TENNESSEE-AMERICAN WATER COMPANY, INC.

DOCKET NO. 24-00032

DIRECT TESTIMONY

OF

ANN E. BULKLEY

ON

COST OF CAPITAL AND CAPITAL STRUCTURE

SPONSORING PETITIONER'S EXHIBITS:

Exhibit AEB-1
Exhibit AEB-2- Summary of Results
Exhibit AEB-3- Proxy Group
Exhibit AEB-4- Constant DCF
Exhibit AEB-5- CAPM and ECAPM
Exhibit AEB-6- Long-Term Beta
Exhibit AEB-7- Market Return
Exhibit AEB-8- Flotation Costs
Exhibit AEB-9- Regulatory Risk
Exhibit AEB-10- Size Premium
Exhibit AEB-11- Capital Structure

DIRECT TESTIMONY
ANN E. BULKLEY
TENNESSEE AMERICAN WATER COMPANY
DOCKET NO. 24-XXXXXX

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.

A. My name is Ann E. Bulkley. I am employed by The Brattle Group ("Brattle") as a Principal. My business address is One Beacon Street, Suite 2600, Boston, Massachusetts 02108.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS TESTIMONY?

A. I am submitting this testimony to the Tennessee Public Utility Commission ("Commission" or "TPUC") on behalf of Tennessee-American Water Company ("Tennessee-American" or the "Company"), a wholly-owned subsidiary of American Water Works Company, Inc. ("AWK" or "American Water").

Q. PLEASE DESCRIBE YOUR BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I hold a Bachelor's degree in Economics and Finance from Simmons College and a Master's degree in Economics from Boston University, with more than 25 years of experience consulting to the energy and utility industry. I have advised numerous energy and utility clients on a wide range of financial and economic issues with primary concentrations in valuation and utility rate matters. Many of these assignments have included the determination of the cost of capital for valuation and ratemaking purposes. My qualifications and prior testimony listing are presented in more detail in Exhibit AEB-1.

II. PURPOSE AND OVERVIEW OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my direct testimony is to provide a comparison-based recommendation regarding Tennessee-American's authorized return on equity ("ROE") and to assess the reasonableness of its capital structure for ratemaking purposes.

Q. ARE YOU SPONSORING ANY EXHIBITS IN SUPPORT OF YOUR DIRECT TESTIMONY?

A. Yes. My analyses and recommendations are based on and supported by the data presented in the following exhibits, which were prepared by me or under my direction:

- Exhibit AEB-2- Summary of Results
- Exhibit AEB-3- Proxy Group
- Exhibit AEB-4- Constant DCF
- Exhibit AEB-5- CAPM and ECAPM
- Exhibit AEB-6- Long-Term Beta
- Exhibit AEB-7- Market Return
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- Exhibit AEB-10- Size Premium
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Q. PLEASE EXPLAIN COST OF CAPITAL IN THE CONTEXT OF A REGULATED UTILITY.

A. The cost of capital for a regulated utility can be defined as the return investors require to finance the assets that provide service to customers. From the Company's perspective, the required financing–which can be provided by debt or equity investors (usually both)– has

a cost. Individually, the cost of debt (i.e., bonds, debentures, bank loans) and the cost of equity ("COE") (i.e., common stock and preferred stock) are collectively referred to as the "cost of capital." The cost of capital is based upon the economic principle of "opportunity cost," which means investing in any asset or security implies a forgone opportunity to invest in alternative assets or securities. Because investments with equivalent risks should offer equivalent returns, the opportunity cost of an investment should equal the return on investments of similar risks.

Although both debt and equity have required costs, they are fundamentally different. The cost of debt is contractually defined and can be directly observed in the market as interest or as a yield on debt securities. Conversely, the cost of equity has no contractual obligation, and it cannot be directly observed in the market. Because companies must use cash flows to pay debt obligations before issuing dividends to common equity investors, the risk (or uncertainty) associated with those residual cash flows determines the COE.

Because of this "residual risk," common equity investors require higher returns than debt holders. Thus, equity and debt investors are distinct in that they invest in different securities, face different risks, and require different returns.

Q. PLEASE EXPLAIN THE DIFFERENCE BETWEEN COE AND ROE.

A. The COE is the investment return required by the investor for making an equity investment, as explained above. In the context of a regulated utility, the ROE is the Commission-authorized return to the utility on the equity portion of the utility's capital structure.

Q. HOW IS COE ESTIMATED FOR A REGULATED UTILITY?

A. As stated above, the COE is not directly observable in the marketplace, unlike the contractual interest that is due on debt obligations. As such, the COE must be projected from economic and financial market data by utilizing financial models developed for that purpose. In turn, the recommended ROE is based upon the marketplace data of a proxy group of utilities that have similar risks as Tennessee-American based upon selection criteria, as outlined in Section VI of my direct testimony.

Q. HOW IS THE ROE YOU ARE RECOMMENDING USED IN THE RATEMAKING PROCESS?

A. The ROE will be used in conjunction with the common equity portion of the capital structure to determine the cost rate for common equity (*i.e.*, the ROE multiplied by the common equity portion). This cost rate for common equity will then be utilized in the proposed revenue requirement presented by Company witness Bob Lane which will ultimately be used in the determination of Tennessee-American's rates.

Q. HOW IS YOUR ASSESSMENT OF THE REASONABLENESS OF THE COMPANY'S PROPOSED CAPITAL STRUCTURE USED IN THE RATEMAKING PROCESS?

A. As outlined above, the common equity portion of the capital structure will be utilized in conjunction with the ROE to determine the cost rate for common equity. My assessment of the reasonableness of the Company's proposed capital structure is to demonstrate that the capital structure being proposed by Company witness Nicholas Furia is reasonable relative to the actual capital structures of the utility operating subsidiaries of the companies in the proxy group.

Q. PLEASE PROVIDE A BRIEF OVERVIEW OF THE ANALYSIS THAT LED TO YOUR RECOMMENDATION FOR TENNESSEE-AMERICAN'S ROE.

A. As discussed in more detail in Section VII, it is important to consider the results of several analytical approaches in determining a reasonable ROE. To develop my ROE recommendation, I first developed a proxy group of utility companies. Because a proxy group composed only of water utilities would result in a small group of companies for which data is limited, I did not limit the proxy group to water utilities, but rather included a broader group of utilities that face similar risk as Tennessee-American. To that proxy group, I applied the Constant Growth form of the Discounted Cash Flow ("DCF") model, the Capital Asset Pricing Model ("CAPM"), and the Empirical Capital Asset Pricing Model ("ECAPM"). My recommendation also takes into consideration the following factors:

- Tennessee-American's capital expenditures relative to the proxy group companies;
- Flotation costs associated with AWK's recent equity issuances;
- Tennessee-American's regulatory risk relative to the proxy group; and
- Tennessee-American's proposed capital structure as compared to the capital structures of the proxy group companies.[1]

While I did not make specific adjustments to my recommended ROE for these factors, I did consider them in the aggregate when determining where my recommended ROE falls within the range of the analytical results.

[1] The selection and purpose of developing a group of comparable companies will be discussed in detail in Section VI of my direct testimony.

Q. HOW IS THE REMAINDER OF YOUR DIRECT TESTIMONY ORGANIZED?

A. The remainder of my direct testimony is organized as follows:

- Section III provides a summary of my analyses and conclusions.
- Section IV reviews the regulatory guidelines pertinent to the development of the cost of capital.
- Section V discusses current and projected capital market conditions and the effect of those conditions on Tennessee-American's cost of equity.
- Section VI explains my selection of the proxy group for Tennessee-American.
- Section VII describes my analyses and the analytical basis for my recommendation of the appropriate ROE for Tennessee-American.
- Section VIII provides a discussion of specific regulatory, business, and financial risks that have a direct bearing on the ROE to be authorized for Tennessee-American in this case.
- Section IX provides an assessment of the reasonableness of Tennessee-American's proposed capital structure relative to the proxy group.
- Section X presents my conclusions and recommendations.

III. SUMMARY OF ANALYSIS AND CONCLUSIONS

Q. PLEASE SUMMARIZE THE KEY FACTORS CONSIDERED IN YOUR ANALYSES AND UPON WHICH YOU BASE YOUR RECOMMENDED ROE.

A. The key factors that I considered in my COE analyses and recommended ROE for Tennessee-American in this proceeding are:

- The United States Supreme Court's *Hope* and *Bluefield* decisions,[2] which established the standards for determining a fair and reasonable authorized ROE for public utilities, including consistency of the allowed return with the returns of other businesses having similar risk, adequacy of the return to provide access to capital and support credit quality, and the requirement that the result lead to just and reasonable rates.

[2] *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) ("Hope"); *Bluefield Waterworks & Improvement Co., v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923) ("Bluefield").

- The effect of current and projected capital market conditions on investors' return requirements.

- The results of several analytical approaches that provide estimates of the Company's cost of equity. Because the Company's authorized ROE should be a forward-looking estimate over the period during which the rates will be in effect, these analyses rely on forward-looking inputs and assumptions (e.g., projected analyst growth rates in the DCF model, forecasted risk-free rate, and market risk premium in the CAPM analysis).

