water service is provided in Schedule CBR-3

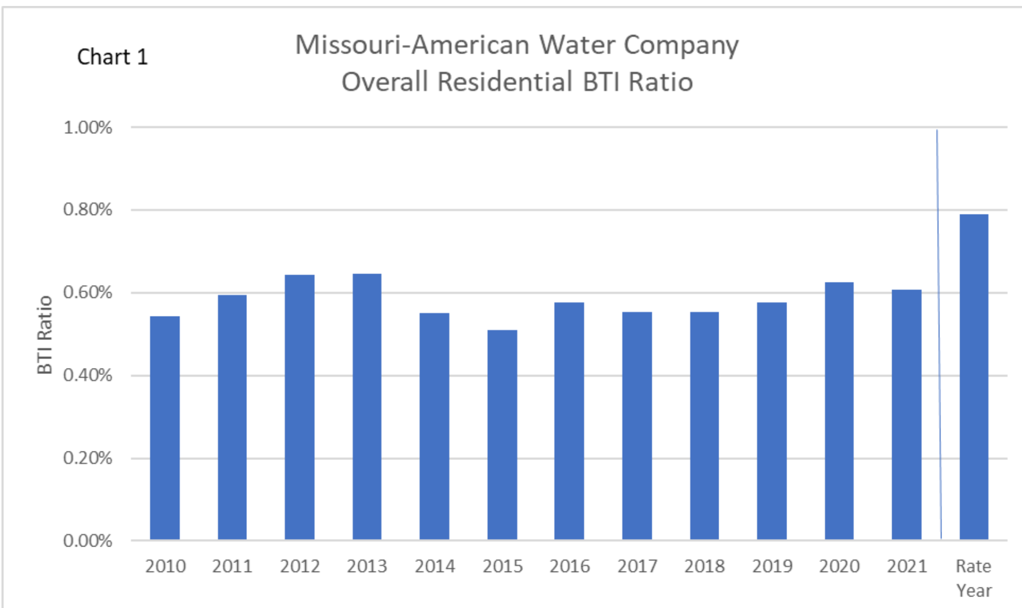
Q. What information does your affordability study provide?

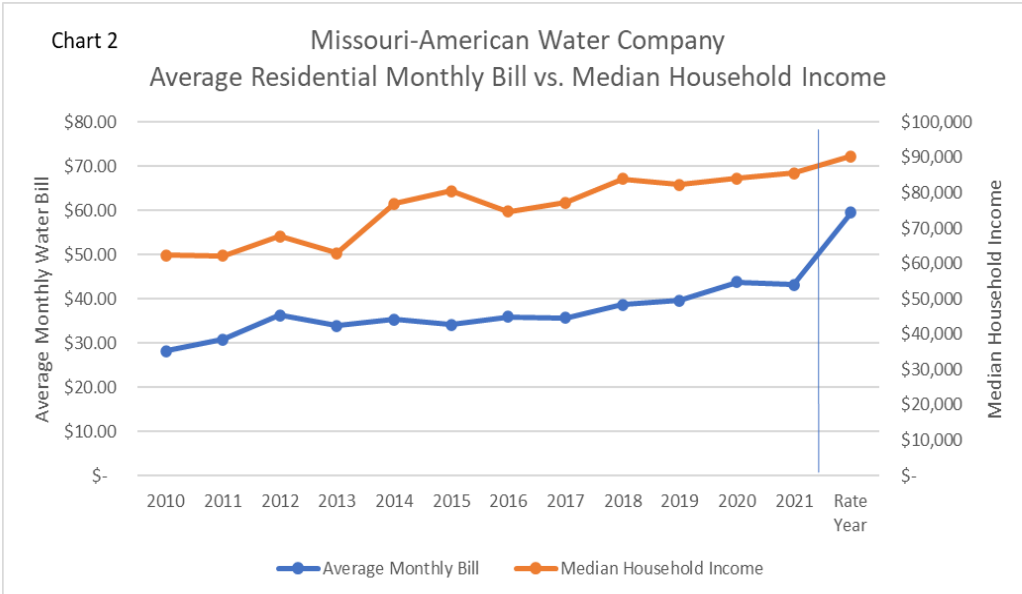
A. My affordability study is actually two different analyses and provides two basic types of information. This information includes:

- Historical comparisons of average monthly bills to MHI are shown in actual terms and shown in terms of Bill-to-Income ("BTI") Ratio, which is defined as annual water bills divided by estimated annual household income.
- Current information on the estimated number of customers in the service territory, and estimated BTI Ratios for various income levels stated in terms of household income and multiples of the Federal Poverty Level ("FPL"). BTI Ratios are calculated for proposed rates in this case.

Q. What is the result of your historical comparison of average monthly water bills to median household income in the MAWC service territory?

A. The charts below compare historical average monthly water bills to MHI for Missouri-American customers from 2012 through 2021 stated in absolute terms and stated in terms of BTI Ratio, along with estimated average monthly bills under the Company's proposed rates in this case and estimated MHI for Missouri-American customers during 2023. The data shows that the BTI Ratios for water service for Missouri-American customers have held steady from 2012 to 2021 generally between 0.5% and 0.6%, meaning that on average MAWC's customers in total have steadily paid between 0.5% and 0.6% of their household income over the last 10 years for water service from Missouri-American. Based on the Company's proposed rates in this case, MAWC expects the BTI Ratio for water service in 2023 to be 0.79%.





Q. What conclusions can you draw from these historical comparisons?

A. The charts above show that average residential monthly bills have risen at approximately the same rate from 2010 to 2021 as median household income has risen for customers. This results in a BTI Ratio that has remained steady over that timeframe within a range of 0.50% to 0.65%. Under the Company's proposed rates, the BTI Ratio in 2023 is expected to be 0.79%.

Q. Is there a generally accepted standard for the affordability of water and wastewater expressed as a percentage of MHI?

A. A benchmark for affordability expressed as a total bill's percentage of MHI is a policy decision; however, bills less than 2.0% or 2.5% of MHI for water and 4.0% to 4.5% of MHI for combined water/wastewater are considered "affordable" by some.[2] An affordability benchmark for water service of 3.0% to 4.5% of household income has also

[2] Teodoro, Manuel P. "Measuring Household Affordability for Water and Sewer Utilities." Journal AWWA, 2018, doi:10.5942/jawwa.2018.110.0002.

been proposed specifically for lower-income groups.[3]

Q. What impact does the Company's proposed rate design have on the affordability of the Company's water service in this case?

A. As shown above, the affordability of MAWC's residential water service has been and is expected to remain affordable under the Company's proposed rates in this case.

Q. What information can support a more focused assessment of affordability of water service for the Company's most vulnerable customers?

A. A more focused assessment of affordability targeted at the Company's more vulnerable customers can compare annualized bills for "basic water service" (i.e., service that is necessary and reasonable to meet basic household needs for drinking, cooking, sanitation, and general health service that does not include seasonal discretionary water use) to measures of household income for lower-income groups. A more focused affordability assessment requires a much more detailed information set that includes:

1. Standard measure of what constitutes low-income customers

Typically, a standard measure of income for lower-income centers around various multiples of the FPL, which is set by the federal government and varies depending on the number of persons in the household. For the calendar year 2020, 100% of FPL for a three-person household in the lower 48 states was $21,720 per year. Multiples of FPL can then be used to set low-income benchmarks (50% of FPL, 150% of FPL, 200% of FPL, etc.). It is important to note that FPL is both a function of income and the number of persons in the

[3] Colton, R. (2020). The Affordability of Water and Wastewater Service in Twelve U.S. Cities: A Social, Business and Environmental Concern prepared for The Guardian (U.S. Office). New York NY. https://www.theguardian.com/environment/2020/jun/23/full-report-read-in-depth-water-poverty-investigation.

household, so the estimation of the number of households at different levels of FPL is more complicated than simply understanding income level.

2. Number of households in the service territory that qualify as low-income customers

The number of households that fall within different levels of income or different intervals of FPL can best be found through the previously mentioned U.S. Census Bureau data, which provides this information at a community level. As previously stated, this data can be paired with a data set that provides the number of customers served by community to determine the estimated percentage of households at different income levels in the service territory. The number of customers at different multiples of FPL can also be estimated by pairing households at different income levels in the service territory with the number of persons per household by income level, which is also available through U.S. Census Bureau data.

3. Number of low-income households that are customers of the utility

The number of low-income households in a service territory does not necessarily equate to the number of low-income customers of the utility, because lower-income customers are more likely to rent and less likely to own homes than higher-income customers. Water and wastewater service provided to apartment buildings and other multifamily housing units are often in the name of the building owner, and tenants are generally not the utility customers of multifamily housing units. To determine the number of low-income households that are actually low-income customers of the utility, one needs to determine a) the level of home ownership in the community by income level, and b) the percentage of renters in a community that rent single-family homes (for which those renters are likely the paying customer of record) versus renters that live in apartment buildings and other multifamily units.

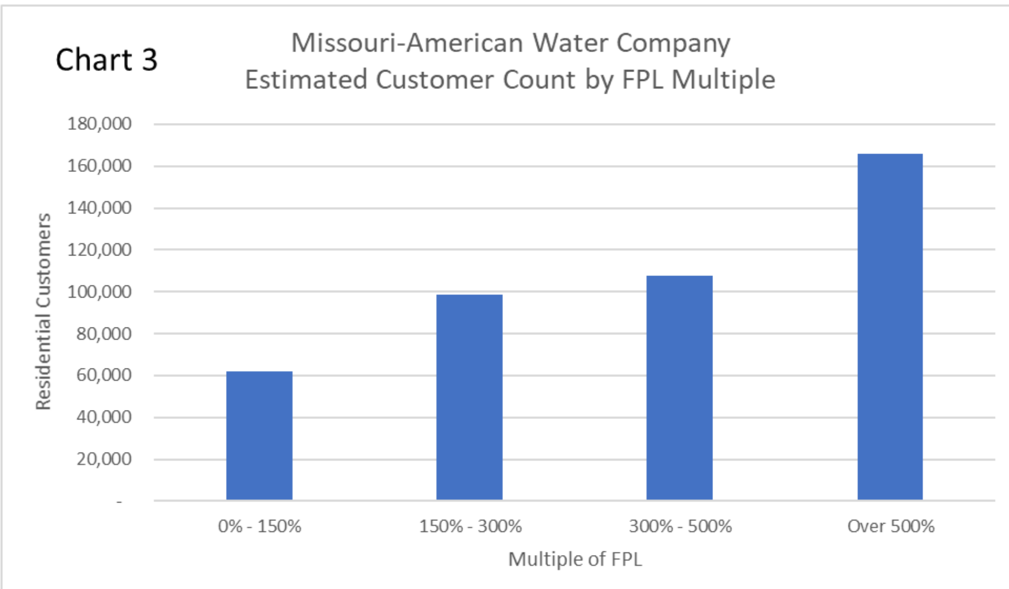
4. Common understanding of what constitutes basic water service

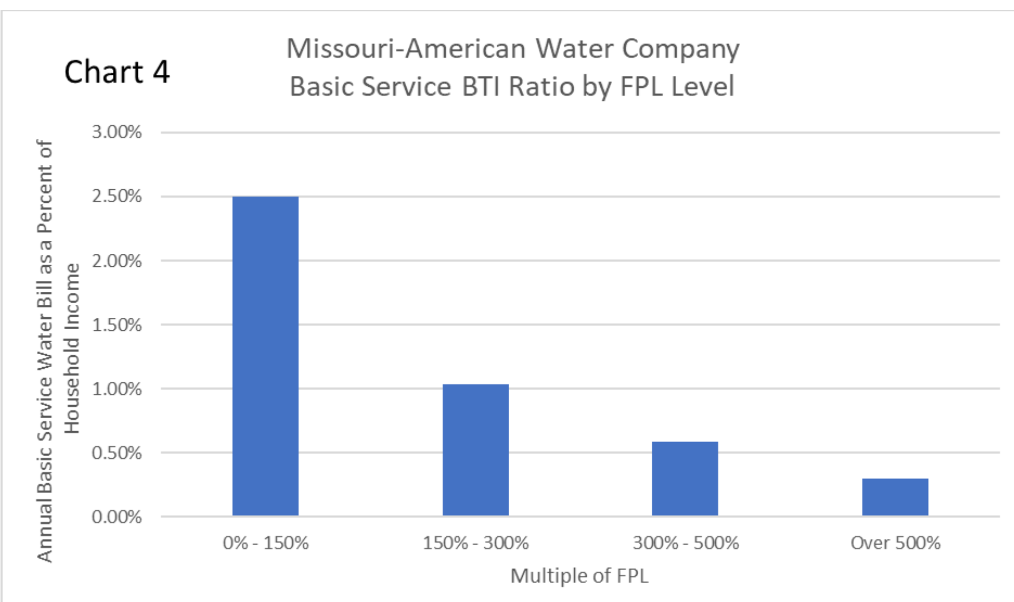
When looking at the appropriate usage levels to determine affordability for lower-income groups, it is not appropriate to rely solely on average usage levels for a residential customer class in total. A better approach is to identify a usage level that reflects water consumption provided for basic human services (cooking, cleaning, sanitation, and general health requirements), which is then assumed to be constant from month-to-month and not subject to significant seasonality or weather conditions. This standard can be expressed in terms of gallons per resident per day. An advantage of this approach is that a basic water service metric stated in terms of gallons per resident can be paired with the fact that lower-income households tend to have lower occupancy rates in terms of persons per household. This information, which is available from U.S. Census Bureau data, can be used to customize a level of usage that accurately reflects basic water service for lower-income households.

An alternative approach to the more focused affordability assessment described above is to look at individual customer billing records and identify a median monthly water consumption for all customers with relatively flat non-seasonal usage across the year. The use of a median statistic in this case reduces the impact of very high usage customers. Another alternative is to choose a consecutive period of time during the year (February through April for example) that tends to have the lowest average use per customer over the course of the year and has the least amount of discretionary seasonal water usage, if any at all. This method helps to ensure that the monthly usage used in an affordability analysis represents the least amount of discretionary water use, and therefore is most representative of basic water usage in a given service territory.

Q. What does the affordability study show in terms of the estimated number of customers in Missouri by household income and how bills for basic water service compare for these customers in terms of BTI Ratios?

A. Charts 3 and 4 below show the estimated number of customers by multiples of FPL for the Company's residential customers and the BTI Ratios for bills for basic water service for each income group under the Company's proposed rates in this case.





For most of our customers, BTI Ratios are less than 2% for basic water service at the Company's proposed rates. The Company estimates that there are approximately 62,000 residential water customers with household incomes at or below 150% of FPL, which represents approximately 14% of the Company's residential water customer base. For these customers, the average BTI Ratio is approximately 2.5% for Basic Water Service, which we define to be 40 gallons of water per household per day.

Q. If you are able to discern the affordability of water service for an average customer, are you able to discern the affordability of water service at differing levels of income?

A. Yes, we are.

Q. Please describe the analysis that estimates the Company's residential customer population for different levels of income.

A. The United States Census Bureau, through ACS, provides detailed information at the zip code level on the number of households, both those that own homes and those that rent, at different levels of income. From that data:

- We develop for each zip code an estimated profile of households that are customers of the Company by income level ($0k to $5k annual income, $5k - $10k, etc.)
- Within each increment of income, we can estimate the number of households with one person, two persons, etc. that can then yield estimates of the number of customers in each zip code by multiple of FPL.
- We can then calculate bills for basic water service for each combination of household income and household size based on the rates applicable to that location and estimate BTI Ratios for each combination of household income, household size, and multiple of FPL within each zip code.

- This information can then be rolled up to any aggregated level, which might be at a county level, district level, tariff group, or for the service territory in total.

Q. What conclusions do you draw based on the Company's affordability study?

A. There are three conclusions that can be drawn from Company's affordability study:

- The affordability of the Company's water service has remained steady from 2010 through the present time, with a modest uptick expected overall in 2023 under the Company's proposed rates.
- The Company's water service has been, is, and is expected to continue to be affordable for the vast majority of its residential customers, including under the final rates proposed in this case.
- There are groups of customers for whom affordability of water service may be an issue.