- Although the companies in my proxy group are generally comparable to Tennessee-American, each company is unique, and no two companies have the exact same business and financial risk profiles. Accordingly, I considered the Company's regulatory, business, and financial risks relative to the proxy group of comparable companies in determining where the Company's ROE should fall within the reasonable range of analytical results to appropriately account for any residual differences in risk.

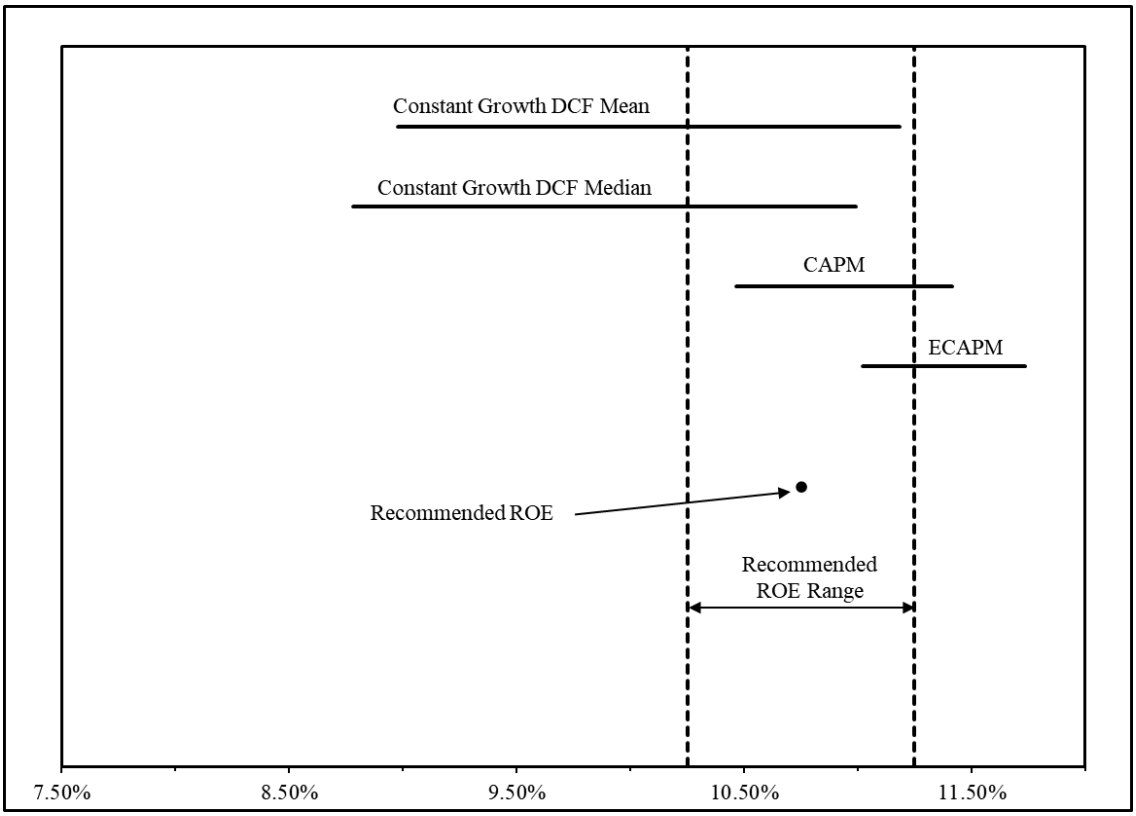
Q. PLEASE EXPLAIN HOW YOU ASSESSED THESE FACTORS.

A. I relied on the range of results produced by the Constant Growth DCF model, the CAPM analysis, and the ECAPM analysis. As shown in Figure 1, these COE estimation models produce a wide range of results. My conclusion as to the appropriate ROE for Tennessee-American within that range of results is based on Tennessee-American's business and financial risk relative to the proxy group and my assessment of market conditions. As noted above, although the companies in my proxy group are generally comparable to Tennessee-American, each company is unique. Accordingly, I considered the Company's business, financial and regulatory risk in aggregate relative to that of the proxy group companies when determining where the Company's ROE should fall within the reasonable range of analytical results to appropriately account for any residual differences in risk.

Q. PLEASE SUMMARIZE THE RESULTS OF THE ROE ESTIMATION MODELS THAT YOU CONSIDERED.

A. Figure 1 summarizes the range of results produced by the Constant Growth DCF, CAPM, and ECAPM.

Figure 1: Summary of Cost of Equity Results[3]



As shown in Figure 1, the range of results produced by the models used to estimate the COE is wide. While it is common to consider multiple models to estimate the COE, it is particularly important when the range of results varies considerably.

[3] DCF results exclude the results for Middlesex Water Company because they do not provide a reasonable equity risk premium over the current yields on the Moody's A rated and Baa rated utility bond indices, which were 5.57 percent and 5.80 percent, respectively, based on a 30-day average ending March 31, 2024.

Q. ARE PROSPECTIVE CAPITAL MARKET CONDITIONS EXPECTED TO AFFECT THE COST OF EQUITY FOR TENNESSEE-AMERICAN DURING THE PERIOD IN WHICH THE RATES ESTABLISHED IN THIS PROCEEDING WILL BE IN EFFECT?

A. Yes. Capital market conditions are expected to affect the investor-required COE and therefore must be taken into account when determining an acceptable ROE. Specifically:

- Long-term interest rates have increased substantially in the past year and are expected to remain elevated at least over the next year.
- Since (i) utility dividend yields are less attractive than the risk-free rates of government bonds; (ii) interest rates are expected to remain elevated, and (iii) utility stock prices are inversely related to changes in interest rates; it is likely that utility share prices will continue to underperform, creating upward pressure on investor-required returns.
- Rating agencies have responded to the risks of the utility sector, citing factors including elevated capital expenditures, interest rates, and inflation that create pressures for customer affordability and prompt rate recovery, and have noted the importance of regulatory support in their current outlooks.
- Similarly, equity analysts have noted the increased risk for the utility sector as a result of rising interest rates and expect the sector to underperform in 2024.
- Consequently, it is important to consider that if utility share prices decline, the results of the DCF model, which relies on current utility share prices, would understate the cost of equity during the period that the Company's rates will be in effect.

It is appropriate to consider all of these factors when estimating a reasonable range of the investor-required cost of equity and, in turn, the recommended ROE for the Company.

Q. WHAT IS YOUR CONCLUSION REGARDING THE APPROPRIATE AUTHORIZED ROE FOR TENNESSEE-AMERICAN IN THIS PROCEEDING?

A. Considering the analytical results presented in Figure 1, and discussed further throughout my testimony, the regulatory, business, and financial risk faced by Tennessee-American's

water operations relative to the proxy group, and current capital market conditions, I conclude an ROE range from 10.25 to 11.25percent is reasonable. Within this range, I believe that an authorized return on equity of 10.75 percent is appropriate.

Q. IS TENNESSEE-AMERICAN'S REQUESTED CAPITAL STRUCTURE REASONABLE AND APPROPRIATE?

A. Yes. The Company's proposed equity ratio of 54.52 percent is within the range of the actual capital structures of the utility operating subsidiaries of the proxy group companies. Further, the Company's proposed equity ratio is reasonable considering credit rating agencies' continued concern with the negative effect on the cash flows and credit metrics associated with relatively high interest rates and inflation, record levels of capital spending, and the need to fund capital spending in a credit supportive manner.

IV. REGULATORY GUIDELINES

Q. PLEASE DESCRIBE THE PRINCIPLES THAT GUIDE THE ESTABLISHMENT OF THE COST OF CAPITAL FOR A REGULATED UTILITY.

A. The U.S. Supreme Court's precedent-setting *Hope* and *Bluefield* cases established the standards for determining the fairness or reasonableness of a utility's authorized ROE. Among the standards established by the Court in those cases are: (1) consistency with other businesses having similar or comparable risks; (2) adequacy of the return to support credit quality and access to capital; and (3) the principle that the specific means of arriving at a fair return are not important, only that the end result (*i.e.*, an ROE that reflects investors' requirements for investments of comparable risks and supports a utility's credit quality and access to capital) leads to just and reasonable rates.[4]

[4] *Bluefield*, 262 U.S. at 692-93; *Hope*, 320 U.S. at 603.

Q. HAS THE COMMISSION PROVIDED SIMILAR GUIDANCE IN ESTABLISHING THE APPROPRIATE RETURN ON COMMON EQUITY?

A. Yes. The Commission follows the precedents of the *Hope* and *Bluefield* cases by acknowledging that utility investors are entitled to a fair and reasonable return. For example, in Docket No. 18-00017, the Commission stated that:

> In setting rates for public utilities, the Commission balances the interests of the utilities subject to its jurisdiction with the interests of Tennessee consumers, i.e., it is obligated to fix just and reasonable rates.
>
> …
>
> The Commission must also approve a rate that provides the regulated utility an opportunity to earn a just and reasonable return on its investments. The Commission considers petitions for a rate increase, filed pursuant to Tenn. Code Ann. § 65-5-103, in light of the following criteria:
>
> The investment or rate base upon which the utility should be permitted to earn a fair rate of return;
>
> The proper level of revenues for the utility;
>
> The proper level of expenses for the utility; and
>
> The rate of return the utility should earn.
>
> …
>
> In addition, the United States Supreme Court has determined that regulated utilities are entitled to a return that is "just and reasonable." The rate a utility is permitted to charge should enable it "to operate successfully, to maintain its financial integrity, to attract capital, and to compensate investors for the risks assumed.".[5] *[citations omitted]*

This guidance is in accordance with my view that an authorized return on equity must be sufficient to enable regulated companies, like Tennessee-American, the ability to attract equity capital on reasonable terms.