Q. Is the affordability of the Company's water service uniform across all of the areas the Company serves?

A. No, it is not. Both bills and household income vary significantly across the Company's service territory. The Company has a very diverse service territory and serves customers in urban, suburban, and rural communities with household incomes that range from well over $150,000 MHI in parts of St. Louis County to as low as $45,000 in Mexico and less than $40,000 in other parts of the Missouri service territory. The Company's water affordability analysis is provided in Schedule CBR-3. These exhibits provide a breakdown by community of the number of customers served in each community, the median household income for each community, and the BTI Ratios for basic water service in each community.

IV. ANALYSIS OF MAWC WATER CONSUMPTION

Q. Are there revenue adjustments the Company is proposing in this case that require a quantitative analysis of water consumption by MAWC's customers?

A. Yes. I will explain the modeling used to develop the revenue forecasts for residential, commercial and public authorities ("OPA") customers, and thereafter, I will discuss the development of the revenue projections for all customer classes (residential, commercial, industrial, OPA, and sales for resale). For residential, commercial, and OPA customers, the Company is proposing adjustments for the normalization of the actual billing determinants for the 12-month period ended June 2022, related to trends in declining use, weather normalization, and the impact of the COVID-19 public health emergency on water consumption for MAWC's water customers. These adjustments require the Company to analyze water consumption and determine (1) if there is a significant and pervasive rate of decline in water use per customer over time, (2) if there are significant relationships between water consumption and weather conditions in the Company's service territory, and if weather was different from normal in the 12-month period ended June 2022, and if so, a weather normalization adjustment to usage is appropriate to reflect more normal weather conditions for the 12-month period ended May 2023, and (3) if the COVID-19 public health emergency has had a significant impact on water consumption for MAWC's customers, to determine if a COVID-related adjustment to usage is appropriate for the 12-month period ended May 2023.

Q. How do you determine the parameters and relationships necessary to analyze declining water use, weather impacts on water consumption, and the impact of

COVID-19 on water consumption for MAWC's customers?

A. The parameters and relationships necessary to analyze declining use, weather, and COVID-19 on water consumption for MAWC's customers are estimated using statistical linear regression modeling.

Q. What is a statistical linear regression model?

A. Statistical linear regression modeling is a commonly used type of mathematical predictive analysis. The overall idea of regression modeling is to examine two things: (1) does a set of independent explanatory variables do a good job of predicting an outcome (dependent) variable, and (2) which independent explanatory variables, in particular, are significant predictors of the dependent variable, and in what way do they help predict the results of the dependent variable.

There are three major uses for statistical linear regression analysis. These major uses are: (1) determining the predictive power of independent explanatory variables; (2) forecasting the effect that independent variables have on a dependent variable; and (3) trend forecasting. First, the regression analysis can be used to identify the strength of the effect that independent explanatory variables have on a dependent variable. A typical question is: "What is the strength of the relationship between summer heat, precipitation, and water sales?" Second, the regression analysis can be used to forecast the effects or impacts of changes. That is, the regression analysis helps us understand how much the dependent variable changes with a change in one or more of the independent variables. A typical question is: "How much water sales can the Company expect to lose for each inch of rainfall above normal in any given period?" Third, regression analysis can predict trends and future values. The regression analysis can be used to get point estimates of future values of the dependent variable based on assumed values for the independent variables. A typical question can be: "Given current trends in water sales, what can we expect water sales to be each month next year assuming normal weather?"

Q. What does a statistical model produce?

A. A statistical linear regression analysis is a way of mathematically validating which independent variables have a significant impact on the dependent variable – the main factor, the one you are trying to better understand or predict. A statistical linear regression model produces an equation that describes a historical relationship between a set of independent variables and a single dependent variable that can be used to forecast future values of the dependent variable based on assumed values of the independent variables. An example of such an equation is shown below:

UPCn = a0 + (a1 x RAINn) + (a2 x CDDn) +
+ (a3 x COVID-19n) + (a4 x TIMEn)

Where:	UPCn =	Use per customer in month n
	RAINn =	Rainfall in month n
	CDDn =	Cooling Degree Days ("CDD") in month n
	COVIDn =	COVID-19 effect in month n (0% to 100%)
	TIMEn =	Year/Month for month n
and:	a0 =	constant term
	a1 =	coefficient for RAIN
	a2 =	coefficient for CDD
	a3 =	coefficient for COVID-19 impact per customer
	a4 =	coefficient for TIME (declining use value)

In this example, use per customer is the dependent variable (outcome) and all other variables are independent variables (predictors).

Q. Can statistical linear regression models be used to weather normalize historical water sales for different customer classes?

A. Yes. In the statistical model in the example above, the a1 coefficient for RAIN can be used to estimate the impact of rainfall on use per customer in any given historical period and estimate the impact of what use per customer would have been if rainfall had been different, especially when actual precipitation was higher or lower than normal. Below is a sample calculation of how weather normalization works with a statistical regression model that uses the weather as a strong predictive independent variable that affects the use per customer dependent variable.

IMPACTn = a1 x (ACTUAL RAINn – NORMAL RAINn)

Where: IMPACTn = Weather impact due to abnormal rainfall in period n

ACTUAL RAINn = Actual Rainfall (in inches) in period n

NORMAL RAINn = Average Rainfall (in inches) in period n

If the value of the a1 coefficient for rainfall is -0.30 in this example, actual rainfall for the period is 6 inches and normal rainfall for the period is 4 inches, the weather impact for the period due to higher-than-normal rainfall is a negative 600 gallons per customer meaning that the Company sold 600 fewer gallons per customer of water than it otherwise would have [-0.30 x (6 – 4) = -0.60]. If there are multiple weather variables in the statistical regression analysis, this calculation is completed separately for each variable and the sum of the calculations is rolled up into a single weather impact. This approach to weather normalization allows an analyst to independently assess the impact of each weather component, and also allows an analyst to state the weather impacts over time both in terms of consumption and in terms of revenues by multiplying the consumption impact by a volumetric price.

Q. Can statistical linear regression models be used to estimate the impacts of COVID-19 on water sales for different customer classes?

Yes. In the statistical model example above, the a3 coefficient for COVID-19 is the estimate of the impact of the COVID-19 public health emergency on monthly use per customer. The historical data set contains a variable for each month that indicates the assumed qualitative level impact of COVID-19 in that month. In all months prior to April 2020, that value was set at 0%. From April 2020 on, that value is set at 100% when maximum COVID-19 impacts are observed, or at a level less than 100% where we see reduced COVID-19 impacts on usage. The coefficient for the COVID-19 impact variable estimates the average monthly use per customer based on the months that have been designated as COVID-19 months. This coefficient can then be used to (1) identify a normal level of usage that is not influenced by the impact of COVID-19, in a manner similar to a normalization calculation that adjusts for the influence on water usage associated with weather conditions that depart from normal, and (2) reflect estimates of future impacts of the COVID-19 public health emergency.

Q. Can these models be used to estimate trends in declining use per customer for different customer classes?

A. Yes. In the same statistical model example represented above, the a5 coefficient for TIME is the estimate of declining use per customer per month. This coefficient measures the rate of decline in use per customer over the historical data set independent of the effect of any other variable in the model. The historical data set contains a variable for each month which is a timestamp that starts at 1 for the first month in the dataset and increases by 1 for every month going forward. This acts as a trend variable for both historical periods in the dataset and future forecast periods. The coefficient for this trend variable is applied to future increasing values of the trend which results in decreasing forecasts of use per customer.

Q. How does one assess the accuracy of a statistical linear regression model?

A. A statistical linear regression model produces a set of statistics that can be used to judge the accuracy and fitness of the model. The most common statistics are (1) the "R-Squared" value, which is a statistical measure in a regression model that determines the proportion of variance in the dependent variable that can be explained by the independent variables, and (2) values and standard deviations for the coefficients, which can be used to determine "t-statistics" and "p-values" which tell how accurately and precisely the different coefficients are being calculated and whether the associated independent variables are strong predictors of the dependent variable.

In the equation described above, the "R-Squared" value is a statistic that measures the percentage of variation from time period to time period in the dependent variable (water use per customer) that is explained by the mathematical relationship with the independent variables. The R-Squared can range from 0% (no explanatory ability) to 100% (perfect explanatory accuracy). In general, the higher the R-squared, the better the predictive value of the model.

The second major test involves comparisons of the values of each of the model coefficients and their associated standard errors. Because a statistical regression model estimates an explanatory relationship between a dependent variable and a set of independent variables, there will always be some degree of uncertainty around what that explanatory relationship actually is. As a result, each model coefficient has a level of uncertainty around it, and this level of uncertainty is represented by measuring how many standard errors each coefficient is away from zero, which the model also calculates.

Dividing the value of each coefficient by its standard error yields a t-statistic which can be used to judge the predictive power of the independent variable that the coefficient represents. For example, in the case of the generic statistical model described above, if the value of the a1 coefficient for rainfall is -0.30 and the standard error for that coefficient is 0.05 (meaning that the real value of the coefficient could be anywhere between -0.35 and -0.25 with -0.30 being the most likely value), the value of the t-statistic is -6.0 (-0.30 divided by 0.05 = 6.0). Generally speaking, t-statistic values greater than 2.0 for positive coefficients or less than -2.0 for negative coefficients indicate an acceptable predictive relationship between that independent variable and the dependent variable of interest. The higher the t-statistic value, the greater the confidence we have in the coefficient as a predictor. Values between 2.0 and -2.0 indicate that the predictive power of that independent variable may not be very strong.

Q. Are there other more qualitative ways to determine whether a statistical linear regression model is accurate and produces reasonable results?

A. Yes. There are also several qualitative ways to determine whether a statistical regression model accurately describes the relationship that a chosen set of independent variables has with the dependent variable:

- **Does the model represent reality?** If it is generally known that water consumption is seasonal and is driven in the summertime by heat and precipitation, it is logical to assume that a statistical model that attempts to describe and predict seasonal water consumption would have explanatory variables related to summer heat and precipitation, and those explanatory variables would be shown to have a strong predictive value in the model. Models that attempt to accurately describe the drivers behind water consumption that do not contain statistically significant coefficients for independent variables that are logically known to drive water consumption are likely not strong predictive models.
- **Are the signs of the coefficients for major independent variables correct?** If water consumption increases in the summertime with increasing heat and decreases in the summertime with increasing precipitation, it is logical to expect that the coefficients for the independent variables that represent summertime heat and summertime precipitation would be positive and negative, respectively.
- **Is the model based on a robust data set?** It is easy for a statistical model with many independent variables and relatively few observations of the dependent variable to accurately explain variation in the dependent variable, but that does not mean that the model has strong predictive power if the data set being analyzed is small in scope. A statistical model that attempts to describe water consumption that has good predictive explanatory power over multiple years of monthly historical data is very useful and accurate in projecting future trends and in explaining how changes in strong predictive independent variables will affect levels of the dependent variable.

- **<u>Do the impacts on the dependent variable that the model describes make logical sense?</u>** It is possible outside of a statistical linear regression model to make ballpark estimates of other facts like the impact of COVID-19 on water consumption and long-term trends in declining use. This can be done with a simple linear plot of annual usage data by year. For example, if a linear plot of annual usage data suggests that there is a downward trend of approximately 1,000 gallons per customer per year, one would expect that a statistical model that is measuring that impact would yield a result that is similar. The same is true when looking at the potential impacts of COVID-19 on water consumption. If a visual examination of data suggests that water use per customer for a commercial class has decreased by 2,000 gallons per customer in 2020 due to the COVID-19 emergency, it is logical to expect a statistical regression model that attempts to statistically measure that impact to yield estimates consistent with that expectation.

<u>V. DECLINING USE AND WEATHER ADJUSTMENTS</u>

Q. Please describe the statistical linear regression model you are using to analyze water consumption data for MAWC.

A. In this proceeding, we are using multiple regression statistical models to analyze use per customer for the residential, commercial, and OPA classes that relate the dependent variable (i.e., water use per customer) to a collection of independent variables. Separate models are developed for St. Louis County customer usage and usage for non-St. Louis County customers. The models use 120 months of monthly data beginning in April 2012 and running through March 2022. Each regression model uses independent variables that can be broken down into four categories to explain monthly use per customer. The four categories are:

- **<u>Weather:</u>** The weather variables used in the models are Cooling Degree Days ("CDDs") and precipitation. These weather variables are a weighted average of current month and lagged month weather readings taken by the National Oceanic and Atmospheric Administration at St. Louis Lambert International Airport. This weighted average lagged approach is used to account for the differences between billing month sales and calendar month weather. Coefficients from these variables show the impact of weather on monthly use per customer over the 10-year period. Weather variables are modeled as monthly deviations from normal for each month in the data set (actual weather for the month less normal weather for the month for each individual weather variable). Normal weather is calculated for each month of the year based on the weather over the ten-year period that the historical data spans.
- **<u>Time:</u>** The time variable is a trending variable that notes the passage of time in the model and produces a coefficient that estimates the monthly decline in usage per customer over the 10-year model. The time variable captures the range of conservation efforts that have been implemented by customers over time, such as the installation of more water-efficient fixtures and appliances. Time on its own is of no consequence, but it is a powerful variable because it is the medium for capturing the conservation effect.
- **<u>COVID-19 indicator</u>**: The COVID-19 indicator variable is set at 0% for months prior to April 2020 and 100% for the months of April 2020 through December 2021. The effect of this variable in the model is to look specifically for increases or

decreases in use per customer for the April 2020 through December 2021 timeframe that may have happened due to systemic changes in the amounts of water customers use as a result of the COVID-19 public health emergency.

- **Monthly indicators:** The monthly indicator variables in the model measure structural monthly and/or seasonal changes in use per customer that cannot be explained by any of the other variables in the model.

Q. What information do these models provide that is useful for developing pro forma adjustments to revenues that you are sponsoring in your testimony?

A. Each model produces a set of weather coefficients that can be used to weather-normalize historical sales, a coefficient that indicates the monthly trend in declining use per customer for each class, and a coefficient that shows for each class the average use per customer impact associated with changes in usage due to COVID-19.

Q. You mentioned that you have developed models for customer usage relating to the residential, commercial, and OPA classes. Are you also modeling usage for the industrial and sales for resale customer classes, and for fire service classes?

A. No. The statistical modeling in this case is only for the residential, commercial, and OPA classes. Usage estimates for the industrial and sales for resale classes are developed using a simple multi-year average and are described later in the revenue section of my testimony.

Q. Is this modeling approach different from the modeling approaches that have been used by the Company in previous rate cases in Missouri?

A. Yes. The modeling approach proposed in this case is a monthly model with 12 monthly data points for each of the 10 years covered in the model, which results in models with 120 historical data points. Modeling approaches in previous rate cases relied on ten years of data but used an annual modeling approach where there was only one data point for each year which resulted in models with 10 historical data points.

Q. Why is the Company proposing to move from an annual model with one data point for each year to a monthly model with 120 historical data points?

A. The Company is moving to a monthly modeling approach to improve the accuracy of the modeling process. Monthly modeling that incorporates monthly weather information and that allows for monitoring of customer usage from month to month significantly improves the Company's ability to understand the impacts of weather on customer usage. Additionally, this approach allows for a more detailed analysis of other factors that affect customer usage like the COVID-19 emergency. This approach to modeling significantly improves the accuracy of the Company's analysis of customer usage.

Q. You previously discussed the various statistical tests used for accuracy and predictability. Please discuss the results of these tests for your models and why they are appropriate to use in this proceeding.