[5] TPUC, Chattanooga Gas Company, Docket No. 18-00017, January 11, 2019, at 9-11.

Q. WHY IS IT IMPORTANT FOR A UTILITY TO BE ALLOWED THE OPPORTUNITY TO EARN A RETURN THAT IS ADEQUATE TO ATTRACT EQUITY CAPITAL ON REASONABLE TERMS?

A. An ROE that is adequate to attract capital on reasonable terms enables the Company to continue to provide safe, reliable water service while maintaining its financial integrity. That return should be commensurate with returns expected elsewhere in the market for investments of equivalent risk. If it is not, debt and equity investors will select alternative investment opportunities for which the expected return reflects the perceived risks, thereby inhibiting the Company's ability to attract capital at reasonable cost.

Q. IS A UTILITY'S ABILITY TO ATTRACT CAPITAL ALSO AFFECTED BY THE ROES THAT ARE AUTHORIZED FOR OTHER UTILITIES?

A. Yes. Utilities compete directly for capital with other investments of similar risk, which include other utilities. Therefore, the ROE authorized for a utility sends an important signal to investors regarding whether there is regulatory support for financial integrity, dividends, growth, and fair compensation for business and financial risk. The cost of capital represents an opportunity cost to investors. If higher returns are available for other investments of comparable risk, over the same time period, investors have an incentive to direct their capital to those alternative investments. Thus, an authorized ROE significantly below authorized ROEs for other utilities can inhibit the utility's ability to attract capital for investment.

Q. WHAT IS THE STANDARD FOR SETTING THE ROE IN A JURISDICTION?

A. The stand-alone ratemaking principle is the foundation of jurisdictional ratemaking.[6] This principle requires that the rates that are charged in any operating jurisdiction be for the costs incurred in that jurisdiction. The stand-alone ratemaking principle ensures that customers in each jurisdiction only pay for the costs of the service provided in that jurisdiction, which is not influenced by the business operations in other operating companies. In order to maintain this principle, the cost of equity analysis is performed for an individual operating company as a stand-alone entity. As such, I have evaluated the investor-required return for the Company's utility operations in Tennessee.

Q. DOES THE FACT THAT THE COMPANY IS WHOLLY-OWNED BY AWK, A PUBLICLY-TRADED COMPANY, AFFECT YOUR ANALYSIS?

A. No. In this proceeding, consistent with stand-alone ratemaking principles, it is appropriate to establish the cost of equity for Tennessee-American, not its publicly-traded parent, AWK. More importantly, however, it is appropriate to establish a cost of equity and capital structure that provide Tennessee-American the ability to attract capital on reasonable terms, both on a stand-alone basis and within AWK. While Tennessee-American is committed to investing the required capital to provide safe and reliable service, because it is a subsidiary of American Water, the Company competes with the other AWK subsidiaries for proactive investment capital. In determining how to allocate its finite capital resources, it would be reasonable for AWK to consider the authorized ROE of each of its subsidiaries.

[6] Morin, Roger, Modern Regulatory Finance, 2021, p. 251-252.

Q. IS THE REGULATORY FRAMEWORK, INCLUDING THE AUTHORIZED ROE AND EQUITY RATIO, IMPORTANT TO THE FINANCIAL COMMUNITY?

A. Yes. The regulatory framework is one of the most important factors in investors' assessments of a utility's risk. Specifically, the authorized ROE and equity ratio for regulated utilities are very important for determining the degree of the jurisdiction's regulatory support for a utility's creditworthiness and financial stability. To the extent that authorized returns in a jurisdiction are lower than the returns that have been authorized more broadly, such actions are considered by both debt and equity investors in the overall risk assessment of the regulatory jurisdiction in which the company operates.

Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE REGULATORY PRINCIPLES TO BE USED IN ESTABLISHING THE COST OF CAPITAL IN THIS PROCEEDING?

A. The ratemaking process is premised on the principle that, in order for investors and companies to commit the capital needed to provide safe and reliable utility services, a utility must have a reasonable opportunity to recover the market-required return on its invested capital. Accordingly, the Commission's order in this proceeding should establish rates that provide the Company with a reasonable opportunity to earn a ROE that is: (1) adequate to attract capital at reasonable terms; (2) sufficient to ensure its financial integrity; and (3) commensurate with returns on investments in enterprises with similar risk. It is important for the ROE authorized in this proceeding to take into consideration current and projected capital market conditions, as well as investors' requirements for both risks and returns. Because utility operations are capital-intensive, regulatory decisions should enable the utility to attract capital at reasonable terms under a variety of economic and financial

market conditions. Providing the opportunity to earn a market-based cost of capital supports the financial integrity of the Company, which is in the interest of both customers and shareholders.

V. CAPITAL MARKET CONDITIONS

Q. WHY IS IT IMPORTANT TO ANALYZE CAPITAL MARKET CONDITIONS?

A. The models used to estimate the cost of equity rely on market data and thus the results of those models can be affected by prevailing market conditions at the time the analysis is performed. While the ROE established in a rate proceeding is intended to be forward-looking, the analysis uses current and projected market data, including stock prices, dividends, growth rates, and interest rates, in the cost of equity estimation models to estimate the investor-required return for the subject company.

Analysts and regulatory commissions recognize that current market conditions affect the results of the cost of equity estimation models. As a result, it is important to consider the effect of the market conditions on these models when determining an appropriate range for the ROE and the reasonableness of an ROE to be used for ratemaking purposes for a future period. If investors do not expect current market conditions to be sustained in the future, it is possible that the cost of equity estimation models will not provide an accurate estimate of investors' required return during that rate period. Therefore, it is very important to consider projected market data to estimate the return for that forward-looking period.

Q. WHAT FACTORS ARE AFFECTING THE COST OF EQUITY FOR REGULATED UTILITIES IN THE CURRENT AND PROSPECTIVE CAPITAL MARKETS?

A. The cost of equity for regulated utility companies is being affected by several factors in the current and prospective capital markets, including: (1) relatively high inflation; (2) changes in monetary policy; and (3) elevated interest rates that are expected to remain relatively high over the next few years. These factors affect the assumptions used in the cost of equity estimation models. Each of these three factors is discussed below.

Inflation Expected to Remain Above Federal Reserve's Target Level for Near-Term

Q. WHAT HAS THE LEVEL OF INFLATION BEEN OVER THE PAST FEW YEARS?

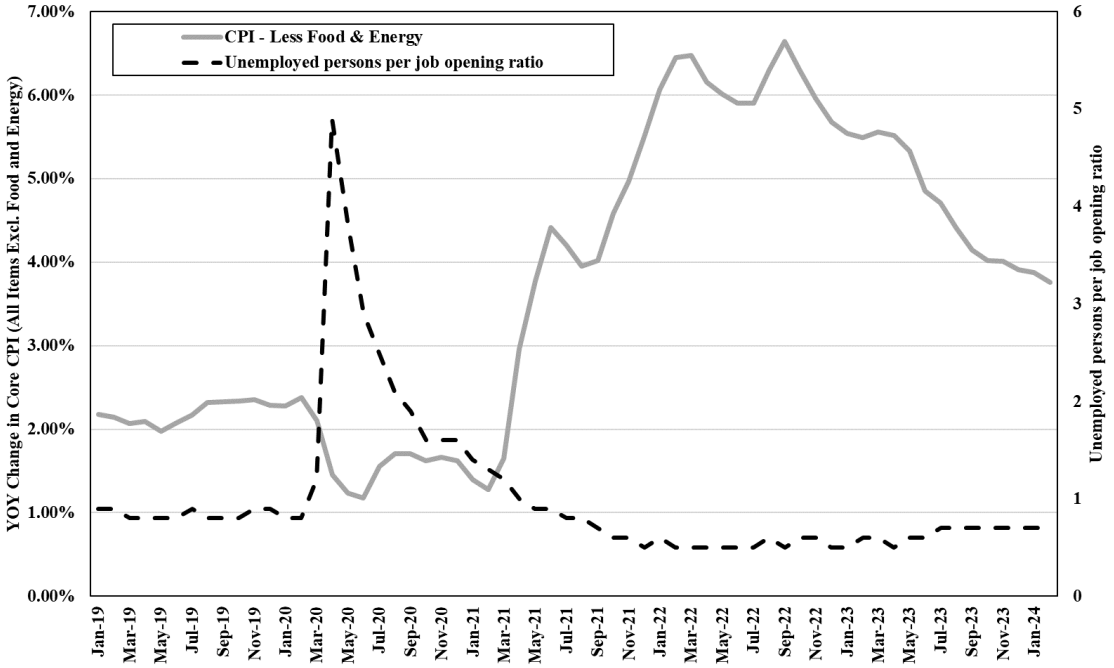
A. As shown in Figure 2**,** core inflation increased steadily beginning in early 2021, rising from 1.40 percent in January 2021 to a high of 6.64 percent in September 2022, which was the largest 12-month increase since 1982.[7] Since that time, while core inflation has declined in response to the Federal Reserve's monetary policy, it continues to remain above the Federal Reserve's target level of 2.0 percent.