A. As shown in Schedules CBR-4, CBR-5, and CBR-6, the Adjusted R-Squared statistics for the residential usage model is 87% and 89% for St. Louis County and non-St. Louis County customers respectively, the Adjusted R-Squared statistic for the commercial usage model is 92% and 89% for St. Louis County and non-St. Louis County customers respectively, and the Adjusted R-Squared statistic for the OPA model is 85% and 80% for St. Louis County and non-St. Louis County customers respectively. This indicates that in all models, the explanatory variables (weather, COVID-19 impacts, declining use, etc.) strongly explain the variability in use per customer over time. The values of the coefficients, standard errors, and t-statistics for the major explanatory variables in the models are as follows:

St. Louis County Residential Model Major Explanatory Variables	Coefficient	Standard Error	t-Statistic
Declining Use Trend	-.0096	.0024	-4.0971
Precipitation	-.2360	.0570	-4.1401
CDD	.0017	.0017	1.0271
COVID-19 Impact	.1309	.2062	.6349

Non-St. Louis County Residential Model Major Explanatory Variables	Coefficient	Standard Error	t-Statistic
Declining Use Trend	-.0082	.0015	-5.6620
Precipitation	-.2358	.0388	-6.0778
CDD	.0064	.0011	5.8139
COVID-19 Impact	.3305	.1270	2.6030

St. Louis County Commercial Model Major Explanatory Variables	Coefficient	Standard Error	t-Statistic
Declining Use Trend	-.0104	.0135	-.7686
Precipitation	-1.3041	.2534	-5.1457
CDD	.0430	.0109	3.9349
COVID-19 Impact	-3.4180	1.1809	-2.8945

Non-St. Louis County Commercial Model Major Explanatory Variables	Coefficient	Standard Error	t-Statistic
Declining Use Trend	.0077	.0064	1.2068
Precipitation	-.5815	.1321	-4.4005
CDD	.0234	.0054	4.3045
COVID-19 Impact	-.6231	.5496	-1.1337

St. Louis County OPA Model Major Explanatory Variables	Coefficient	Standard Error	t-Statistic
Declining Use Trend	.0134	.0413	.3252
Precipitation	-2.9459	.8847	-3.4877
CDD	.1287	.0343	3.7572
COVID-19 Impact	-6.5469	3.6182	-1.8094

Non-St. Louis County OPA Model Major Explanatory Variables	Coefficient	Standard Error	t-Statistic
Declining Use Trend	-.0175	.0214	-.8191
Precipitation	-1.9477	.4889	-3.9838
CDD	.0325	.0190	1.7095
COVID-19 Impact	-3.7743	1.8691	-2.0193

Apart from the declining usage variables (which I discuss later in my testimony), the statistics for the individual explanatory independent variables above show a high degree of explanatory power with most parameters having t-statistics all outside of the +/- 2.00 range. Signs for the precipitation variables are all negative as expected, meaning that more rainfall over a summer period results in less seasonal water usage from our residential customers. Signs for the CDD variables are positive, which indicates that the hotter the weather gets in the summer, customers use more water, which is expected, and the COVID-19 impact variables generally indicate that residential usage went up as a result of COVID-19 and usage for commercial and OPA customers went down.

Q. Your regression models show a trend of declining use per customer. What is the amount of declining use your models have identified?

A. The annual amount of declining use identified for residential customers is approximately 1,400 gallons per year per customer for St. Louis County customers and 1,200 gallons per year for customers outside of St. Louis County. The annual amount of declining use identified for commercial customers is approximately 1,500 gallons per year per customer for St. Louis County with a gain of approximately 1,100 gallons per year for customers outside of St. Louis County. The annual amount of declining use identified for OPA customers is approximately 2,000 gallons per year per customer for OPA customers in St. Louis County and 2,500 gallons per year for non-St. Louis County customers.

Q. Are these declining usage trends you have identified significant?

A. For residential customers, these declining usage trends are statistically significant as I have outlined in my discussion of the levels and significance of the declining use model statistics previously in my testimony. For commercial and OPA customers these trends are not statistically significant, and therefore we do not propose to include any declining use adjustment for commercial and OPA customers in this proceeding and instead use a five-year average of use per customer as I describe later in my testimony.

Q. Why do you believe that declining use is a valid trend for residential customers that will continue?

A. Consumption patterns for the Company's customers are similar to those for other American Water operating companies which have experienced a decline in residential consumption per customer averaging approximately -2.0% per year over the last 10 years. According to the 2010 Water Research Foundation report, "many water utilities across the United States and elsewhere are experiencing declining water sales among households." The report further states: "A pervasive decline in household consumption has been determined at the national and regional levels."[4]

Q. What is causing the decline in residential customers' usage?

[4] Coomes, Paul et al., North America Residential Water Usage Trends Since 1992 – Project #4031, page 1 (Water Research Foundation, 2010).

A. Several factors drive the decline in residential customers' usage. These factors include the incremental introduction of low-flow fixtures and appliances, new regulations that lead to further reductions in fixture flow rates, conservation programs, and public initiatives that have led to greater consumer water conservation awareness.

Plumbing fixtures such as toilets, showerheads, and faucets available to consumers today are more water-efficient than were those fixtures manufactured in the past. Similarly, appliances such as dishwashers and washing machines are also more water efficient. When a customer replaces an older toilet, washing machine, or dishwasher with a new unit, the new unit will almost certainly use less water than the one it replaced. Similarly, the construction of new homes results in the installation of water-efficient fixtures meeting new, more efficient, regulatory standards.

Q. How much water do the new fixtures and appliances save?

A. The Energy Policy Act of 1992 mandated the manufacture of water-efficient toilets, showerheads, and faucet fixtures. For example, a toilet manufactured after 1994 must use no more than 1.6 gallons per flush, compared to a pre-1994 toilet, which typically used from 3.5 to 7 gallons per flush. In fact, toilets using only 1.28 gallons per flush or less are becoming more prevalent in the marketplace. Replacing an old toilet with a new one, therefore, can save from 2 to nearly 6 gallons per flush. The United States Environmental Protection Agency estimates that there are more than 220 million toilets in the United States and that approximately 10 million new toilets are sold each year for installation in new homes and businesses or replacement of aging fixtures in existing homes and businesses.

The Energy Independence & Security Act of 2007, which established stringent efficiency standards for dishwashers and washing machines, has further reduced indoor water consumption. Dishwashers manufactured after 2009 and washing machines manufactured after 2010 must use 54% and 30% less water, respectively. All other factors being equal, a typical residential household in a new home constructed in 2015, with water-efficient toilets, washing machines, dishwashers, and other fixtures, uses approximately 35% less water for indoor purposes than a non-retrofitted home built prior to 1994.

Q. Are there other factors contributing to the continued decline in water consumption patterns?

A. Yes. Programs to raise customer awareness and interest in the benefits of conserving water and energy continue to increase. As awareness of water and energy efficiency increases, customers may decide to replace a fixture or appliance even before it has broken. Additionally, customers may further reduce consumption by changing their household water use habits in other various ways.

Q. Do you expect the trend of declining customer usage to continue in the future?

A. Yes. Water-efficient fixtures and other drivers such as conservation education and government-mandated standards will continue to drive further efficiency into residential and nonresidential usage per customer. In fact, the trend is well established and continues to affect water usage on the MAWC system as well as most water utilities across the United States. The rate of the continued trend is dependent on the pace of fixture replacement within the Company's footprint as well as the broadening acceptance of a conservation ethic through raised customer and business awareness programs, government conservation policy, and similar behavior modification-related programs.

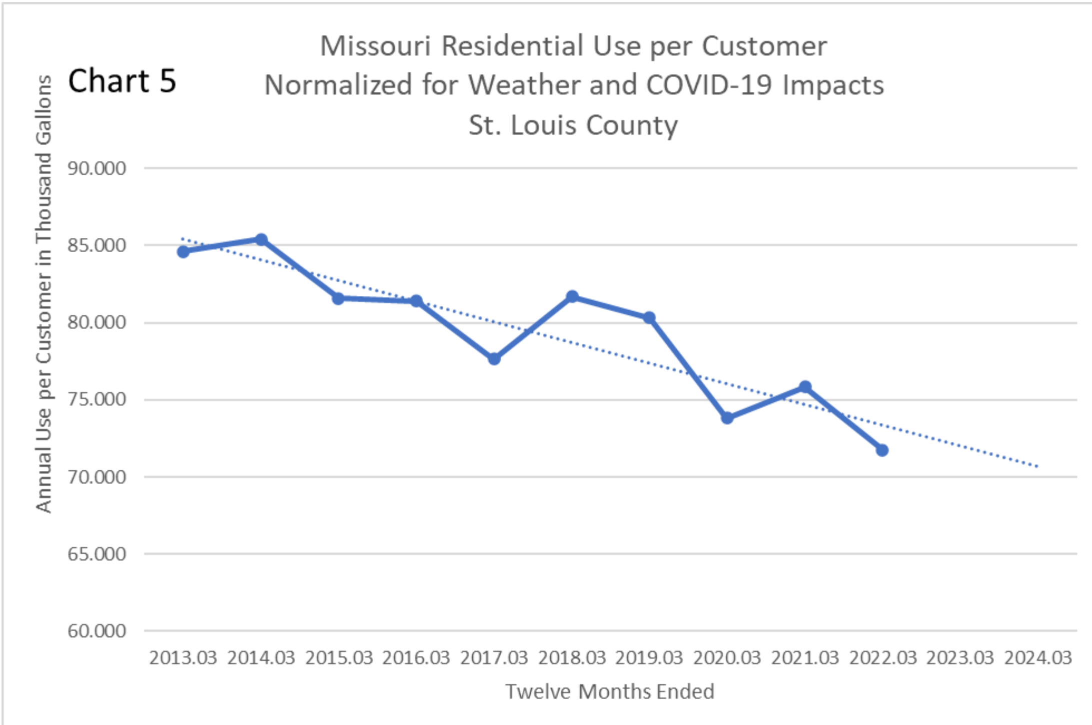
Technology is now available for newer, more water-efficient products that further improve on Energy Policy Act levels, and there has been a growing movement to codify these more stringent specifications. The introduction of progressive code modifications – such as the International Code Council's International Green Construction Code and the International Association of Plumbing and Mechanical Officials Green Plumbing and Mechanical Code Supplement (2011) – support uniform implementation of increased water efficiency standards. An article in the June 2012 issue of the American Water Works Association ("AWWA") Journal entitled "Insights into declining single-family residential water demands" recognizes this decline in water consumption: "[r]educed residential demand is a cornerstone of future urban water resource management. Great progress has been made in the last 15 years and the industry appears poised to realize further demand reductions in the future."[5] The trend of declining water consumption based on improved water efficiency has continued over time.

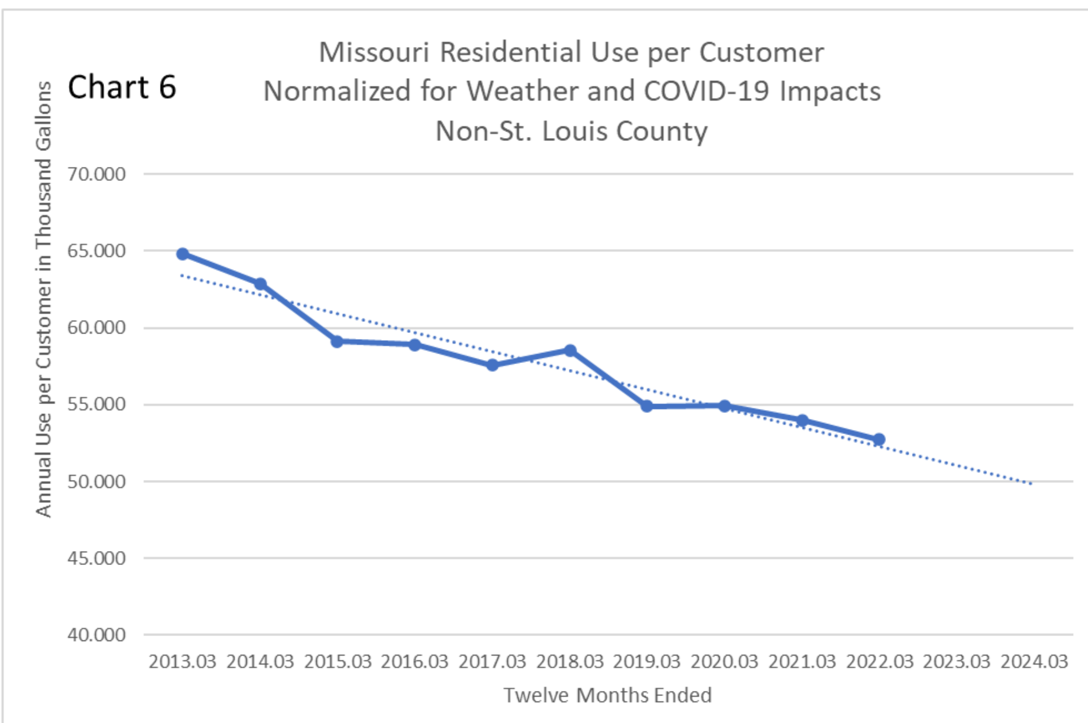
Q. Normalizing historical usage for weather and the COVID-19 emergency, what has the overall trend been for use per customer for the residential, commercial, and OPA classes?

A. The statistical analysis of residential, commercial, and OPA usage shows that once weather effects and the one-time effects of COVID-19 have been accounted for, there is a significant downward trend for residential customers and fairly stable usage for commercial and OPA customers over time. Charts 5 through 10 below show use per customer for residential, commercial, and OPA customers respectively for the ten years

[5] DeOreo, William and Mayer, Peter. American Water Works Association Journal. Vol. 104. Issue 6. http://apps.awwa.org/WaterLibrary/showabstract.aspx?an=JAW_0076117. June 2012

ending March 2022, adjusted for the weather impacts and COVID-19 impacts I previously described in my testimony.