In addition, as shown in Figure 2, I have also considered the ratio of unemployed persons per job opening, which is currently 0.7 and has been consistently below 1.0 since 2021, despite the Federal Reserve's accelerated policy normalization. This metric indicates

[7] The year-over-year ("YOY") change in core inflation, as measured by the Consumer Price Index ("CPI") excluding food and energy prices as published by the Bureau of Labor Statistics, is considered because it is the preferred inflation indicator of the Federal Reserve for determining the direction of monetary policy. Core inflation is preferred by the Federal Reserve because it removes the effect of food and energy prices, which can be highly volatile.

sustained strength in the labor market. Given the Federal Reserve's dual mandate of maximum employment and price stability, the continued increased levels of core inflation coupled with the strength in the labor market has resulted in the Federal Reserve's sustained focus on the priority of reducing inflation.

Figure 2: Core Inflation and Unemployed Persons-to-Job Openings, January 2019 to February 2024[8]



Q. WHAT ARE THE EXPECTATIONS FOR INFLATION OVER THE NEAR-TERM?

A. The Federal Reserve has indicated that it expects inflation will remain elevated above its target level until 2026 and that the extent to which it maintains the restrictive monetary policy will depend on market indicators going forward. Over the last several months the Federal Open Market Committee ("FOMC") has been clear that they intend to rely on

[8] Bureau of Labor Statistics

market data before making any changes to interest rates. In the FOMC's meeting on March 20, 2024, Chairman Powell observed that the FOMC will make their decision "meeting by meeting" and while he believes that it will be appropriate to reduce the Federal Funds rate at some point in 2024, the FOMC is prepared to maintain the current Federal Funds rate range higher for longer if needed to reduce inflation:

> We know that reducing policy restraint too soon or too much could result in a reversal of the progress we have seen on inflation and ultimately require even tighter policy to get inflation back to 2 percent. At the same time, reducing policy restraint too late or too little could unduly weaken economic activity and employment. In considering any adjustments to the target range for the federal funds rate, the Committee will carefully assess incoming data, the evolving outlook, and the balance of risks. The Committee does not expect it will be appropriate to reduce the target range until it has gained greater confidence that inflation is moving sustainably down toward 2 percent. Of course, we are committed to both sides of our dual mandate, and an unexpected weakening in the labor market could also warrant a policy response. We will continue to make our decisions meeting by meeting.

A. Moreover, Atlanta Federal Reserve President Raphael Bostic, who is a voting member of the FOMC in 2024, recently commented that he expects one rate cut in 2024 but would not rule out the possibility of either two or zero rate cuts depending on the direction of the macroeconomic data. Mr. Bostic's expectations of one rate cut is less than the three that were forecast at the recent FOMC meeting in March 2024. Similarly, Federal Reserve Governor Michelle Bowman, also a voting member of the FOMC, recently noted that while it is not her baseline forecast, there is the possibility that rates will need to increase in 2024 to control inflation as she still sees "a number of potential upside risks to inflation".

Q. HAVE THERE BEEN ECONOMIC INDICATORS PUBLISHED SINCE THE FOMC PUBLISHED THE SUMMARY OF ECONOMIC PROJECTIONS ON MARCH 20, 2024, THAT INDICATE STRENGTH IN THE U.S. ECONOMY?

A. Yes. Since that time, the following data has been released demonstrating the unexpected strength in the U.S. economy:

- U.S. employers added 303,000 jobs in March, far exceeding economists' expectation of 200,000.[9]
- The unemployment rate declined from 3.9 percent in February to 3.8 percent in March.[10]
- Average hourly earnings increased 0.3 percent in March 2024, up 4.1 percent year-over-year.[11]
- The year-over-year ("YoY") change in core inflation as measured by the Consumer Price Index ("CPI") excluding food and energy prices was 3.8 percent in March 2024, exceeding economists' estimates of 3.7 percent and equal to the 3.8 percent YoY change in core inflation reported in February 2024.[12]

Q. WHAT IS THE MARKET'S EXPECTATION ABOUT INTEREST RATE CUTS SINCE THE RECENT ECONOMIC DATA YOU REFERENCED HAS BEEN REPORTED?

A. The market has recognized the strength in the economy and the labor market and has tempered its expectations that the FOMC will decrease interest rates in the first quarter of this year. The CME Group, which publishes a "FedWatch" probability chart of FOMC activity, reported on April 8, 2024, that federal funds rate futures contracts reflect expectations of approximately 60 basis points in rate cuts this year which is substantially lower than the 150 basis points in rate cuts that were expected in January 2024.[13] In

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[9] *See, e.g.*, Cox, Jeff, "Job growth zoomed in March as payrolls jumped by 303,000 and unemployment dropped to 3.8%," CNBC, April 5, 2024.

[10] *Id.*

[11] *Id.*

[12] Cox, Jeff, "Consumer prices rose 3.5% from a year ago in March, more than expected," CNBC, April 10, 2024.

[13] Reuters, "Fed rate cut expectations for 2024 fall to lowest since October", April 8, 2024.

summary, the market is expecting that interest rates will remain higher for longer than anticipated at the beginning of 2024.

The Federal Reserve to Continue Use of Monetary Policy to Address Inflation

Q. WHAT POLICY ACTIONS HAS THE FEDERAL RESERVE ENACTED TO RESPOND TO INCREASED INFLATION?

A. The dramatic increase in inflation has prompted the Federal Reserve to pursue an aggressive normalization of monetary policy, removing the accommodative policy programs used to mitigate the economic effects of COVID-19. Since the March 2022 meeting, the Federal Reserve increased the target federal funds rate through a series of increases from a range of 0.00–0.50 percent to a range of 5.25--to 5.50 percent.[14] Further, as noted above, while the Federal Reserve acknowledges that inflation has declined from its peak, it still is well above the Federal Reserve's target of 2 percent. Therefore, the Federal Reserve anticipates the continued need to maintain the federal funds rate at a restrictive level in order to achieve its goal of 2 percent inflation over the long-run.

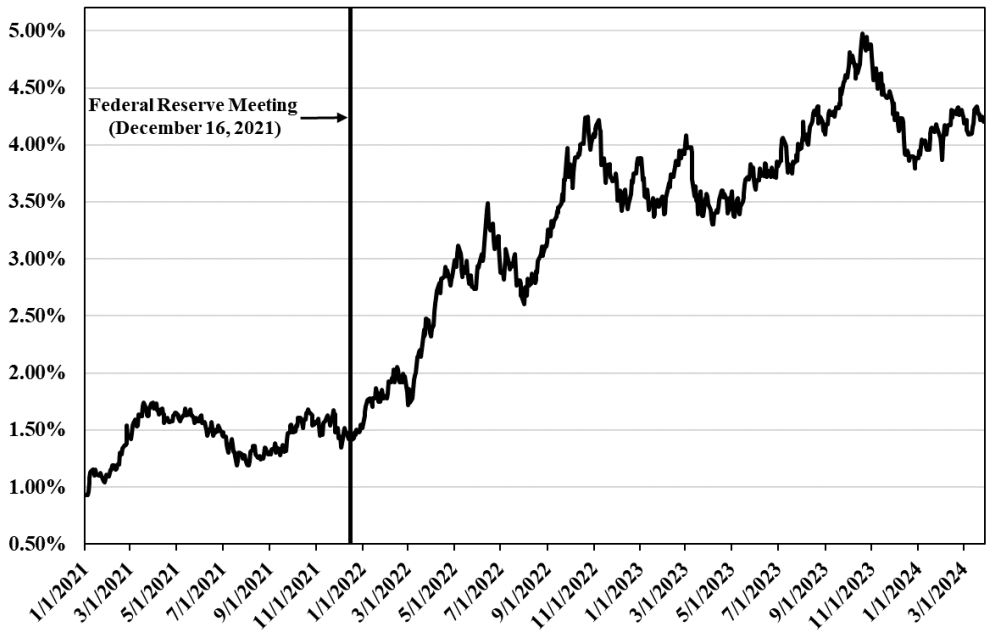
Q. HAVE THE YIELDS ON LONG-TERM GOVERNMENT BONDS INCREASED IN RESPONSE TO INFLATION AND THE FEDERAL RESERVE'S NORMALIZATION OF MONETARY POLICY?

A. Yes. As the Federal Reserve has substantially increased the Federal Funds rate and decreased its holdings of Treasury bonds and mortgage-backed securities in response to increased levels of inflation that have persisted for longer than originally projected, longer term interest rates have also increased. For example, as shown in Figure 3, since the

[14] https://www.federalreserve.gov/monetarypolicy/openmarket.htm.

Federal Reserve's December 2021 meeting, the yield on 10-year Treasury bonds have increasing from 1.47 percent on December 15, 2021, to 4.20 percent at the end of March 2024.

Figure 3: 10-Year Treasury Bond Yield – January 2021 through March 2024[15]



Q. HOW HAVE INTEREST RATES AND INFLATION CHANGED SINCE THE COMPANY'S LAST RATE CASE?

A. As shown in Figure 4, both short-term and long-term interest rates have increased since Tennessee-American's last rate proceeding in 2012. Specifically, long-term interest rates have increased by more than 150 basis points over this period, which is indicative of an increase in the cost of equity. As discussed, as a result of the Federal Reserve's monetary policy of substantially increasing short-term interest rates, core inflation has increased since the last rate proceeding and remains above the Federal Reserve's long-term target value of 2.0 percent.