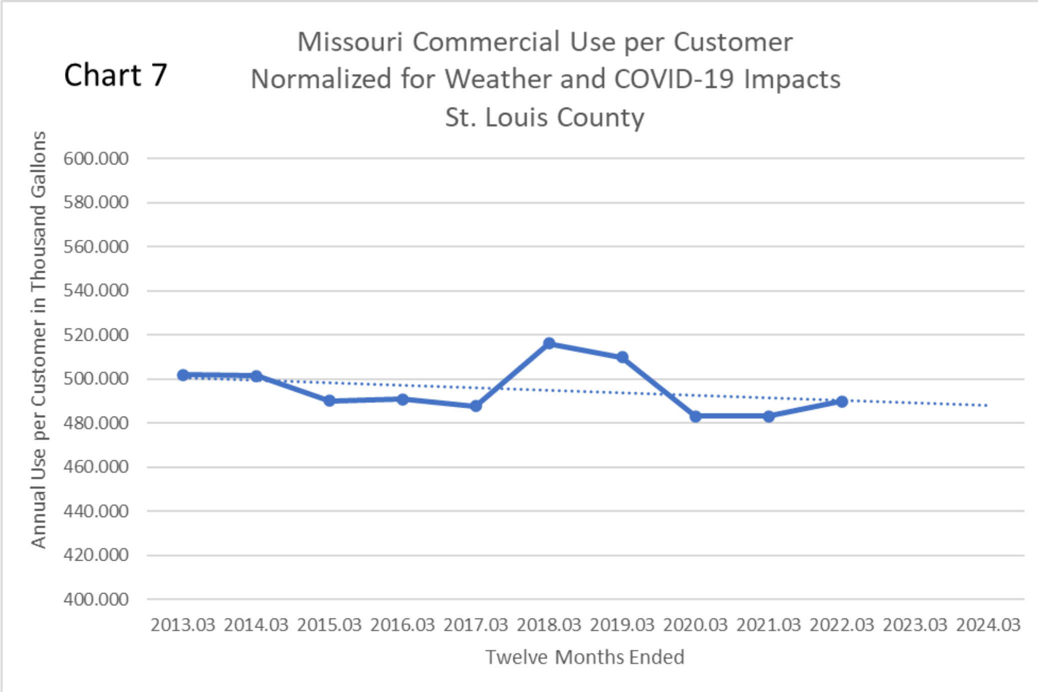


Chart 7
Missouri Commercial Use per Customer
Normalized for Weather and COVID-19 Impacts
St. Louis County
Annual Use per Customer in Thousand Gallons
600.000
580.000
560.000
540.000
520.000
500.000
480.000
460.000
440.000
420.000
400.000
2013.03 2014.03 2015.03 2016.03 2017.03 2018.03 2019.03 2020.03 2021.03 2022.03 2023.03 2024.03
Twelve Months Ended

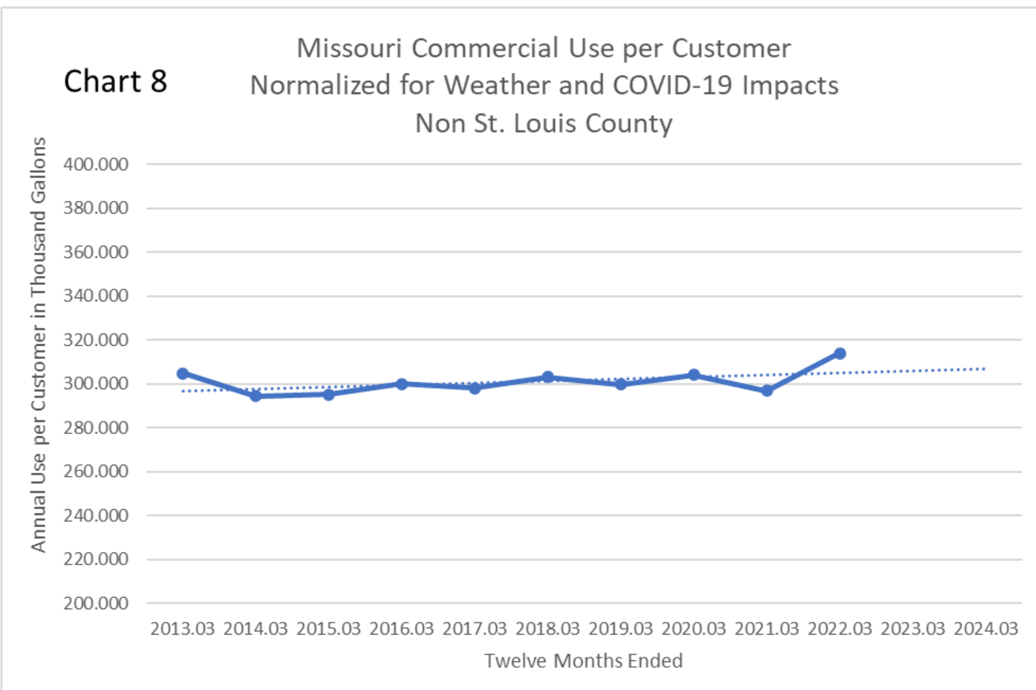
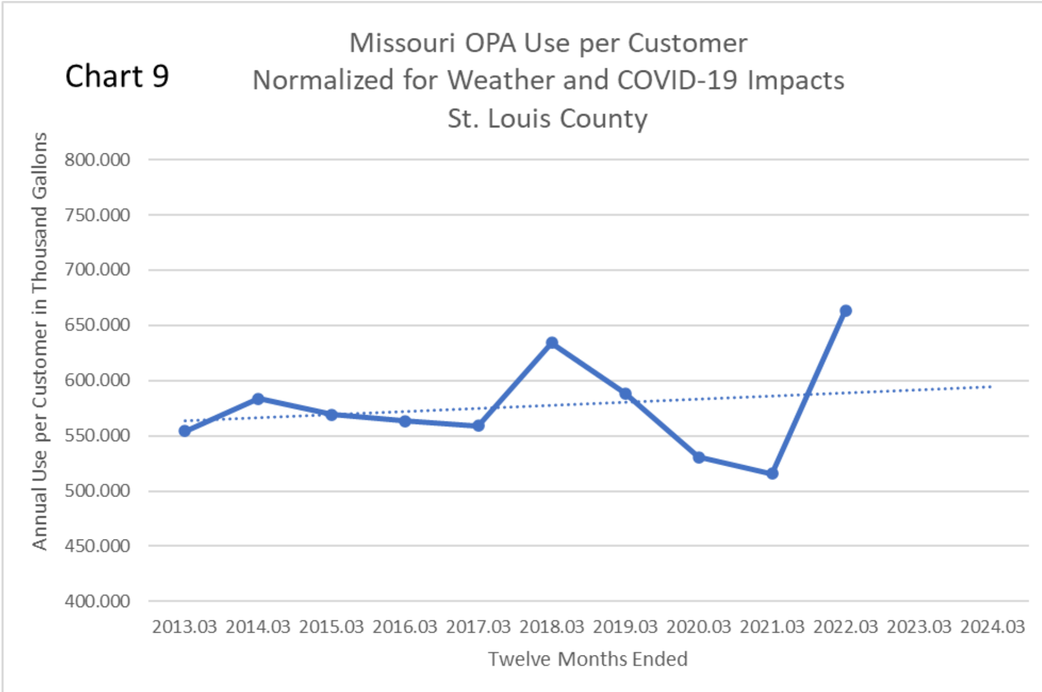
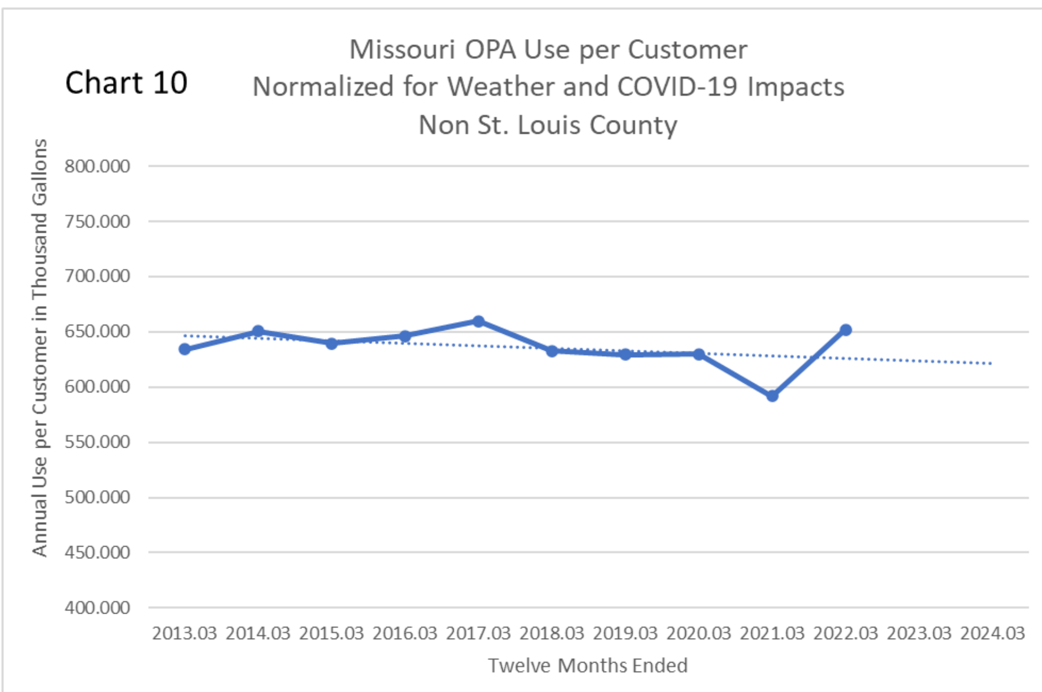


Chart 8
Missouri Commercial Use per Customer
Normalized for Weather and COVID-19 Impacts
Non St. Louis County
Annual Use per Customer in Thousand Gallons
400.000
380.000
360.000
340.000
320.000
300.000
280.000
260.000
240.000
220.000
200.000
2013.03 2014.03 2015.03 2016.03 2017.03 2018.03 2019.03 2020.03 2021.03 2022.03 2023.03 2024.03
Twelve Months Ended





Q. What conclusions do these charts reveal?

A. Extending the historical trends in adjusted usage going forward, these charts and the supporting analysis demonstrate that there has been a significant and pervasive decline in normalized use per customer for residential customers both in St. Louis County and non-St. Louis County service territories. There has not been a significant movement over time in normalized use per customer in either the St. Louis County or non-St. Louis County service territories for commercial or OPA customers.

VI. REVENUE CALCULATIONS

Q. Please explain the development of MAWC's pro-forma revenues as set forth in the revenue related Schedules (CAS-8, CAS-11 and CAS-12).

A. The process of developing the Company's revenue requirement begins with revenues recorded on the Company's books of account on June 30, 2022, to which various adjustments were made. A summary of the development of pro forma revenues for MAWC's water and sewer operations under present and proposed rates are set forth on Schedules CAS-11 and CAS-12, which show operating revenues by customer classification for the twelve months ending June 30, 2022 (normalized), twelve months ended December 31, 2022, and twelve months ended May 31, 2023 under present rates and proposed rates. CAS-11 shows a summary by revenue class, and CAS-12 shows the detail by revenue class. In addition to pro forma revenues at current rates, Schedules CAS-11 and 12 show pro forma revenues at proposed rates. These rates are based on the rate design discussion previously outlined in my Direct Testimony.

Q. Please explain the adjustments to the Company's book revenues that were made to develop pro forma revenues under present rates as shown on Schedule CAS-8.

A. Schedule CAS-8 begins with test year revenues for the 12 months ended June 30, 2022. At the time of filing, the test year is based on 9 months of actual revenues through March 31, 2022, and 3 months of estimates through June 30, 2022. Three adjustments are made to present a pro forma revenue for the 12 months ended June 30, 2022. First, unbilled revenue is eliminated. Second, all revenue related to Water & Sewer Infrastructure Replacement Surcharge ("WSIRA") is eliminated. Lastly, the per books revenues were adjusted for the bill analysis normalization as shown in Schedules CAS-11 and 12.

Q. Please explain the adjustments to determine the Company's pro forma revenues as shown on Schedules CAS-8 and CAS-11 and 12.

A. The revenue adjustments are primarily for customer growth and for customer usage. We project customer counts and use per customer for residential, commercial, industrial, OPA, sales for resale, and fire service classes for St. Louis County and non-St. Louis County service territories for water service. These include projections specifically for Rate J customers and any special contracts. These projections also include any customers and sales associated with acquisitions. We also project customer counts and usage data for wastewater customers that include both existing customers and acquisitions. The Company also projects miscellaneous revenues for both water and wastewater service to complete the calculation of revenues for the relevant periods.

Q. Please describe the methods used for estimating customer counts, use per customer, and billing determinants for residential water sales.

A. Customer growth for residential customers was projected using a 5-year historical growth pattern from 2017 through 2021 applied to customer counts as of March 31, 2022. Residential use per customer was developed based on the normalized values from the usage modeling previously discussed in my Direct Testimony.

Q. Please describe the methods used for estimating customer counts, use per customer, and billing determinants for Commercial, Industrial, OPA and Other Water Utilities

(OWU) water sales.

A. Commercial and OPA customer counts are based on organic growth using the 5-year historical growth pattern for these classes from 2017 through 2021. No customer growth was projected for the Industrial class and the Sales for Resale class. Usage for all these non-residential classes is projected using a 5-year annual average usage per customer multiplied by the projected number of customers. Because there is not a significant trend in use per customer for these classes as I have previously discussed in my testimony, the Company is using a 5-year average of water usage (2017-2021) for these customer classes, which is an appropriate period to use for normalizing sales when there is no strong underlying trend in usage. This time period eliminates short-term fluctuations in usage while still reflecting normal water consumption levels for these customers.

Q. Please describe how projections were made for Rate J customers and sales.

A. Non-residential customers excluding Sale for Resale customers constantly using large quantities of water not less than 450,000 gallons per month are classified as Rate J customers. Usage for Rate J customers was projected using a 5-year average annual usage per customer for the time period 2017-2021.

Q. Did you also compute the total estimated gallons of production that correspond to your revenue forecast and that were used by Company witness Michael Schwarzell for purposes of the system delivery adjustments that he proposes for water service?

A. Yes, I did. System deliveries are calculated separately for St. Louis County and non-St. Louis County operations and are based on the five-year average from 2017 through 2021 of non- revenue water percentages, which is the percentage of total system deliveries in a year that is not attributable to metered sales. This average non-revenue water percentage is applied to total sales for the 12- month period ending May 2023 to arrive at system deliveries for the same period.

Q. Please describe the methods used for estimating revenue for private fire service.

A. Revenue for private fire was calculated using nine months of actual historical counts of service connections and hydrants in service through March 31, 2022, and three months of estimated counts through June 30, 2022. Organic growth was projected using the 5-year average change in counts for the years 2017-2021.

Q. Please describe how customer count and sales information was developed for wastewater customers.

A. Organic growth for residential and commercial classes were calculated using the 5-year average growth patterns from 2017-2021. No customer growth was projected for the OPA class. Water usage/flow for the City of Arnold was projected using a 5-year average water usage/flow per customer.

Q. How was this information developed for the acquisitions the Company is including in this case for wastewater service.

A. The billing determinants for the City of Taos and the City of Hallsville used the actual billing determinants through March 2022 and then annualized for a full 12-month billing period. The billing determinants for the City of Eureka were taken from the billing register provided to the Company for the twelve months ended March 2022. The billing determinants for Monsees Lake, City of Purcell, City of Stewartsville, and the City of Smithton are all estimated based on estimates from the acquisition information.

Q. Please describe how miscellaneous revenues were developed.

A. Revenue for rents and usage data are projected based on known and measurable changes in agreements from the Test Year period. Revenues for late payment fees are based on a 3-year average ratio of actual late payment fees charged to customers to actual billed revenues. Revenue projection for Returned Check Charges, Reconnect Fees, After Hours Charges, Application Fees, Frozen Meter and Miscellaneous Services revenues are based on 5-year average historical revenues from 2017 through 2021.

VII. REVENUE STABILIZATION MECHANISM

Q. What is a Revenue Stabilization Mechanism?

A. A Revenue Stabilization Mechanism ("RSM") is an accounting and ratemaking tool that is designed to align the Company's revenues going forward (i.e., beyond the conclusion of this proceeding) with the level of authorized revenue ultimately approved by the Commission. This mechanism stabilizes changes in revenues resulting from changes in volumes of water sold to customers on an ongoing basis due to factors largely beyond the control of the Company.

Q. How does an RSM work?

A. The mechanics of the Company's proposed RSM are discussed in greater detail in the Direct Testimony of Company witness John Watkins. Generally speaking though, the Company's proposed RSM will adjust rates up or down over time so that the revenue the Company collects is consistent with the revenue requirement approved by the Commission for water service in this proceeding. The RSM affords the Company with the ability to collect an annual revenue amount consistent with the authorized revenue amount in this case and that customers in total pay the revenue level found appropriate to produce just and reasonable rates.

Q. Which customer classes are included in the RSM?

A. As described in Section 386.266.4, RSMo, the RSM would be applicable to water customers in the residential, commercial, OPA, and sale for resale classes.

Q. Which customer classes would be excluded from the RSM?

A. Industrial water customers and water customers taking service under contract rates. All wastewater customers would also be excluded.

Q. Do the revenues the Company collects under the WSIRA factor into the RSM?

A. No. The RSM only compares the water revenues for eligible customer classes authorized to be collected through base rates in the Company's rate case to the actual base rate water revenue collected from those customers in the eligible customer classes. The WSIRA mechanism already includes a reconciliation that essentially functions as an RSM. Revenues authorized and collected via WSIRA are not part of the RSM.

Q. How will the RSM that the Company is proposing generally function?

A. As explained in greater detail in the Direct Testimony of Company witness Mr. Watkins, the RSM will compare water revenues for eligible customers authorized in a rate case to actual base water revenues collected from eligible customers, net of applicable production costs, and net of acquisitions that have not yet been through a general rate case.

Q. Why is the Company proposing that new acquisitions be excluded from the RSM?

A. As described in Section 386.266.5(1), RSMo, the Commission may approve RSM rate schedules provided it finds the adjustment mechanism "is reasonably designed to provide the utility with a sufficient opportunity to earn a fair return on equity." When the Company acquires new systems, there are many costs incurred that are offset, sometimes only partially, by the revenues collected from those customers. If the revenues from acquisitions are included in the adjustment mechanism, the Company will incur these costs with no revenues to offset them. These incremental costs will reduce the Company's opportunity to earn a fair return on Equity.

Q. Why is the Company proposing that the incremental production costs be included in the RSM?

A. Similarly to the discussion about acquisitions in the RSM above, excluding the incremental production costs would reduce the Company's opportunity to earn a fair return on equity. In the instance where the Company's eligible revenues are more than what was authorized, this amount would be returned to the customers. However, that additional revenue will be generated by increased water sales, and treating and pumping that additional water creates incremental additional production costs. If the additional revenues went to the RSM, the Company would be left with additional costs and no revenues to offset them. In the opposite example, where the Company's eligible revenues are less than what was authorized, this amount would be collected from customers via a surcharge. The shortfall of revenue will be generated by decreased water sales, and the Company will likewise experience lower production costs as a result. It would not be fair to customers to collect the revenue shortfall from them, while not also including the benefit of the reduced expense.

Q. Of the total revenues collected under your proposed water rates, how much revenue is being collected through fixed charges and how much revenue is being collected through volumetric charges?

A. Total proposed water revenues equals $468,757,639. Of this amount, $90,955,000 is collected through fixed charges (19.4% of the total) $372,556,606 is collected through volumetric charges (79.5% of the total), and $5,246,033 is collected through miscellaneous fees (1.1% of the total).

Q. Is ongoing revenue volatility a significant concern?

A. Yes. Approximately 79.5% of the Company's water service revenues will be collected as volumetric rates pursuant to the Company's proposed rate structure in this case, which means that revenues will vary up or down depending on how much water our customers use. At the same time, over 90% of the Company's costs are fixed costs, which do not vary depending on how much water our customers use. If water sales are less than the levels used to set the Company's water service rates in this proceeding, the Company's revenues will be less than the authorized level in this proceeding, and as a result, the Company's ability to recover the costs that the Commission determines to be prudent will be diminished. Likewise, if revenues exceed the authorized level in this proceeding due to higher than anticipated water sales, the Company will recover more than the authorized level in this proceeding. The RSM will permit the Company to recover the level of revenue authorized in this case, as the difference between that amount and actual revenues will be charged or credited back to customers in the subsequent year.

Q. What are the external factors that cause revenues to be volatile from year to year?

A. There are two primary factors that cause revenue volatility from year to year -- seasonal weather conditions and the ongoing trend of declining use for residential, commercial, and municipal customers.

Seasonal weather conditions can cause water sales to either increase or decrease from expected going-forward levels, which, in turn, cause revenues to increase or decrease from expected going levels. Hot dry summers tend to increase water sales, and cooler wetter summers tend to decrease water sales. Weather volatility in either direction causes volatility in revenues.

Continuing trends in declining use per customer in the residential, commercial, and OPA classes also cause volatility in revenues. I have previously testified to both the impact of weather conditions on annual water sales and on the continuing trends in declining use and the associated impact of declining use on water sales. It is expected that water consumption per customer will continue to decline over the next several years. Both of these conditions cause declines in revenues, and it is expected that both total consumption on a per customer basis, and revenue on a per customer basis will continue to decline well beyond the period of time for which a revenue requirement is approved and rates are set in this case.

Q. Does the Company have any control over either seasonal weather conditions or the drivers that are causing declining usage?

A. No, it does not.

Q. Are there other factors that can cause the Company's revenue to deviate from expected levels?

A. Yes. The COVID-19 pandemic situation is a prime example of an external event that can cause the Company's revenues to vary from expected or approved levels. Since March of 2020, the Company has seen increased sales volumes for residential customers beyond expected levels due to the COVID-19 pandemic, as more people were staying home from work and school. Over the same period, the Company saw decreases in sales volumes from expected levels in the commercial and OPA classes. These changes in volumes, whether temporary or permanent, cause changes in revenues from expected or authorized levels and increase the Company's revenue volatility. Implementation of a well-structured RSM can stabilize customer bills over time and mitigate the Company's revenue volatility due to circumstances beyond the customer or Company's control.

Q. Does the Company have the ability to reduce its costs when water sales are lower than expected to compensate for the reductions in revenues?

A. To some extent, the Company experiences a reduction in variable costs associated with the reduced cost of treating and pumping less water. For the most part, however, the Company's ability to reduce its fixed costs during periods when water sales are lower is limited, and it is generally not in the long-term best interests of our customers for the Company to do so. One simple example of this is employee counts. The Company can hardly hire and fire its well-trained workforce based on short-term trends in weather or economic conditions simply to keep expenses in line with revenues. Similarly, although maintenance may be deferred in a period of reduced revenue, that merely forestalls the inevitable, could degrade the quality of service provided to MAWC's customers, and increase the cost of service over time.

Q. Beyond changes in variable cost, does the continuing trend in declining use per customer reduce the revenue requirement needed to invest in, maintain, and operate the water system for the long-term benefit of the Company's customers?

A. No, it does not.

Q. Isn't the possibility of reduced revenues for the Company a good thing for customers because it means customers' water bills are lower than they otherwise would have been?

A. In the short term, that may appear to be the case. Ultimately, however, a decreasing revenue stream is not in the long-term best interest of our customers if revenue requirements are not reduced to match the decreasing revenue stream.

Q. How is a volatile and decreasing long-term revenue stream not in the long-term best interests of the Company's water service customers?

A. The Company is committed to helping customers use water efficiently and to provide quality water service that is affordable. As I explain below, the Company's ability to reliably recover its revenue requirement over the long term through rates is an important part of the Company's ability to properly operate, maintain, and invest in the water system at a reasonable cost. This ability to prudently manage the systems at a reasonable cost is in the long-term best interests of our customers.

Q. Does Missouri law allow the Commission to approve the Company's proposed RSM?

A. Yes. It is my understanding that Section 386.266.4, RSMo, provides as follows:

> Subject to the requirements of this section, a water corporation with more than eight thousand Missouri retail customers may make an application to the commission to approve rate schedules authorizing periodic rate adjustments outside of general rate proceedings to ensure revenues billed by such water corporation for regulated services equal the revenue requirement for regulated services as established in the water corporation's most recent general rate proceeding or complaint proceeding, excluding any other commission-approved surcharges and gross receipts tax, sales tax, and other similar pass-through taxes not included in tariffed rates, <u>due to any revenue variation</u> resulting from increases or decreases in residential, commercial, public authority, and sale for resale usage.

(emphasis added).

Q. What did the General Assembly identify when authorizing the Commission to approve the adoption of alternative recovery mechanisms such as the RSM?

A. I believe that purpose is found within the statute itself. Section 386.266.4, RSMo states that "... to ensure revenues billed by such water corporation for regulated services equal the revenue requirement for regulated services as established in the water corporation's most recent general rate proceeding or complaint proceeding . . . **due to any revenue variation** resulting from increases or decreases in residential, commercial, public authority, and sale for resale usage." (emphasis added).

Q. Is the approach to water corporations different for the mechanism applicable to electric and gas corporations in Missouri?

A. Yes. Electric and gas corporations are limited to "variations in either weather, conservation, or both." Section 386.266.4. The General Assembly appears to have recognized that there are issues that cause fluctuations in usage that are unique to water corporations.

Q. How does a properly structured RSM address this purpose and benefit MAWC's customers?

A. It is in the long-term best interests of customers for the Company to be able to reliably recover its revenue requirement on an ongoing basis. The authorized water revenue requirements approved by the Commission in this case represent the amount of revenue the Commission determines that the Company needs to operate, maintain, and invest in its water system in a prudent and efficient manner. The ability to reliably recover the Company's approved revenue requirement improves the Company's ability to plan, manage, maintain, and invest in the facilities necessary to continue providing safe, reliable, and high-quality water service at a reasonable cost to customers, and a properly structured RSM does just that.

Q. Are there other benefits to customers from the approval of an RSM?

A. Yes. An RSM will eliminate the throughput incentive – the Company's financial incentive to sell more water. Under the current rate structure (without an RSM), the more water customers use, the more water the Company sells, the more revenue the Company collects, and the better the Company's financial performance. Currently, from a public policy perspective, any actions taken by the Company or the government (local, state, or Federal) to encourage conservation, no matter how beneficial to society, creates a disconnect between the public policy goal of more efficient use of water resources and the Company's legitimate financial objectives.

The Company is engaged in a broad array of efforts to become more efficient, and an RSM supports more consistent planning and deployment of the most efficient resources. Improving water efficiency also reduces withdrawals from limited freshwater supplies, leaving more water for future use and improving the ambient water quality and aquatic habitat. Improving water efficiency is a "win/win/win" providing a wide range of benefits for consumers, utilities, businesses, and for communities as a whole. Approving an RSM opens the path to achieving that winning combination.

Q. Are there other policy concerns among public utility regulators that an RSM addresses?

A. Yes. The National Association of Regulatory Utility Commissioners ("NARUC") has been at the forefront of this issue. At its November 2013 annual meeting, NARUC adopted a resolution that supports the consideration of alternative recovery mechanisms for water and wastewater utilities, attached hereto as Schedule CBR-7. The NARUC resolution recognizes declining use per customer, a shift to non-revenue producing infrastructure replacement, and that the traditional cost of service model is not well adapted to this new environment. It states, in part:

> WHEREAS, Traditional cost of service ratemaking, which has worked reasonably well in the past for water and wastewater utilities, no longer adequately addresses the challenges of today and tomorrow. Revenue, driven by declining use per customer, is flat to decreasing, while the nature of investment (rate base) has shifted largely from plant needed for serving new customers to non-revenue producing infrastructure replacement and compliance with new drinking water standards; and
>
> WHEREAS, The traditional cost of service model is not well adapted to a no/low growth, high investment utility environment and is unlikely to encourage the necessary future investment in infrastructure replacement; and
>
> WHEREAS, Compared to the water and wastewater industry, the electric and natural gas delivery industries have in place a larger number and a greater variety of alternative regulation policies, such as multiyear rate plans and rate stabilization programs, and those set forth in the 2005 Resolution; and
>
> WHEREAS, The U.S. water industry is the most capital intensive sector of regulated utilities and faces critical investment needs that are expected to total $335 billion to $1 trillion over the next quarter century, as noted in the American Society of Civil Engineers 2013 Report Card for America's Infrastructure…

The NARUC resolution goes on to recommend the adoption of alternative recovery mechanisms such as the RSM. It states that:

> Alternative regulatory mechanisms can enhance the efficiency and effectiveness of water and wastewater utility regulation by reducing regulatory costs, increasing rates for customers, when necessary, on a more gradual basis; and providing the predictability and regulatory certainty that supports the attraction of debt and equity capital at reasonable costs and maintains that access at all times.

Q. Are alternative regulatory mechanisms such as the RSM recognized in the regulatory community as an effective means of addressing these policy concerns?

A. Yes. RSMs have been adopted in many states to eliminate the throughput incentive, support energy efficiency initiatives and investment, and align actual revenue collection with authorized revenue. Clauses similar to the RSM proposed here have been successfully used for some time for water utilities in New York and California and have been more recently adopted for water utilities in Connecticut, Nevada, Maine, and Illinois. In addition, similar revenue stabilizing mechanisms have been approved for gas utilities in 23 states and an additional two states plus the District of Columbia have mechanisms pending, according to the December 2016 report from the American Gas Association entitled "Innovative Rates, Non-Volumetric Rates, and Tracking Mechanisms: Current List."[6] This report also states that Weather Normalization Adjustments are allowed in 22 states. A December 2017 report by the Institute for Electric Innovation lists 32 states and the District of Columbia that have an approved fixed cost recovery mechanism for electric utilities with an additional state pending approval.

Q. Please summarize why adoption of an RSM for the Company and its customers is appropriate in this proceeding.

A. Adoption of an RSM is in the long-term best interest of the Company and its customers. Rate designs that tie a utility's revenue recovery directly to sales volume have prompted two widespread concerns in modern utility regulation. First, rewarding a water utility for selling more water implicitly encourages water use and penalizes a water utility for encouraging end use water efficiency and conservation. This misalignment is unfortunate because utilities can play an important role in helping to improve water efficiency and promote conservation. Second, because of seasonal variability and declining use per customer, volumetric rates do not give water utilities a reasonable opportunity to recover

[6] An earlier 2013 study by the Brattle Group entitled "Alternative Regulation and Ratemaking Approaches for Water Companies: Supporting the Capital Investment Needs of the 21st Century," prepared for the National Association of Water Companies, (September 30, 2013) found that 27 states for electricity, 30 states for natural gas delivery, and 5 states for water have this kind of mechanism.

their authorized revenues. By allowing the Company to collect the revenues authorized by the Commission, the RSM: 1) makes the Company indifferent to selling less water; 2) promotes water efficiency and conservation; 3) reduces the adverse impact of weather variability for both the utility and its customers; and 4) reasonably provides that revenues for continued water efficiency investments are available. In addition, the revenue volatility that has been caused by the COVID-19 pandemic and that may continue as our customers continue to recover from the economic effects of the pandemic provides another strong argument for adoption of the RSM and makes the present case a particularly appropriate time to implement such a mechanism. The result is a better alignment of all stakeholder interests, and the Company respectfully requests the Commission to authorize its proposed RSM.