[15] S&P Capital IQ Pro.

Figure 4: Change in Market Conditions Since Company's Last Rate Case[16]

Docket	Date	Federal Funds Rate	30-Day Avg of 30-Year Treasury Bond Yield	Core Inflation Rate
Docket No. 12-00049	11/20/2012	0.16%	2.86%	1.95%
Current	3/31/2024	5.33%	4.38%	3.76%
Change since last rate case		5.17%	1.52%	1.81%

Q. WHAT HAVE EQUITY ANALYSTS SAID ABOUT LONG-TERM GOVERNMENT BOND YIELDS?

A. Leading equity analysts have noted that they expect the yields on long-term government bonds to remain elevated. For example, according to the *Blue Chip Financial Forecasts* report, the consensus estimate of the average yields on the 10-year and 30-year Treasury bonds are approximately 3.80 percent and 4.00 percent, respectively, through the second quarter of 2025.[17] Therefore, investors expect interest rates to remain elevated for at least the next 15 months.

Expected Performance of Utility Stocks and the Investor-Required Return on Utility Investments

Q. ARE UTILITY SHARE PRICES CORRELATED TO CHANGES IN THE YIELDS ON LONG-TERM GOVERNMENT BONDS?

A. Yes. Interest rates and utility share prices are inversely correlated, which means that increases in interest rates result in declines in the share prices of utilities and vice versa.

[16] St. Louis Federal Reserve Bank; Bureau of Labor Statistics.
[17] *Blue Chip Financial Forecasts*, Vol. 43, No. 4, April 1, 2024, at 2.

For example, Goldman Sachs and Deutsche Bank examined the sensitivity of share prices of different industries to changes in interest rates over five-year period. Both Goldman Sachs and Deutsche Bank found that utilities had one of the strongest negative relationships with bond yields (i.e., increases in bond yields resulted in the decline of utility share prices).[18]

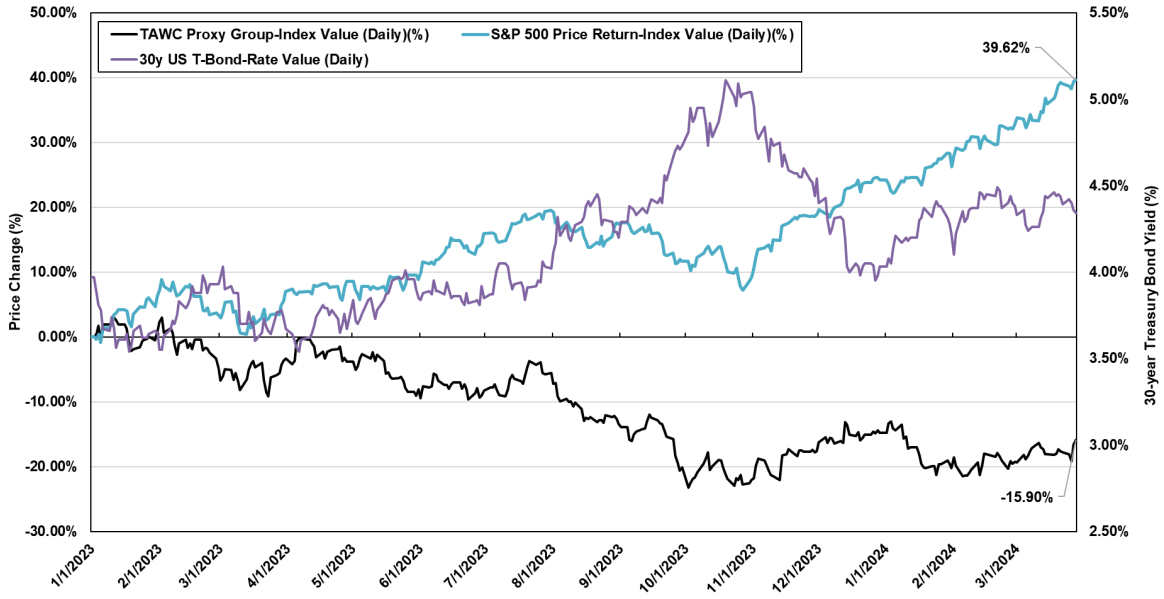
Q. DID THE UTILITY SECTOR UNDERPERFORM IN 2023?

A. Yes. During 2023 utility stocks significantly underperformed the broader market, as Treasury bond yields have increased to levels greater than the dividend yields of utility stocks. For example, as shown in Figure 5, since January 1, 2023, the yield on the 30-year Treasury bond has increased approximately 40 basis points, while the share prices for the utilities included in my proxy group (discussed in the following section) have declined by 15.90 percent, and the S&P 500 Index has increased by 39.62 percent.

Figure 5: Relative Performance of the Proxy Group and the S&P 500 Index, January 2023 to March 2024[19]

[18] Lee, Justina, "Wall Street Is Rethinking the Treasury Threat to Big Tech Stocks." Bloomberg.com, March 11, 2021.

[19] S&P Capital IQ Pro.



Q. HOW DO EQUITY ANALYSTS EXPECT THE UTILITIES SECTOR TO PERFORM IN 2024?

A. Equity analysts have recently projected the continued underperformance of the utility sector:

- Fidelity Investments classifies the utility sector as underweight;[20]
- Bank of America recently noted that they are "not so constructive on [u]tilities" given that the dividend yields for utilities are below both the yields available on long- and short-term treasury bonds;[21]
- UBS recently classified the 11 sectors of the S&P 500 as most preferred, natural and least preferred for 2024 with the utility sector being classified as one of UBS's three least preferred sectors (*i.e.,* utilities, materials and real estate;[22] and
- Professional investors surveyed by *Barron's* in its most recent Big Money poll selected the utility sector as one of the four equity sectors that they liked the least over the next twelve months, indicating they are projecting that utilities will underperform the broader market in 2024.[23]

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[20] Fidelity Investments. "Fourth Quarter 2023 Investment Research Update." October 19, 2023.

[21] Dumoulin-Smith, Julien, *et. al*. "US Electric Utilities & IPPs: As the leaves fall, preparing for Autumn utility outlook. Macro still has potholes." BofA Securities, September 6, 2023.

[22] Capul, Jason. "UBS Prefers Info Tech, Consumer Staples and Energy in 2024." Seeking Alpha, December 12, 2023, seekingalpha.com/news/4045578-ubs-outlines-its-sector-outlook-and-offers-a-year-end-sp-price-target.

[23] Jasinski, Nicholas. "Big Money Pros Are Split on the Outlook for Stocks. But They Are Fans of Bonds." *Barron's*. October 27, 2023.

Finally, while Ned Davis Research classified the utility sector as marketweight, they cited risks going forward that could result in a downgrade of their rating to underweight:

> Key drivers: Falling yields have made Utilities' dividend yield more attractive, but the sector still yields less than the 10-year Treasury. At the end of December, only 40% of the sector's stocks yielded more than the 10-year Treasury, 0.6 standard deviations below its long-term average. Lower interest rates or a continuation of the sector's decline in price will be needed to attract dividend-hungry investors.
>
> Indicators to watch: Utilities saw slight sector model score deterioration in December, as one of its relative overbought/oversold indicators flipped from bullish to neutral during the month. Utilities starts 2024 tied with Consumer Staples and Financials for the lowest composite scores among all sectors. We see the possibility for more defensive leadership in the new year, but the sector model has us much closer to a downgrade of the sector than an upgrade.[24]

Q. WHY DO EQUITY ANALYSTS EXPECT THE UTILITY SECTOR TO UNDERPERFORM OVER THE NEAR-TERM?

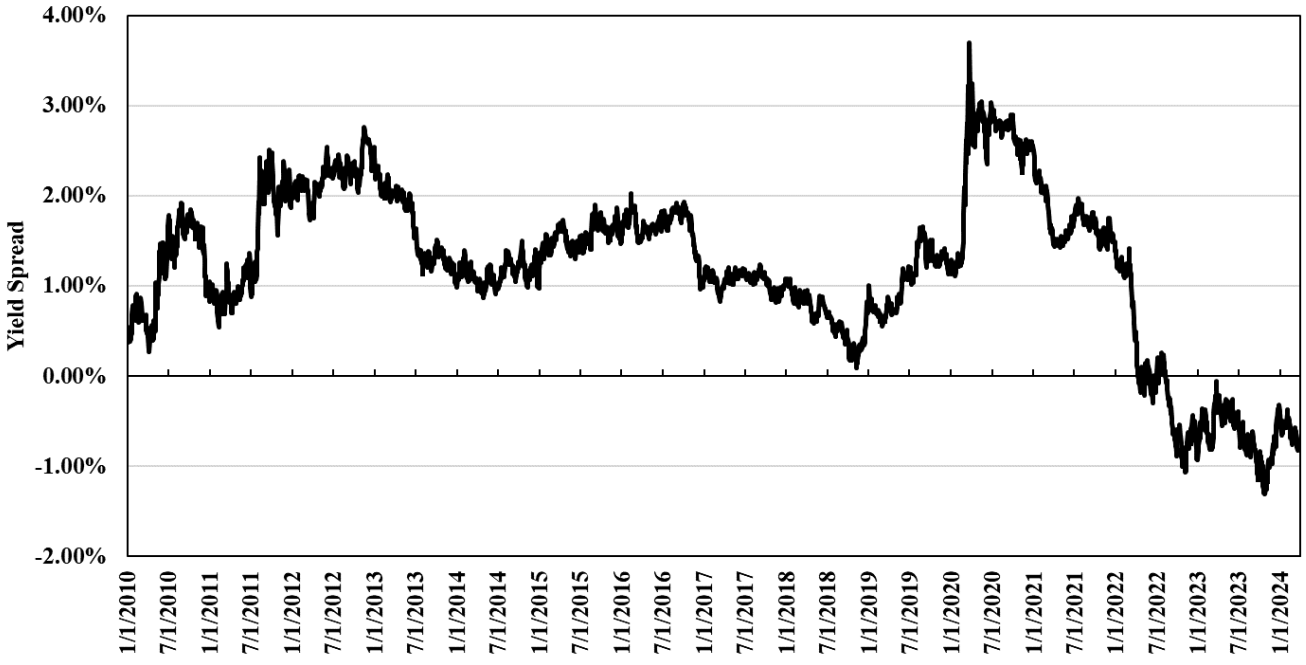
A. Equity analysts expect the utility sector to continue to underperform given that utility dividend yields remain lower than the yields on long-term government bonds. To illustrate this point, I have examined the difference between the dividend yields of utility stocks and the yields on long-term government bonds ("yield spread") from January 2010 through January 2024. I selected the dividend yield on the Standard & Poor's Utilities Index as the measure of the dividend yields for the utility sector and the yield on the 10-year Treasury bond as the estimate of the yield on long-term government bonds.