Q. Does this conclude your Direct Testimony?

A. Yes.

Missouri-American Water Company
Case No.
Proposed Water Rate Design

Meter Charge	Present Rate St Louis County	Present Rate All Other	Proposed Rate St Louis County	Proposed Rate All Other
5/8 - Meter	$ 9.00	$ 9.00	$ 12.00	$ 12.00
3/4 - Meter	$ 12.25	$ 12.25	$ 16.00	$ 16.00
1 - Meter	$ 16.58	$ 16.58	$ 25.00	$ 25.00
1 1/2 - Meter	$ 27.42	$ 27.42	$ 45.00	$ 45.00
2 - Meter	$ 40.43	$ 40.43	$ 65.00	$ 65.00
3 - Meter	$ 71.10	$ 71.10	$ 115.00	$ 115.00
4 - Meter	$ 114.11	$ 114.11	$ 180.00	$ 180.00
6 - Meter	$ 222.47	$ 222.47	$ 350.00	$ 350.00
8 - Meter	$ 379.54	$ 379.54	$ 560.00	$ 560.00
10 - Meter	$ 637.71	$ 637.71	$ 850.00	$ 850.00
12 - Meter	$ 765.25	$ 765.25	$ 1,375.00	$ 1,375.00
Flat Rate - RT 1.2		$ 48.40		$ 55.00
Flat Rate - Table Rock		$ 20.58		$ 55.00
Flat Rate - Montsees Lake		$ 35.30		$ 55.00
Rate A Volumetric	$ 0.56290	$ 0.62469	$ 0.85672	$ 0.85672
Rate J Volumetric	$ 0.17797	$ 0.28268	$ 0.29638	$ 0.37672
Rate B Volumetric	$ 0.26194	$ 0.26194	$ 0.32639	$ 0.32639
Eureka	$ 0.56290		$ 0.85672	
Triumph		$ 0.06284		$ 0.09615
Empire		$ 0.25145		$ 0.33268
Mexico - 1st 3000 g		$ 0.57266		$ 0.85672
Mexico - Next 7000 g		$ 0.71583		$ 0.85672
Mexico - Over 10000 g		$ 0.79027		$ 0.85672
C-1 Foxed Revenue	$ 118,510			
City of Kirkwood	$ 0.10404		$ 0.10757	
PWSD #C-1 Jefferson	$ 0.09984		$ 0.10282	
Charlton Co Dist #2		$ 0.62740		$ 0.64653

Private Fire	Present Rate St Louis County	Present Rate All Other	Proposed Rate St Louis County	Proposed Rate All Other
2 or less - Meter	$ 6.00	$ 6.00	$ 8.70	$ 8.70
3 - Meter	$ 19.36	$ 19.36	$ 26.00	$ 26.00
4 - Meter	$ 23.85	$ 23.85	$ 34.60	$ 34.60
6 - Meter	$ 53.70	$ 53.70	$ 77.90	$ 77.90
8 - Meter	$ 95.55	$ 95.55	$ 138.50	$ 138.50
10 - Meter	$ 149.25	$ 149.25	$ 216.00	$ 216.00
12 - Meter	$ 214.94	$ 214.94	$ 311.20	$ 311.20
20 - Meter	$ 356.83	$ 356.83	$ 517.40	$ 517.40
Hydrant	$ 53.70	$ 53.70	$ 77.90	$ 77.90

Missouri-American Water Company
Case No.
Proposed Wastewater Rate Design

Arnold	Present	Proposed
Minimum Charge	$ 37.23	$ 37.50
Usage - 1st 5000 g	$ -	$ -
Usage - Over 5000 g	$ 0.7140	$ 0.7188

Other Tariffs	Present Rate Tarrif 2.1	Present Rate Tariff 3.1	Present Rate Tariff 3.2	Present Rate Tariff 4.1	Present Rate Eureka	Proposed Rate Tarrif 2.1	Tariff 3.1	Tariff 3.2	Proposed Rate Tariff 4.1	Proposed Rate Eureka
Minimum Charge	$ 61.64	$ 44.03	$ 65.00		$ 44.03	$ 66.70	$ 49.65	$ 66.70		$ 49.65
5/8 - Meter	$ 61.64	$ 44.03			$ 44.03	$ 66.70	$ 49.65			$ 49.65
3/4 - Meter	$ 80.19	$ 57.28			$ 57.28	$ 86.80	$ 64.60			$ 64.60
1 - Meter	$ 117.20	$ 83.71			$ 83.71	$ 126.80	$ 94.40			$ 94.40
1 1/2 - Meter	$ 209.79	$ 149.85			$ 149.85	$ 227.00	$ 169.00			$ 169.00
2 - Meter	$ 320.90	$ 229.22			$ 229.22	$ 347.20	$ 258.50			$ 258.50
3 - Meter	$ 565.37	$ 403.84			$ 403.84	$ 611.80	$ 455.40			$ 455.40
4 - Meter	$ 926.33	$ 661.66			$ 661.66	$ 1,002.40	$ 746.05			$ 746.05
Usage - 1st 6000 g	$ -	$ -			$ -	$ -	$ -			$ -
Usage - Over 6000 g	$ 1.0274	$ 0.7338			$ 0.7338	$ 1.0540	$ 0.8303			$ 0.8303
Minimum Charge - Residential				$ 38.75					$ 49.65	
Minimum Charge - Non Residential				$ 48.75					$ 49.65	
Monsees Lake	$ 58.00					$ 66.70				

Missouri-American Water Company
2022 General Rate Case
Water Affordability Summary - Bills for Basic Water Service (40 gallons per household member per day)

Income Level	Household Size	Water Service	Income	Customers	Bill Under Proposed Rates	BTI Ratio	--- Customers by FPL --- 0-50%	50%-100%	100%-150%	150%-200%	200%-250%	250%-300%	300%-350%	350%-400%	400%-450%	450%-500%	Over 500%
$0-$5k	1	1,200	$ 3,000	4,942	$ 22.28	8.9%	4,942	-	-	-	-	-	-	-	-	-	-
$0-$5k	2	2,400	$ 3,000	1,962	$ 32.56	13.0%	1,962	-	-	-	-	-	-	-	-	-	-
$0-$5k	3	3,600	$ 3,000	870	$ 42.84	17.1%	870	-	-	-	-	-	-	-	-	-	-
$0-$5k	4	4,800	$ 3,000	394	$ 53.12	21.2%	394	-	-	-	-	-	-	-	-	-	-
$0-$5k	5	6,000	$ 3,000	170	$ 63.40	25.4%	170	-	-	-	-	-	-	-	-	-	-
$0-$5k	6	7,200	$ 3,000	92	$ 73.68	29.5%	92	-	-	-	-	-	-	-	-	-	-
$0-$5k	7	8,400	$ 3,000	34	$ 83.96	33.6%	34	-	-	-	-	-	-	-	-	-	-
$5-$10k	1	1,200	$ 7,500	4,987	$ 22.28	3.6%	1,242	3,745	-	-	-	-	-	-	-	-	-
$5-$10k	2	2,400	$ 7,500	1,898	$ 32.56	5.2%	1,311	586	-	-	-	-	-	-	-	-	-
$5-$10k	3	3,600	$ 7,500	743	$ 42.84	6.9%	743	-	-	-	-	-	-	-	-	-	-
$5-$10k	4	4,800	$ 7,500	370	$ 53.12	8.5%	370	-	-	-	-	-	-	-	-	-	-
$5-$10k	5	6,000	$ 7,500	150	$ 63.40	10.1%	150	-	-	-	-	-	-	-	-	-	-
$5-$10k	6	7,200	$ 7,500	83	$ 73.68	11.8%	83	-	-	-	-	-	-	-	-	-	-
$5-$10k	7	8,400	$ 7,500	28	$ 83.96	13.4%	28	-	-	-	-	-	-	-	-	-	-
$10-$15k	1	1,200	$ 12,500	8,668	$ 22.28	2.1%	-	4,317	4,351	-	-	-	-	-	-	-	-
$10-$15k	2	2,400	$ 12,500	1,922	$ 32.56	3.1%	-	1,922	-	-	-	-	-	-	-	-	-
$10-$15k	3	3,600	$ 12,500	671	$ 42.84	4.1%	89	582	-	-	-	-	-	-	-	-	-
$10-$15k	4	4,800	$ 12,500	408	$ 53.12	5.1%	234	173	-	-	-	-	-	-	-	-	-
$10-$15k	5	6,000	$ 12,500	142	$ 63.40	6.1%	142	-	-	-	-	-	-	-	-	-	-
$10-$15k	6	7,200	$ 12,500	109	$ 73.68	7.1%	109	-	-	-	-	-	-	-	-	-	-
$10-$15k	7	8,400	$ 12,500	58	$ 83.96	8.1%	58	-	-	-	-	-	-	-	-	-	-
$15-$20k	1	1,200	$ 17,500	10,173	$ 22.28	1.5%	-	-	7,599	2,574	-	-	-	-	-	-	-
$15-$20k	2	2,400	$ 17,500	3,281	$ 32.56	2.2%	-	1,253	2,028	-	-	-	-	-	-	-	-
$15-$20k	3	3,600	$ 17,500	1,242	$ 42.84	2.9%	-	1,242	-	-	-	-	-	-	-	-	-
$15-$20k	4	4,800	$ 17,500	739	$ 53.12	3.6%	-	739	-	-	-	-	-	-	-	-	-
$15-$20k	5	6,000	$ 17,500	320	$ 63.40	4.3%	5	315	-	-	-	-	-	-	-	-	-
$15-$20k	6	7,200	$ 17,500	114	$ 73.68	5.1%	52	62	-	-	-	-	-	-	-	-	-
$15-$20k	7	8,400	$ 17,500	62	$ 83.96	5.8%	56	6	-	-	-	-	-	-	-	-	-
$20-$25k	1	1,200	$ 22,500	8,202	$ 22.28	1.2%	-	-	-	8,169	33	-	-	-	-	-	-
$20-$25k	2	2,400	$ 22,500	4,189	$ 32.56	1.7%	-	-	4,189	-	-	-	-	-	-	-	-
$20-$25k	3	3,600	$ 22,500	1,469	$ 42.84	2.3%	-	391	1,078	-	-	-	-	-	-	-	-
$20-$25k	4	4,800	$ 22,500	765	$ 53.12	2.8%	-	765	-	-	-	-	-	-	-	-	-
$20-$25k	5	6,000	$ 22,500	438	$ 63.40	3.4%	-	438	-	-	-	-	-	-	-	-	-
$20-$25k	6	7,200	$ 22,500	190	$ 73.68	3.9%	-	190	-	-	-	-	-	-	-	-	-
$20-$25k	7	8,400	$ 22,500	57	$ 83.96	4.5%	-	57	-	-	-	-	-	-	-	-	-
$25-$35k	1	1,200	$ 30,000	15,672	$ 22.28	0.9%	-	-	-	-	9,756	5,916	-	-	-	-	-
$25-$35k	2	2,400	$ 30,000	11,586	$ 32.56	1.3%	-	-	423	9,796	1,367	-	-	-	-	-	-
$25-$35k	3	3,600	$ 30,000	3,729	$ 42.84	1.7%	-	-	2,608	1,120	-	-	-	-	-	-	-
$25-$35k	4	4,800	$ 30,000	2,890	$ 53.12	2.1%	-	217	2,673	-	-	-	-	-	-	-	-
$25-$35k	5	6,000	$ 30,000	1,357	$ 63.40	2.5%	-	702	656	-	-	-	-	-	-	-	-
$25-$35k	6	7,200	$ 30,000	559	$ 73.68	2.9%	-	536	23	-	-	-	-	-	-	-	-
$25-$35k	7	8,400	$ 30,000	259	$ 83.96	3.4%	-	259	-	-	-	-	-	-	-	-	-
$35-$50k	1	1,200	$ 42,500	19,018	$ 22.28	0.6%	-	-	-	-	-	3,132	7,918	7,918	51	-	-
$35-$50k	2	2,400	$ 42,500	18,516	$ 32.56	0.9%	-	-	-	-	8,980	9,536	-	-	-	-	-
$35-$50k	3	3,600	$ 42,500	6,217	$ 42.84	1.2%	-	-	-	3,175	3,042	-	-	-	-	-	-
$35-$50k	4	4,800	$ 42,500	3,960	$ 53.12	1.5%	-	-	957	3,003	-	-	-	-	-	-	-
$35-$50k	5	6,000	$ 42,500	2,515	$ 63.40	1.8%	-	-	1,719	796	-	-	-	-	-	-	-
$35-$50k	6	7,200	$ 42,500	1,135	$ 73.68	2.1%	-	-	1,135	-	-	-	-	-	-	-	-
$35-$50k	7	8,400	$ 42,500	406	$ 83.96	2.4%	-	109	297	-	-	-	-	-	-	-	-
$50-$75k	1	1,200	$ 62,500	21,189	$ 22.28	0.4%	-	-	-	-	-	-	-	-	5,259	5,293	10,637
$50-$75k	2	2,400	$ 62,500	29,587	$ 32.56	0.6%	-	-	-	-	-	864	10,006	10,006	8,710	-	-
$50-$75k	3	3,600	$ 62,500	11,357	$ 42.84	0.8%	-	-	-	-	1,510	4,845	4,845	157	-	-	-
$50-$75k	4	4,800	$ 62,500	8,800	$ 53.12	1.0%	-	-	-	528	4,532	3,740	-	-	-	-	-
$50-$75k	5	6,000	$ 62,500	4,038	$ 63.40	1.2%	-	-	-	1,670	2,368	-	-	-	-	-	-
$50-$75k	6	7,200	$ 62,500	1,697	$ 73.68	1.4%	-	-	128	1,174	395	-	-	-	-	-	-
$50-$75k	7	8,400	$ 62,500	1,020	$ 83.96	1.6%	-	-	348	673	-	-	-	-	-	-	-
$75-$100k	1	1,200	$ 87,500	10,951	$ 22.28	0.3%	-	-	-	-	-	-	-	-	-	-	10,951
$75-$100k	2	2,400	$ 87,500	23,499	$ 32.56	0.4%	-	-	-	-	-	-	-	-	1,029	7,947	14,522
$75-$100k	3	3,600	$ 87,500	10,191	$ 42.84	0.6%	-	-	-	-	-	-	-	4,207	4,348	1,637	-
$75-$100k	4	4,800	$ 87,500	8,262	$ 53.12	0.7%	-	-	-	-	-	744	4,255	3,264	-	-	-
$75-$100k	5	6,000	$ 87,500	3,627	$ 63.40	0.9%	-	-	-	-	62	2,188	1,377	-	-	-	-
$75-$100k	6	7,200	$ 87,500	1,460	$ 73.68	1.0%	-	-	-	-	670	790	-	-	-	-	-
$75-$100k	7	8,400	$ 87,500	856	$ 83.96	1.2%	-	-	-	103	668	85	-	-	-	-	-
$100-$150k	1	1,200	$ 125,000	7,273	$ 22.28	0.2%	-	-	-	-	-	-	-	-	-	-	7,273
$100-$150k	2	2,400	$ 125,000	29,933	$ 32.56	0.3%	-	-	-	-	-	-	-	-	-	-	29,933
$100-$150k	3	3,600	$ 125,000	14,472	$ 42.84	0.4%	-	-	-	-	-	-	-	-	-	1,925	12,547
$100-$150k	4	4,800	$ 125,000	12,888	$ 53.12	0.5%	-	-	-	-	-	-	-	773	3,319	3,319	5,477
$100-$150k	5	6,000	$ 125,000	5,905	$ 63.40	0.6%	-	-	-	-	-	-	661	1,781	1,781	1,681	-
$100-$150k	6	7,200	$ 125,000	2,206	$ 73.68	0.7%	-	-	-	-	-	166	763	763	513	-	-
$100-$150k	7	8,400	$ 125,000	1,217	$ 83.96	0.8%	-	-	-	-	-	415	475	328	-	-	-
Over $150k	1	1,200	$ 200,000	4,800	$ 22.28	0.1%	-	-	-	-	-	-	-	-	-	-	4,800
Over $150k	2	2,400	$ 200,000	27,523	$ 32.56	0.2%	-	-	-	-	-	-	-	-	-	-	27,523
Over $150k	3	3,600	$ 200,000	15,661	$ 42.84	0.3%	-	-	-	-	-	-	-	-	-	-	15,661
Over $150k	4	4,800	$ 200,000	16,938	$ 53.12	0.3%	-	-	-	-	-	-	-	-	-	-	16,938
Over $150k	5	6,000	$ 200,000	7,159	$ 63.40	0.4%	-	-	-	-	-	-	-	-	-	61	7,098
Over $150k	6	7,200	$ 200,000	2,414	$ 73.68	0.4%	-	-	-	-	-	-	-	-	137	417	1,860
Over $150k	7	8,400	$ 200,000	1,373	$ 83.96	0.5%	-	-	-	-	-	-	-	83	268	268	755
							13,136	18,606	30,212	32,781	33,383	32,420	30,299	29,280	25,415	22,548	165,975

Notes: 1 - Average Monthly Bills for Basic Water Service do not reflect current or porposed low income discounts

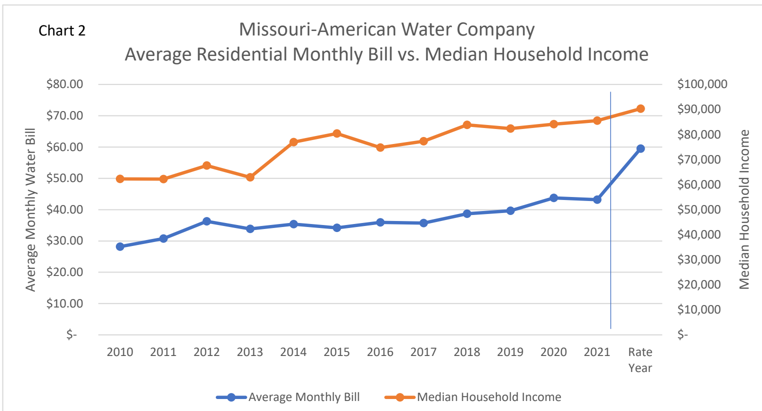
Missouri-American Water Company
2022 General Rate Case
Water Affordability by Community - Bills for Basic Water Service (40 gallons per household member per day)