As shown in Figure 6, the recent significant increase in long-term government bonds yields has resulted in the yield on long-term government bonds exceeding the dividend yields of utilities. The yield spread as of March 31, 2024, was negative 0.82

[24] Ned Davis Research, "Risk-on leadership closes out 2023, January 4, 2024, at 18.

percent, meaning that the yield on the 10-year Treasury bond exceeds the dividend yield for the S&P Utilities Index. However, the long-term average yield spread from 2010 to 2023 is 1.21 percent. Therefore, the current yield spread is well below the long-term average. Because the yield spread is currently well below the long-term average and interest rates are expected to remain relatively high through at least the next year, it is reasonable to conclude that the utility sector will most likely underperform over the near-term. This is because investors that purchased utility stocks as an alternative to the lower yields on long-term government bonds would otherwise be inclined to rotate back into government bonds, particularly as the yields on long-term government bonds remain elevated, thus resulting in a decrease in the share prices of utilities.

Figure 6: Spread between the Proxy Group Dividend Yield and the 10-year Treasury Bond Yield, January 2010 – March 2024[25]



[25] S&P Capital IQ Pro.

Conclusion

Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE EFFECT OF CURRENT MARKET CONDITIONS ON THE COST OF EQUITY FOR THE COMPANY?

A. Due to their effect on the estimated cost of equity, it is important that current and projected market conditions be considered in setting the forward-looking ROE in this proceeding. The combination of high inflation and the Federal Reserve's changes in monetary policy indicate that the cost of equity has increased since the Company's last rate proceeding. Additionally, as demonstrated above: (i) there is a strong historical inverse correlation between interest rates (*i.e.*, yields on long-term government bonds) and the share prices of utility stocks (*i.e.*, as interest rates increase, utility share prices decline); and (ii) the long-term government bond yields currently exceed utility dividend yields when historically the opposite has been true. Given these factors, it is likely that the cost of equity will increase over the near-term for utilities. As a result, cost of equity estimates based in whole or in part on historical or current market conditions, as opposed to projected market conditions, may understate the cost of equity during the future period that the Company's rates will be in effect. Therefore, these current and expected market conditions support consideration of forward-looking cost of equity estimation models such as the CAPM and ECAPM, which better reflect expected market conditions.

VI. PROXY GROUP SELECTION

Q. PLEASE PROVIDE A BRIEF PROFILE OF TENNESSEE-AMERICAN.

A. Tennessee-American, a wholly-owned subsidiary of AWK, provides water distribution service to approximately 87,000 customers in Tennessee and in 2022 had total gross

revenue of $60 million.[26] The Company generally accesses debt markets through American Water Capital Corp. ("AWCC"). The current credit ratings on senior unsecured debt for AWK and AWCC are as follows: (1) S&P - A (Outlook: Stable); and (2) Moody's – Baa1 (Outlook: Stable).[27]

Q. WHY HAVE YOU USED A PROXY GROUP OF PUBLICLY TRADED COMPANIES TO ESTIMATE THE COST OF EQUITY FOR TAWC?

A. In this proceeding, I am estimating the cost of equity for TAWC, a rate-regulated subsidy of AWK. Since the cost of equity is a market-based concept and given the fact that Tennessee-American does not make up the entirety of a publicly-traded entity, it is necessary to establish a group of companies that are both publicly traded and comparable to Tennessee-American in certain fundamental business and financial respects to serve as its "proxy" for purposes of estimating the cost of equity.

The process begins with developing a set of screening criteria, the purpose of which is to select a proxy group of companies that aligns with the financial and operational characteristics of Tennessee-American and that investors would view as comparable to the Company. I developed the screens and thresholds for each screen based on judgment with the intention of balancing the need to maintain a proxy group that is of sufficient size with the need to establish a proxy group of companies that are comparable in business and financial risk to Tennessee-American.

Even if Tennessee-American's regulated utility business made up the entirety of a publicly-traded entity, it is possible that transitory events could bias its market value over

[26] Tennessee-American 2022 Utility Annual Report to the TPUC, at F-3 and W-3.
[27] S&P Global Ratings and Moody's Investors Service, accessed March 7, 2024.

a given time period. A significant benefit of using a proxy group is that it mitigates the effects of anomalous events that may be associated with any one company. The proxy companies used in my analyses all possess a set of operating and financial risk characteristics that are comparable to Tennessee-American, and, therefore, provide a reasonable basis to estimate the appropriate cost of equity for the Company.

Q. HOW DID YOU SELECT THE COMPANIES IN YOUR PROXY GROUP?

A. I began with the group of 16 companies that *Value Line Investment Survey* ("*Value Line*") classifies as Water Utilities and Natural Gas Distribution Utilities and applied the following screening criteria to select companies that:

- pay consistent quarterly cash dividends, because companies that do not cannot be analyzed using the Constant Growth DCF model;
- have investment grade long-term issuer ratings from S&P and/or Moody's;
- are covered by more than one utility industry analyst;
- have positive long-term earnings growth forecasts from at least two utility industry equity analysts;
- derive more than 70.00 percent of their total operating income from regulated operations; and
- were not parties to a merger or transformative transaction during the analytical periods relied on.

Q. DID YOU CONSIDER ANY ADDITIONAL COMPANIES FOR INCLUSION IN YOUR PROXY GROUP?

A. Yes. I also considered the group of 36 companies that *Value Line* classifies as Electric Utilities. In determining which electric utilities would qualify for inclusion in my proxy group, I started by relying on the criteria used to screen the water and natural gas utilities.

I then applied two additional screening criteria to only include electric utilities that would be considered risk comparable to Tennessee-American:

- have owned generation comprising less than 10 percent of the Company's MWh sales to ultimate customers to ensure that the electric utilities included did not own a substantial amount of generation and therefore had operations that were primarily transmission and distribution; and
- own water and wastewater operations.

Q. DID YOU INCLUDE AWK IN YOUR PROXY GROUP?

A. No. Since we are estimating the COE for Tennessee-American, a subsidiary of American Water, if we were to include AWK in the proxy group this would create an issue of circular logic that would occur when utilizing the economic and financial models to estimate the ROE for Tennessee-American using the market data for AWK, which would be influenced by the outcome of the rate decision for Tennessee-American. In order to eliminate the circularity described, it is more appropriate to estimate the COE based on a proxy group of comparable companies, excluding AWK.

Q. WHAT IS THE COMPOSITION OF YOUR PROXY GROUP?

A. As shown in Exhibit AEB-3, the screening criteria discussed above resulted in a proxy group consisting of the companies in Figure 7.

Figure 7: Proxy Group

Company	Ticker
Atmos Energy Corporation	ATO
NiSource Inc.	NI
Northwest Natural Gas Company	NWN
ONE Gas, Inc.	OGS
Spire, Inc.	SR
Eversource Energy	ES
American States Water Company	AWR
California Water Service Group	CWT
Middlesex Water Company	MSEX
SJW Group	SJW
Essential Utilities, Inc.	WTRG

Q. WHY DID YOU INCLUDE ELECTRIC UTILITIES AND NATURAL GAS DISTRIBUTION COMPANIES IN THE PROXY GROUP?

A. *Value Line* currently classifies only seven companies as water utilities. Therefore, the universe of water utilities is already small before a set of screening criteria are applied. Additionally, there has been a recent trend towards consolidation in the utility industry, which reduces the number of available proxy companies.[28] Because there are a small number of companies that are available for inclusion in the proxy group, I also consider electric utilities and natural gas distribution companies that meet the screening criteria, such as Eversource Energy, which has electric distribution, natural gas distribution and water utility operations.

[28] Chediak, Mark, *et al*. "Utility M&A Is So Hot Not Even Berkshire's Billions Won a Bid." Bloomberg.com, Bloomberg, 3 Jan. 2018, www.bloomberg.com/news/articles/2018-01-03/utility-m-a-is-so-hot-not-even-berkshire-s-billions-won-a-bid.

Q. ARE ELECTRIC UTILITIES AND NATURAL GAS DISTRIBUTION COMPANIES REASONABLY COMPARABLE TO WATER UTILITIES TO BE INCLUDED IN A PROXY GROUP USED TO ESTIMATE THE COST OF EQUITY FOR A WATER UTILITY?

A. Yes. I believe that it is reasonable to rely on a combined proxy group. As noted above, due to consolidation in the water utility industry, there is only a small group of water companies that can be included in the proxy group. In addition, the screening criteria relied on for my proxy group require that a company derive more than 70 percent of their operating income from regulated operations. Therefore, the electric utilities and natural gas distribution companies included in my proxy group generate a large portion of their operating income from regulated operations, similar to Tennessee-American and the water utilities that are included in the proxy group. As a result, I believe that it is appropriate to include relevant natural gas and electricity distribution companies in my proxy group.

VII. COST OF EQUITY ESTIMATION

Q. PLEASE BRIEFLY DISCUSS THE ROE IN THE CONTEXT OF THE REGULATED RATE OF RETURN.

A. The rate of return for a regulated utility is the weighted average cost of capital, in which the costs of the individual sources of capital are weighted by their respective proportion (*i.e.*, book values) in the utility's capital structure. The ROE is the cost rate applied to the equity capital in calculating the rate of return. While the costs of debt and preferred stock can be directly observed, the cost of equity is market-based and, therefore, must be estimated based on observable market data.

Q. HOW IS THE REQUIRED COE DETERMINED?

A. A range of the required cost of equity is estimated by using analytical techniques that rely on market-based data to quantify investor expectations regarding equity returns. Within that range, the ROE that is recommended is based on a review of the business, regulatory, and financial risks of the subject utility as compared with the proxy group, including the capital structure of the subject utility. A key consideration in determining the cost of equity is to ensure that the methodologies employed reasonably reflect investors' general views of the financial markets and specific views of subject company (in the context of the proxy group). Further, it is important that the ROE ultimately authorized takes into consideration the financial risk resulting from the authorized capital structure of the subject utility. An authorized capital structure that has a greater amount of leverage results in greater risk since equity is the last claimant in the event of the dissolution of a company. Therefore, as the leverage in the capital structure increases, it is necessary for the ROE to increase to recognize the incremental risk to equity holders.

Q. WHAT METHODS DO YOU USE TO ESTIMATE THE COSTS OF EQUITY FOR THE COMPANY IN THIS PROCEEDING?

A. I considered the results of the Constant Growth DCF model, the CAPM, and the ECAPM. A reasonable cost of equity estimate appropriately considers alternative methodologies and the reasonableness of their individual and collective results.

Q. WHY IS IT IMPORTANT TO USE MORE THAN ONE ANALYTICAL APPROACH?

A. Because the cost of equity is not directly observable, it must be estimated based on both quantitative and qualitative information. When estimating the cost of equity, analysts and

investors are inclined to gather and evaluate as much relevant data as reasonably can be analyzed. Several models have been developed to estimate the cost of equity, and I use multiple approaches to inform my analysis. As a practical matter, however, all of the models available for estimating the cost of equity are subject to limiting assumptions or other methodological constraints. Consequently, many well-regarded finance texts recommend using multiple approaches when estimating the cost of equity. For example, Copeland, Koller, and Murrin[29] suggest using the CAPM and Arbitrage Pricing Theory model, while Brigham and Gapenski[30] recommend the CAPM, DCF, and Bond Yield Plus Risk Premium approaches.

Further, the recent changes in market conditions discussed previously highlight the benefit of using multiple models since each model relies on different assumptions, certain of which better reflect current and projected market conditions at different times. For example, the CAPM and ECAPM analyses rely directly on interest rates as an assumption in the models and therefore may more directly reflect the market conditions expected when the Company's rates are in effect. Accordingly, it is important to use multiple analytical approaches to ensure that the cost of equity results reflect market conditions that are expected during the period that the Company's rates will be in effect.

[29] Tom Copeland, Tim Koller and Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, 3rd Ed. (New York: McKinsey & Company, Inc., 2000), at 214.

[30] Eugene Brigham, Louis Gapenski, *Financial Management: Theory and Practice*, 7th Ed. (Orlando: Dryden Press, 1994), at 341.

Q. HAS THE COMMISSION RECOGNIZED THAT IT IS IMPORTANT TO CONSIDER THE RESULTS OF MULTIPLE MODELS?

A. Yes. For example, in its January 11, 2019 order in Docket No. 18-00017, the Commission considered various models such as the annual DCF model and CAPM, also taking into consideration recent trends for authorized ROEs in other states, ultimately authorizing a 9.80 percent ROE, primarily relying on the results of the CAPM.[31]

A. Constant Growth DCF Model

Q. PLEASE DESCRIBE THE DCF APPROACH.

A. The DCF approach is based on the theory that a stock's current price represents the present value of all expected future cash flows. In its most general form, the DCF model is expressed as follows:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \ldots + \frac{D_\infty}{(1+k)^\infty} \qquad [1]$$

Where P_0 represents the current stock price, D1…D∞ are all expected future dividends, and k is the discount rate, or required ROE. Equation [1] is a standard present value calculation that can be simplified and rearranged into the following form:

$$k = \frac{D_0(1+g)}{P_0} + g \qquad [2]$$

Equation [2] is often referred to as the constant growth DCF model in which the first term is the expected dividend yield and the second term is the expected long-term growth rate (*i.e.*, "*g"*).

[31] TPUC, Chattanooga Gas Company, Docket No. 18-00017, January 11, 2019, at 65 and 68.

Q. WHAT ASSUMPTIONS ARE REQUIRED FOR THE CONSTANT GROWTH DCF MODEL?

A. The Constant Growth DCF model requires the following four assumptions: (1) a constant growth rate for earnings and dividends; (2) a stable dividend payout ratio; (3) a constant price-to-earnings ratio; and (4) a discount rate greater than the expected growth rate. To the extent that any of these assumptions are not objectively valid, considered judgment and/or specific adjustments should be applied to the results.

Q. WHAT MARKET DATA DID YOU USE TO CALCULATE THE DIVIDEND YIELD IN YOUR CONSTANT GROWTH DCF MODEL?

A. The dividend yield in my Constant Growth DCF model is based on the proxy companies' current annual dividend and average closing stock prices over the 30-, 90-, and 180-trading days as of March 31, 2024.

Q. WHY DID YOU USE THREE AVERAGING PERIODS FOR STOCK PRICES?

A. In my constant growth DCF model, I use an average of recent trading days to calculate the term P_0 in the DCF model to ensure that the cost of equity is not skewed by anomalous events that may affect stock prices on any given trading day. The averaging period should also be reasonably representative of expected capital market conditions over the long term.

Q. DID YOU MAKE ANY ADJUSTMENTS TO THE DIVIDEND YIELD TO ACCOUNT FOR PERIODIC GROWTH IN DIVIDENDS?

A. Yes. Since utility companies tend to increase their quarterly dividends at different times throughout the year, it is reasonable to assume that dividend increases will be evenly distributed over calendar quarters. Given that assumption, it is reasonable to apply one-half of the expected annual dividend growth rate for purposes of calculating the expected

dividend yield component of the DCF model. This adjustment ensures that the expected first-year dividend yield is, on average, representative of the coming twelve-month period, and does not overstate the aggregated dividends to be paid during that time.

Q. WHY IS IT IMPORTANT TO SELECT APPROPRIATE MEASURES OF LONG-TERM GROWTH IN APPLYING THE DCF MODEL?

A. In its Constant Growth form, the DCF model (i.e., Equation [2]) assumes a single growth estimate in perpetuity. To reduce the long-term growth rate to a single measure, one must assume that the payout ratio remains constant and that earnings per share ("EPS"), dividends per share, and book value per share all grow at the same constant rate. However, over the long run, dividend growth can only be sustained by earnings growth, meaning earnings are the fundamental driver of a company's ability to pay dividends. Therefore, projected EPS growth is the appropriate measure of a company's long-term growth. In contrast, changes in a company's dividend payments are based on management decisions related to cash management and other factors. For example, a company may decide to retain earnings rather than pay out a portion of those earnings to shareholders through dividends. Therefore, dividend growth rates are less likely than earnings growth rates to accurately reflect investor perceptions of a company's growth prospects. Accordingly, I have incorporated a number of sources of long-term EPS growth rates into the Constant Growth DCF model.

Q. WHICH SOURCES OF LONG-TERM EARNINGS GROWTH RATES DO YOU USE IN YOUR DCF ANALYSIS?

A. I incorporate three sources of long-term earnings per share ("EPS") growth rates: (1) Zacks Investment Research; (2) Yahoo! Finance; and (3) Value Line.

Q. HOW DID YOU CALCULATE THE RANGE OF RESULTS FOR THE CONSTANT GROWTH DCF MODELS?

A. I calculate the low-end result for the constant growth DCF model using the minimum growth rate of the three sources (i.e., the lowest of the Zacks, Yahoo! Finance, and Value Line projected EPS growth rates) for each of the proxy group companies. I use a similar approach to calculate a high-end result, using the maximum growth rate of the three sources for each proxy group company. Lastly, I also calculate results using the average EPS growth rate from all three sources for each proxy group company.