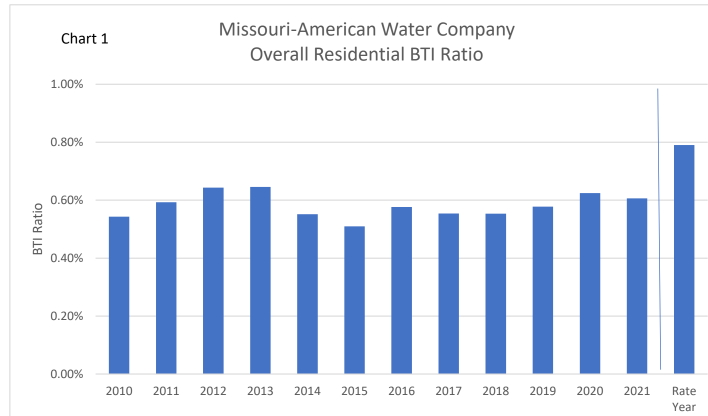
							--- Customers by FPL ---										
Zip Code	City	Rate Zone	Customers	Median Household Income	Avg. Monthly Bill Basic Service	BTI Ratio	0-50%	50%-100%	100%-150%	150%-200%	200%-250%	250%-300%	300%-350%	350%-400%	400%-450%	450%-500%	Over 500%
63005	Chesterfield	St. Louis County	5,677	$ 176,644	$ 28.34	0.19%	61	71	105	127	150	164	171	188	182	207	4,252
63011	Ballwin	St. Louis County	12,799	$ 111,538	$ 27.16	0.29%	154	214	465	569	636	679	710	744	695	711	7,221
63017	Chesterfield	St. Louis County	13,039	$ 128,269	$ 27.44	0.26%	238	239	451	588	539	558	582	602	595	591	8,057
63021	Ballwin	St. Louis County	18,343	$ 99,020	$ 26.86	0.33%	196	336	739	927	1,095	1,141	1,171	1,179	1,082	1,036	9,440
63025	Eureka	St. Louis County	273	$ 115,933	$ 27.30	0.28%	4	5	8	10	12	13	15	15	16	15	159
63026	Fenton	St. Louis County	8,820	$ 87,738	$ 26.35	0.36%	143	274	462	520	524	552	602	605	586	565	3,988
63031	Florissant	St. Louis County	17,242	$ 66,924	$ 25.44	0.46%	445	626	1,244	1,441	1,502	1,486	1,415	1,358	1,158	1,008	5,559
63033	Florissant	St. Louis County	13,805	$ 61,034	$ 25.11	0.49%	462	642	1,170	1,296	1,185	1,171	1,103	1,067	896	794	4,020
63034	Florissant	St. Louis County	6,667	$ 95,016	$ 26.60	0.34%	211	154	222	289	368	407	459	472	455	447	3,181
63038	Glencoe	St. Louis County	1,830	$ 150,250	$ 27.95	0.22%	5	27	45	58	66	68	72	76	78	82	1,253
63040	Grover	St. Louis County	2,794	$ 125,951	$ 27.58	0.26%	7	37	76	93	119	127	140	150	153	160	1,732
63042	Hazelwood	St. Louis County	5,297	$ 52,612	$ 24.54	0.56%	213	301	449	564	603	561	481	437	342	254	1,092
63043	Maryland Heights	St. Louis County	7,178	$ 72,940	$ 25.79	0.42%	153	206	445	513	572	588	586	569	491	440	2,615
63044	Bridgeton	St. Louis County	3,355	$ 74,195	$ 25.73	0.42%	101	129	207	247	267	263	249	245	211	196	1,239
63049	High Ridge	St. Louis County	489	$ 75,205	$ 25.85	0.41%	9	18	33	37	35	36	36	35	32	30	189
63074	Saint Ann	St. Louis County	5,346	$ 55,521	$ 24.31	0.53%	221	346	559	566	544	512	502	431	402	269	992
63088	Valley Park	St. Louis County	2,445	$ 68,123	$ 25.67	0.45%	54	92	191	212	199	197	182	169	139	110	899
63105	Saint Louis	St. Louis County	2,891	$ 166,101	$ 27.96	0.20%	101	45	50	63	88	92	103	105	114	112	2,016
63114	Saint Louis	St. Louis County	13,515	$ 48,932	$ 24.28	0.60%	669	884	1,418	1,463	1,482	1,351	1,135	1,049	829	662	2,572
63117	Saint Louis	St. Louis County	3,222	$ 103,834	$ 26.85	0.31%	96	69	124	165	156	171	190	192	185	176	1,698
63119	Saint Louis	St. Louis County	11,503	$ 99,920	$ 26.88	0.32%	176	233	444	578	662	672	703	701	681	649	6,003
63120	Saint Louis	St. Louis County	274	$ 27,734	$ 22.67	0.98%	31	43	47	39	27	21	13	12	9	6	26
63121	Saint Louis	St. Louis County	8,403	$ 44,527	$ 23.88	0.64%	613	698	970	969	914	837	669	616	434	332	1,350
63122	Saint Louis	St. Louis County	4,420	$ 116,446	$ 27.10	0.28%	76	102	171	198	220	230	238	242	228	220	2,495
63123	Saint Louis	St. Louis County	17,735	$ 67,288	$ 25.40	0.45%	573	796	1,217	1,399	1,517	1,506	1,417	1,382	1,149	1,050	5,730
63124	Saint Louis	St. Louis County	3,645	$ 183,839	$ 28.19	0.18%	81	19	62	90	102	117	131	137	132	142	2,634
63125	Saint Louis	St. Louis County	10,960	$ 57,776	$ 24.77	0.51%	344	565	961	1,080	1,151	1,082	956	894	728	600	2,599
63126	Saint Louis	St. Louis County	6,028	$ 84,775	$ 26.35	0.37%	74	165	304	346	390	409	436	434	407	385	2,677
63127	Saint Louis	St. Louis County	1,846	$ 118,822	$ 26.98	0.27%	55	63	81	90	84	84	87	87	88	83	1,043
63128	Saint Louis	St. Louis County	10,514	$ 86,147	$ 26.28	0.37%	133	329	625	654	700	720	715	721	637	614	4,667
63129	Saint Louis	St. Louis County	17,337	$ 90,212	$ 26.51	0.35%	286	437	836	1,007	1,114	1,138	1,143	1,150	1,050	1,001	8,175
63130	Saint Louis	St. Louis County	9,702	$ 89,355	$ 26.26	0.35%	464	381	527	540	610	614	578	568	477	440	4,503
63131	Saint Louis	St. Louis County	6,543	$ 176,891	$ 28.15	0.19%	148	83	130	168	191	200	200	221	216	241	4,746
63132	Saint Louis	St. Louis County	4,526	$ 90,470	$ 26.18	0.35%	149	185	273	282	308	297	282	267	245	206	2,031
63133	Saint Louis	St. Louis County	2,240	$ 26,228	$ 22.41	1.03%	327	379	360	300	234	182	108	94	62	35	159
63134	Saint Louis	St. Louis County	4,823	$ 39,955	$ 23.57	0.71%	220	460	617	655	594	516	413	354	280	174	540
63135	Saint Louis	St. Louis County	7,519	$ 48,151	$ 24.34	0.61%	449	488	836	834	777	689	566	516	428	321	1,614
63136	Saint Louis	St. Louis County	13,457	$ 38,061	$ 23.37	0.74%	885	1,365	2,022	1,891	1,535	1,300	943	846	615	428	1,627
63137	Saint Louis	St. Louis County	6,828	$ 44,604	$ 23.76	0.64%	410	587	893	822	762	668	543	477	387	262	1,017
63138	Saint Louis	St. Louis County	5,340	$ 50,279	$ 24.26	0.58%	243	432	645	616	541	484	391	358	283	211	1,138
63140	Saint Louis	St. Louis County	56	$ 29,565	$ 22.97	0.93%	3	4	9	12	12	8	2	2	1	1	3
63141	Saint Louis	St. Louis County	5,994	$ 139,045	$ 27.50	0.24%	55	101	225	248	291	278	275	268	271	250	3,731
63143	Saint Louis	St. Louis County	2,444	$ 66,893	$ 25.15	0.45%	88	156	225	211	191	184	167	165	137	132	787
63144	Saint Louis	St. Louis County	2,936	$ 90,873	$ 26.50	0.35%	74	47	119	158	190	202	218	211	198	175	1,344
63146	Saint Louis	St. Louis County	8,139	$ 86,491	$ 26.32	0.37%	164	226	418	500	530	559	569	567	500	466	3,640
		St. Louis County	318,239	$ 84,381	$ 25.85	0.37%	9,664	13,060	21,483	23,434	23,792	23,132	21,666	20,976	18,285	16,292	126,455
63301	Saint Charles	Other	1,824	$ 71,815	$ 27.57	0.46%	48	65	115	140	147	145	140	135	118	103	667
63303	Saint Charles	Other	5,804	$ 88,436	$ 28.47	0.39%	70	145	263	322	382	393	395	398	358	347	2,731
63304	Saint Charles	Other	13,125	$ 100,756	$ 28.99	0.35%	196	165	386	563	747	795	839	869	814	817	6,936
63336	Clarksville	Other	11	$ 60,242	$ 26.85	0.53%	0	1	1	1	1	1	1	1	1	0	3
63348	Foristell	Other	716	$ 97,106	$ 28.84	0.36%	18	9	17	29	41	45	50	51	48	47	362
63362	Moscow Mills	Other	158	$ 79,349	$ 27.65	0.42%	5	7	10	10	10	11	11	11	11	10	61
63366	O Fallon	Other	244	$ 83,879	$ 28.24	0.40%	4	5	11	15	16	17	19	18	17	15	105
63367	Lake Saint Louis	Other	11	$ 105,550	$ 29.14	0.33%	0	0	0	0	1	1	1	1	1	1	6
63368	O Fallon	Other	1,404	$ 110,690	$ 29.19	0.32%	8	20	47	64	68	73	81	85	84	84	789
63373	Portage Des Sioux	Other	1	$ 77,058	$ 27.69	0.43%	0	0	0	0	0	0	0	0	0	0	0
63376	Saint Peters	Other	7,383	$ 87,292	$ 28.30	0.39%	108	168	363	450	476	499	521	528	486	473	3,311
63448	La Grange	Other	1	$ 51,996	$ 26.34	0.61%	0	0	0	0	0	0	0	0	0	0	0
63664	Potosi	Other	78	$ 43,235	$ 25.47	0.71%	4	8	10	9	8	7	6	5	4	3	13
64014	Blue Springs	Other	1	$ 84,793	$ 28.15	0.40%	0	0	0	0	0	0	0	0	0	0	0
64062	Lawson	Other	901	$ 69,443	$ 27.41	0.47%	9	37	66	55	71	76	81	77	67	57	304
64093	Warrensburg	Other	6,888	$ 67,222	$ 27.11	0.48%	220	358	494	497	571	573	570	542	483	412	2,169
64113	Kansas City	Other	1	$ 137,632	$ 29.96	0.26%	0	0	0	0	0	0	0	0	0	0	1
64129	Kansas City	Other	1	$ 45,768	$ 25.56	0.67%	0	0	0	0	0	0	0	0	0	0	0
64150	Riverside	Other	752	$ 78,942	$ 27.45	0.42%	22	38	75	67	58	50	36	38	32	34	302
64151	Kansas City	Other	777	$ 85,275	$ 28.26	0.40%	14	23	40	47	52	52	52	52	49	46	350
64152	Kansas City	Other	4,518	$ 103,678	$ 28.93	0.33%	49	76	154	219	283	297	282	293	240	247	2,379
64401	Agency	Other	402	$ 69,285	$ 27.39	0.47%	2	10	29	39	43	37	31	30	27	24	131
64439	Dearborn	Other	89	$ 77,578	$ 27.81	0.43%	2	3	5	6	7	7	7	7	6	6	34
64440	De Kalb	Other	23	$ 71,951	$ 26.77	0.45%	1	2	2	1	1	1	2	2	1	1	8
64448	Faucett	Other	421	$ 63,085	$ 26.84	0.51%	33	19	26	23	35	37	39	36	31	25	119
64501	Saint Joseph	Other	3,337	$ 42,491	$ 25.25	0.71%	305	317	407	383	326	301	251	234	173	144	498
64503	Saint Joseph	Other	4,477	$ 51,039	$ 26.27	0.62%	111	286	472	469	510	449	361	333	268	213	1,004
64504	Saint Joseph	Other	3,753	$ 51,744	$ 26.16	0.61%	129	248	369	425	405	369	322	288	241	176	781
64505	Saint Joseph	Other	3,836	$ 59,472	$ 26.70	0.54%	132	248	377	333	332	320	288	274	227	189	1,115
64506	Saint Joseph	Other	7,483	$ 70,105	$ 27.35	0.47%	249	354	542	592	569	558	539	526	472	430	2,651
64507	Saint Joseph	Other	4,645	$ 58,873	$ 26.62	0.54%	111	309	506	417	390	371	344	332	294	261	1,310
64801	Joplin	Other	9,633	$ 49,996	$ 26.04	0.63%	471	841	1,067	1,020	895	830	687	658	495	436	2,234
64804	Joplin	Other	12,266	$ 56,393	$ 26.59	0.57%	508	722	1,079	1,184	1,196	1,119	1,011	908	773	564	3,202
64840	Diamond	Other	7	$ 63,321	$ 27.06	0.51%	0	0	0	1	1	1	1	1	0	0	2
64850	Neosho	Other	167	$ 54,473	$ 26.32	0.58%	6	10	16	19	19	17	13	13	10	8	38
64865	Seneca	Other	43	$ 47,742	$ 25.85	0.65%	2	3	5	5	5	4	4	3	2	2	8
64870	Webb City	Other	256	$ 56,037	$ 26.53	0.57%	6	15	24	25	27	25	22	20	16	13	63
65018	California	Other	49	$ 62,565	$ 26.94	0.52%	2	3	4	4	4	4	4	4	3	3	15
65032	Eugene	Other	82	$ 84,766	$ 27.60	0.39%	4	3	4	6	4	5	6	6	5	6	32
65101	Jefferson City	Other	4,735	$ 69,005	$ 27.44	0.48%	116	162	292	366	398	402	401	379	334	281	1,605
65109	Jefferson City	Other	4,801	$ 73,259	$ 27.59	0.45%	131	172	297	347	364	372	377	365	329	292	1,756
65202	Columbia	Other	1	$ 65,302	$ 27.02	0.50%	0	0	0	0	0	0	0	0	0	0	0
65236	Brunswick	Other	321	$ 47,762	$ 25.67	0.64%	15	37	45	32	29	26	20	20	14	14	71
65265	Mexico	Other	4,338	$ 45,598	$ 25.29	0.67%	168	293	506	549	509	444	331	306	220	165	847
65301	Sedalia	Other	355	$ 50,567	$ 26.03	0.62%	15	25	40	41	35	33	28	26	20	16	76
65355	Warsaw	Other	133	$ 40,154	$ 25.50	0.76%	6	11	17	18	16	14	10	9	6	5	21
65616	Branson	Other	3,130	$ 56,140	$ 26.55	0.57%	68	182	307	315	307	288	259	241	203	165	796
65630	Chestnutridge	Other	129	$ 99,375	$ 29.33	0.35%	-	0	1	3	6	7	9	10	10	12	70
65637	Dora	Other	2	$ 30,593	$ 24.78	0.97%	0	0	0	0	0	0	0	0	0	0	0
65672	Hollister	Other	723	$ 51,202	$ 26.37	0.62%	27	45	66	76	73	69	60	56	45	36	170
65686	Kimberling City	Other	173	$ 62,069	$ 27.14	0.52%	5	12	15	15	13	12	12	11	10	8	61
65721	Ozark	Other	91	$ 65,155	$ 27.05	0.50%	3	4	7	8	8	8	8	7	6	5	27
65737	Reeds Spring	Other	663	$ 49,097	$ 26.05	0.64%	30	44	80	76	66	59	51	45	39	27	145
65738	Republic	Other	87	$ 61,558	$ 26.87	0.52%	3	5	6	8	8	8	7	7	6	5	24
65747	Shell Knob	Other	468	$ 40,192	$ 25.63	0.77%	36	31	61	50	53	48	36	34	20	16	84
65754	Spokane	Other	52	$ 64,892	$ 26.55	0.49%	3	4	3	4	5	4	5	4	4	3	13
67060	Haysville	Other	1	$ 60,895	$ 26.92	0.53%	0	0	0	0	0	0	0	0	0	0	0
		Other	115,771	$ 69,747	$ 27.24	0.47%	3,472	5,546	8,728	9,348	9,590	9,284	8,629	8,299	7,125	6,248	39,500

Notes: 1 - Average Monthly Bills for Basic Water Service do not reflect current or proposed low income discounts

Missouri-American Water Company
2022 General Rate Case
Historical Water Affordability

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rate Year
MO Revenue	$ 141,267,228	$ 154,084,017	$ 182,439,094	$ 172,053,851	$ 179,670,809	$ 174,130,824	$ 183,937,731	$ 183,626,565	$ 199,951,336	$ 205,328,788	$ 227,963,883	$ 225,280,295	$ 314,829,884
MO Customers	417,693	417,705	419,449	423,430	423,208	424,515	426,650	428,788	431,003	431,738	433,979	434,592	441,002
MO Median Income	$ 45,817	$ 45,774	$ 49,764	$ 46,303	$ 56,630	$ 59,196	$ 55,016	$ 56,885	$ 61,726	$ 60,597	$ 61,901	$ 62,953	$ 66,456
MO Customer Median Income	$ 62,262	$ 62,203	$ 67,626	$ 62,922	$ 76,956	$ 80,443	$ 74,763	$ 77,302	$ 83,881	$ 82,347	$ 84,119	$ 85,549	$ 90,309
MO Average Monthly Bill	$ 28.18	$ 30.74	$ 36.25	$ 33.86	$ 35.38	$ 34.18	$ 35.93	$ 35.69	$ 38.66	$ 39.63	$ 43.77	$ 43.20	$ 59.49
MO BTI Ratio	0.54%	0.59%	0.64%	0.65%	0.55%	0.51%	0.58%	0.55%	0.55%	0.58%	0.62%	0.61%	0.79%





Note 1: Table H-8 Median Household Income by State: 1984 to 2020 U.S. Census Bureau
Note 2: 1.3589 MO adjustment factor to reflect the difference between statewide income and income for MO customers

2022 Missouri-American Water Company General Rate Case
Residential Usage Analysis - St. Louis County

REGRESSION MODEL

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9401
R Square	0.8838
Adjusted R Squ	0.8658
Standard Error	0.6471
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16	328.149	20.509	48.971	9.8273E-41
Residual	103	43.137	0.419		
Total	119	371.286			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	5.5139	0.2620	21.0437	0.0000	4.9943	6.0336
Jan	-0.4343	0.2903	-1.4961	0.1377	-1.0099	0.1414
Feb	-0.8408	0.2904	-2.8955	0.0046	-1.4168	-0.2649
Mar	-0.7148	0.2906	-2.4602	0.0155	-1.2911	-0.1386
April	-0.9710	0.2903	-3.3449	0.0011	-1.5467	-0.3952
May	-0.5515	0.2899	-1.9024	0.0599	-1.1264	0.0234
Jun	0.4574	0.2898	1.5786	0.1175	-0.1173	1.0321
Jul	1.2015	0.2917	4.1190	0.0001	0.6230	1.7801
Aug	2.7991	0.2917	9.5953	0.0000	2.2205	3.3776
Sep	3.0006	0.2917	10.2856	0.0000	2.4221	3.5792
Oct	2.2581	0.2918	7.7393	0.0000	1.6795	2.8368
Nov	0.2635	0.2894	0.9106	0.3646	-0.3105	0.8375
Trend	-0.0096	0.0024	-4.0971	0.0001	-0.0143	-0.0050
Drought	2.3629	0.3816	6.1922	0.0000	1.6061	3.1197
Rain	-0.2360	0.0570	-4.1401	0.0001	-0.3491	-0.1230
CDD	0.0017	0.0017	1.0271	0.3068	-0.0016	0.0050
COVID	0.1309	0.2062	0.6349	0.5269	-0.2780	0.5398

2022 Missouri-American Water Company General Rate Case
Residential Usage Analysis - Non St. Louis County

REGRESSION MODEL

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9533
R Square	0.9088
Adjusted R Squ	0.8946
Standard Error	0.3993
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16	163.665	10.229	64.155	4.55763E-46
Residual	103	16.423	0.159		
Total	119	180.088			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3.4487	0.1616	21.3373	0.0000	3.1281	3.7692
Jan	0.3930	0.1791	2.1942	0.0305	0.0378	0.7482
Feb	-0.1306	0.1792	-0.7289	0.4677	-0.4860	0.2248
Mar	-0.1585	0.1793	-0.8843	0.3786	-0.5141	0.1970
April	0.0249	0.1790	0.1390	0.8897	-0.3301	0.3798
May	0.3261	0.1789	1.8231	0.0712	-0.0286	0.6809
Jun	1.6051	0.1788	8.9775	0.0000	1.2505	1.9596
Jul	2.3800	0.1800	13.2221	0.0000	2.0230	2.7370
Aug	2.5751	0.1800	14.3060	0.0000	2.2181	2.9321
Sep	1.9973	0.1800	11.0951	0.0000	1.6403	2.3543
Oct	1.2554	0.1800	6.9730	0.0000	0.8984	1.6125
Nov	0.2525	0.1786	1.4139	0.1604	-0.1017	0.6067
Trend	-0.0082	0.0015	-5.6620	0.0000	-0.0111	-0.0053
Drought	0.9512	0.2361	4.0282	0.0001	0.4829	1.4196
Rain (Diff)	-0.2358	0.0388	-6.0778	0.0000	-0.3127	-0.1588
CDD (Diff)	0.0064	0.0011	5.8139	0.0000	0.0042	0.0086
COVID	0.3305	0.1270	2.6030	0.0106	0.0787	0.5823

2022 Missouri-American Water Company General Rate Case
Commercial Usage Analysis - St. Louis County

REGRESSION MODEL

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9627
R Square	0.9268
Adjusted R Squ	0.9154
Standard Error	3.6972
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16	17827.227	1114.202	81.509	6.32083E-51
Residual	103	1407.973	13.670		
Total	119	19235.200			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	35.4462	1.4988	23.6493	0.0000	32.4736	38.4187
Jan	-5.8703	1.6583	-3.5398	0.0006	-9.1592	-2.5813
Feb	-7.4899	1.6591	-4.5144	0.0000	-10.7804	-4.1994
Mar	-4.2091	1.6600	-2.5355	0.0127	-7.5013	-0.9168
Apr	-5.9039	1.6583	-3.5603	0.0006	-9.1927	-2.6151
May	-3.6235	1.6562	-2.1879	0.0309	-6.9081	-0.3389
Jun	5.7794	1.6554	3.4912	0.0007	2.4962	9.0625
Jul	13.8002	1.6659	8.2837	0.0000	10.4962	17.1042
Aug	27.9224	1.6660	16.7603	0.0000	24.6183	31.2265
Sep	21.0292	1.6661	12.6215	0.0000	17.7248	24.3336
Oct	15.4621	1.6664	9.2787	0.0000	12.1572	18.7671
Nov	7.2129	1.6535	4.3622	0.0000	3.9336	10.4923
Trend	-0.0104	0.0135	-0.7686	0.4439	-0.0371	0.0164
Drought	8.0196	2.1408	3.7461	0.0003	3.7738	12.2654
Rain	-1.3041	0.2534	-5.1457	0.0000	-1.8068	-0.8015
CDD	0.0430	0.0109	3.9349	0.0002	0.0213	0.0647
COVID	-3.4180	1.1809	-2.8945	0.0046	-5.7600	-1.0760

2022 Missouri-American Water Company General Rate Case
Commercial Usage Analysis - Non St. Louis County

REGRESSION MODEL

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9530
R Square	0.9082
Adjusted R Squ	0.8940
Standard Error	1.7158
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16	3001.769	187.611	63.724	6.21892E-46
Residual	103	303.242	2.944		
Total	119	3305.012			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	21.5573	0.6997	30.8075	0.0000	20.1695	22.9450
Jan	-0.2267	0.7761	-0.2920	0.7709	-1.7660	1.3127
Feb	-1.1466	0.7700	-1.4890	0.1395	-2.6737	0.3806
Mar	-0.3096	0.7704	-0.4018	0.6886	-1.8375	1.2184
Apr	1.0907	0.7692	1.4180	0.1592	-0.4348	2.6163
May	0.9352	0.7687	1.2167	0.2265	-0.5892	2.4596
Jun	5.5597	0.7683	7.2364	0.0000	4.0360	7.0834
Jul	10.2487	0.7719	13.2769	0.0000	8.7178	11.7796
Aug	12.6180	0.7719	16.3457	0.0000	11.0870	14.1489
Sep	10.6228	0.7720	13.7598	0.0000	9.0917	12.1539
Oct	7.3491	0.7721	9.5177	0.0000	5.8177	8.8805
Nov	1.3967	0.7674	1.8201	0.0717	-0.1252	2.9186
Trend	0.0077	0.0064	1.2068	0.2303	-0.0049	0.0203
Drought	2.1248	0.8964	2.3703	0.0196	0.3469	3.9026
Rain (Diff)	-0.5815	0.1321	-4.4005	0.0000	-0.8436	-0.3194
CDD (Diff)	0.0234	0.0054	4.3045	0.0000	0.0126	0.0342
COVID	-0.6231	0.5496	-1.1337	0.2595	-1.7132	0.4669

2022 Missouri-American Water Company General Rate Case
OPA Usage Analysis - St. Louis County

REGRESSION MODEL

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9345
R Square	0.8733
Adjusted R Squ	0.8536
Standard Error	11.3177
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16	90900.762	5681.298	44.354	7.99777E-39
Residual	103	13193.375	128.091		
Total	119	104094.137			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	41.9364	4.5898	9.1368	0.0000	32.8335	51.0393
Jan	-22.0107	5.0764	-4.3359	0.0000	-32.0786	-11.9428
Feb	-20.2464	5.0788	-3.9864	0.0001	-30.3191	-10.1738
Mar	-10.9965	5.0816	-2.1640	0.0328	-21.0746	-0.9184
Apr	-24.8516	5.0753	-4.8966	0.0000	-34.9173	-14.7859
May	-11.9491	5.0698	-2.3569	0.0203	-22.0038	-1.8944
Jun	16.5533	5.0675	3.2666	0.0015	6.5031	26.6035
Jul	29.9510	5.1002	5.8725	0.0000	19.8359	40.0661
Aug	60.2884	5.1004	11.8204	0.0000	50.1730	70.4038
Sep	34.1208	5.1008	6.6893	0.0000	24.0046	44.2371
Oct	28.9290	5.1016	5.6706	0.0000	18.8111	39.0468
Nov	8.0136	5.0616	1.5832	0.1164	-2.0250	18.0521
Trend	0.0134	0.0413	0.3252	0.7457	-0.0684	0.0953
Drought	17.4370	6.5933	2.6447	0.0095	4.3607	30.5132
Rain (Diff)	-2.9459	0.8447	-3.4877	0.0007	-4.6211	-1.2708
CDD (Diff)	0.1287	0.0343	3.7572	0.0003	0.0608	0.1967
COVID	-6.5469	3.6182	-1.8094	0.0733	-13.7228	0.6290

2022 Missouri-American Water Company General Rate Case
OPA Usage Analysis - Non St. Louis County

REGRESSION MODEL

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9077
R Square	0.8239
Adjusted R Squ	0.7965
Standard Error	5.8593
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16	16539.579	1033.724	30.110	1.23224E-31
Residual	103	3536.115	34.331		
Total	119	20075.694			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	41.4706	2.3753	17.4592	0.0000	36.7598	46.1815
Jan	-1.9713	2.6281	-0.7501	0.4549	-7.1835	3.2409
Feb	-0.1060	2.6293	-0.0403	0.9679	-5.3206	5.1086
Mar	0.4184	2.6307	0.1591	0.8739	-4.7990	5.6359
Apr	1.6834	2.6264	0.6409	0.5230	-3.5254	6.8921
May	5.4476	2.6247	2.0755	0.0404	0.2420	10.6531
Jun	14.1667	2.6235	5.3999	0.0000	8.9636	19.3697
Jul	22.9036	2.6405	8.6739	0.0000	17.6668	28.1405
Aug	28.1250	2.6406	10.6511	0.0000	22.8881	33.3620
Sep	26.3725	2.6408	9.9866	0.0000	21.1351	31.6099
Oct	23.4004	2.6412	8.8598	0.0000	18.1622	28.6386
Nov	6.7026	2.6204	2.5578	0.0120	1.5055	11.8996
Trend	-0.0175	0.0214	-0.8191	0.4146	-0.0599	0.0249
Drought	2.2530	3.4152	0.6597	0.5109	-4.5202	9.0263
Rain (Diff)	-1.9477	0.4889	-3.9838	0.0001	-2.9174	-0.9781
CDD (Diff)	0.0325	0.0190	1.7095	0.0904	-0.0052	0.0701
COVID	-3.7743	1.8691	-2.0193	0.0461	-7.4812	-0.0673

Resolution Endorsing Consideration of Alternative Regulation that Supports Capital Investment in the 21st Century for Water and Wastewater Utilities

WHEREAS, Through the *Resolution Supporting Consideration of Regulatory Policies Deemed as "Best Practices"* (2005), the National Association of Regulatory Utility Commissioners (NARUC) has previously recognized the important role of innovative regulatory policies and mechanisms in facilitating the efforts of water and wastewater utilities to address their significant infrastructure investment challenges; *and*

WHEREAS, Traditional cost of service ratemaking, which has worked reasonably well in the past for water and wastewater utilities, no longer adequately addresses the challenges of today and tomorrow. Revenue, driven by declining use per customer, is flat to decreasing, while the nature of investment (rate base) has shifted largely from plant needed for serving new customers to non-revenue producing infrastructure replacement and compliance with new drinking water standards; *and*

WHEREAS, The traditional cost of service model is not well adapted to a no/low growth, high investment utility environment and is unlikely to encourage the necessary future investment in infrastructure replacement; *and*

WHEREAS, Compared to the water and wastewater industry, the electric and natural gas delivery industries have in place a larger number and a greater variety of alternative regulation policies, such as multiyear rate plans and rate stabilization programs, and those set forth in the 2005 Resolution; *and*

WHEREAS, The U.S. water industry is the most capital intensive sector of regulated utilities and faces critical investment needs that are expected to total $335 billion to $1 trillion over the next quarter century, as noted in the *American Society of Civil Engineers 2013 Report Card for America's Infrastructure*; *and*

WHEREAS, Tap water is physically ingested and the quality of the service must be maintained to protect the health and economic well-being of communities across our Nation and comply with current and future regulations covering the control of a number of contaminants from nitrosamines to chromium, at a cost estimated at $42 billion by the EPA as part of their April 2013 Report to Congress; *and*

WHEREAS, Alternative regulatory mechanisms can enhance the efficiency and effectiveness of water and wastewater utility regulation by reducing regulatory costs, increasing rates for customers, when necessary, on a more gradual basis; and providing the predictability and regulatory certainty that supports the attraction of debt and equity capital at reasonable costs and maintains that access at all times; *now, therefore be it*

RESOLVED, That the National Association of Regulatory Utility Commissioners, convened at its 125th Annual Meeting in Orlando, Florida, supports consideration of alternative regulation plans and mechanisms along with and in addition to the policies and mechanisms outlined in the