Q. WHAT ARE THE RESULTS OF YOUR CONSTANT GROWTH DCF ANALYSES?

A. The results of my Constant Growth DCF analyses are presented in Exhibit AEB-4 and summarized in Figure 8.

Figure 8: Summary of DCF Results[32]

	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
Constant Growth DCF			
Mean Results:			
30-Day Average	9.06%	10.10%	11.18%
90-Day Average	9.03%	10.06%	11.15%
180-Day Average	8.98%	10.01%	11.10%
Average	9.02%	10.06%	11.14%
Median Results:			
30-Day Average	8.86%	10.11%	10.99%
90-Day Average	8.79%	10.10%	10.87%
180-Day Average	8.78%	10.05%	10.85%
Average	8.81%	10.09%	10.90%

Q. HAVE REGULATORY COMMISSIONS ACKNOWLEDGED THAT THE DCF MODEL MIGHT UNDERSTATE THE COST OF EQUITY GIVEN THE CURRENT CAPITAL MARKET CONDITIONS OF HIGH INFLATION AND INCREASED INTEREST RATES?

A. Yes. For example, in its May 2022 decision establishing the cost of equity for Aqua Pennsylvania, Inc., the Pennsylvania Public Utility Commission concluded that the current capital market conditions of high inflation and increased interest rates has resulted in the DCF model understating the utility cost of equity, and that weight should be placed on risk premium models, such as the CAPM, in determining the ROE:

> To help control rising inflation, the Federal Open Market Committee has signaled that it is ending its policies designed to maintain low interest rates. Aqua Exc. at 9. Because the DCF model does not directly account for interest rates, consequently, it is slow to respond to interest rate changes. However, I&E's CAPM model uses forecasted yields on ten-year Treasury

[32] DCF results exclude the results for Middlesex Water Company because they do not provide a reasonable equity risk premium over the current yields on the Moody's A rated and Baa rated utility bond indices, which were 5.57 percent and 5.80 percent, respectively, based on a 30-day average ending March 31, 2024.

bonds, and accordingly, its methodology captures forward looking changes in interest rates.

Therefore, our methodology for determining Aqua's ROE shall utilize both I&E's DCF and CAPM methodologies. As noted above, the Commission recognizes the importance of informed judgment and information provided by other ROE models. In the 2012 PPL Order, the Commission considered PPL's CAPM and RP methods, tempered by informed judgment, instead of DCF-only results. We conclude that methodologies other than the DCF can be used as a check upon the reasonableness of the DCF derived ROE calculation. Historically, we have relied primarily upon the DCF methodology in arriving at ROE determinations and have utilized the results of the CAPM as a check upon the reasonableness of the DCF derived equity return. As such, where evidence based on other methods suggests that the DCF-only results may understate the utility's ROE, we will consider those other methods, to some degree, in determining the appropriate range of reasonableness for our equity return determination. In light of the above, we shall determine an appropriate ROE for Aqua using informed judgement based on I&E's DCF and CAPM methodologies.[33]

…..

We have previously determined, above, that we shall utilize I&E's DCF and CAPM methodologies. I&E's DCF and CAPM produce a range of reasonableness for the ROE in this proceeding from 8.90% [DCF] to 9.89% [CAPM]. Based upon our informed judgment, which includes consideration of a variety of factors, including increasing inflation leading to increases in interest rates and capital costs since the rate filing, we determine that a base ROE of 9.75% is reasonable and appropriate for Aqua.[34]

Similarly, the Massachusetts Department of Public Utilities in a recent rate case for NSTAR Electric Company concluded that given the recent increase in interest rates there was "greater certainty" that the results of the DCF model were understating the cost of equity for the utility.[35]

[33] Pennsylvania Public Utility Commission, Docket Nos. R-2021-3027385 and R-2021-3027386, Opinion and Order, May 12, 2022, at 154-155.

[34] *Id*., at 177-178.

[35] Massachusetts Department of Public Utilities, D.P.U. 22-22, November 30, 2022, at 385-386.

Q. IS THERE ANY MARKET EVIDENCE THAT THE LOW END OF YOUR DCF RESULTS IS NOT CONSISTENT WITH THE INVESTOR-REQUIRED RETURN ON EQUITY?

A. Yes. There are numerous examples in which utilities have experienced a negative market response related to the financial effects of a rate decision, including credit rating downgrades and material stock price declines. For example, ALLETE, Inc.,[36] CenterPoint Energy Houston Electric,[37] and Pinnacle West Capital Corporation ("PNW")[38] each received credit rating downgrades following rate case decisions in the past few years for reasons that included below average authorized ROEs. The most recent example is the decision by the Illinois Commerce Commission ("ICC") in mid-December 2023 that rejected the multiyear grid plan proposals of Ameren Illinois Co. ("Ameren IL") and Commonwealth Edison Co. ("ComEd") and authorized lower-than-expected ROEs for both utilities. Specifically, the ICC authorized an ROE for Ameren IL of 8.72 percent and 8.905 percent for ComEd, which was a significant reduction from the Administrative Law Judge's recommendations of 9.24 percent and 9.28 percent, respectively.[39]

Q. HOW DID THE MARKET RESPOND TO THE ICC'S DECISIONS FOR THESE UTILITIES?

A. While the Standard & Poor's ("S&P") 500 Index was increasing, the share prices of the parent companies of both Ameren IL and ComEd (*i.e.*, Ameren Corp. and Exelon Corp.,

[36] Moody's Investors Service, "Credit Opinion: ALLETE, Inc. Update following downgrade," April 3, 2019, at 3.
[37] Fitch Ratings, "Fitch Downgrades CenterPoint Energy Houston Electric to BBB+; Affirms CNP; Outlooks Negative," February 19, 2020.
[38] S&P Capital IQ Pro; Fitch Ratings, "Fitch Downgrades Pinnacle West Capital & Arizona Public Service to 'BBB+'; Outlooks Remain Negative," October 12, 2021; and Moody's Investors Service, "Rating Actions: Moody's downgrades Pinnacle West to Baa1 and Arizona Public Service to A3; outlook negative," November 17, 2021.
[39] Allison Good, "Ameren, Exelon shares fall after Illinois regulators reject grid plans," *Platts*, December 15, 2023.

respectively) each dropped more than 7 percent on December 14, 2023, after the ICC's decision, and declined again by more than 4.4 percent and 6.4 percent the following day, respectively.[40] As of the close on January 5, 2023, Ameren and Exelon's stock prices were, respectively, 8.9 percent and 11.4 percent below where their stock prices closed on December 13, 2023, or the day immediately prior to the ICC's decisions.[41]

In addition, the reactions of equity analysts were universally negative, and questioned whether the parents of both Ameren IL and ComEd (*i.e.*, Ameren Corp. and Exelon Corp., respectively) will shift their capital spending out of the jurisdiction as a result of the uncertainty associated with the multiyear rate plan and low authorized ROEs. For example:

- Barclays characterized the ICC's ROE authorizations as "draconian" and "one of the lowest awarded in recent memory, especially in an elevated interest rate and cost of capital environment."[42] Barclays also stated it found it hard to believe utilities "can deploy capital under the same magnitude on the updated grid plans to be filed, especially under the current proposed ROE framework."
- In its assessment of the impact on Exelon, the parent of ComEd, UBS stated that, "[t]he actions taken by the ICC today call into question, in our view, the regulatory backdrop in which EXC operates."[43]
- Wells Fargo stated that it was not mincing words, and that the ICC's orders were "onerous" and that:

> We now view IL as one of the worst regulatory jurisdictions in the U.S. (nipping at CT's heels). We think the totality of the recent orders suggest that the regulatory balancing act between customers and investors is currently heavily skewed toward customers. As a result, we wonder if AEE

[40] Yahoo! Finance.
[41] Ameren Corp.'s stock price closed at $81.32 on December 13, 2023 and $74.05 on January 5, 2023. Exelon Corp.'s stock price closed at $41.00 on December 13, 2023 and $36.31 on January 5, 2023.
[42] Barclays, "AEE/EXC: Coal Stocking-Stuffer in Illinois," December 14, 2023.
[43] UBS, First Read Exelon Corp., "Negative Rate Case Outcome – Rating and PT Under Review," December 14, 2023.

& EXC will allocate capital away from IL. Keep in mind, IL represents ~25% of both AEE's & EXC's total rate base."[44]

- In its evaluation of Ameren IL, BofA Securities characterized the ICC's decision as "punitive" and stated that it was a surprise based on numerous conversations with investors that believed the ICC may authorize an ROE above the ALJ's recommendation, not substantially lower, and that the downside surprise was one of the biggest in recent memory for their regulated utility coverage.[45] While BofA Securities acknowledged that Ameren IL represents less than 20 percent of Ameren Corp.'s consolidated rate base, it will nonetheless need offsets or capital expenditures elsewhere in order to hit its earnings growth rate targets.[46]
- After the decisions, Guggenheim questioned, "Is Illinois Becoming the Next Connecticut?" Guggenheim noted that investors questioned whether Illinois was "slowly becoming a CT-esque jurisdiction," and that equity and debt holders are going to be wary of Illinois as a jurisdiction going forward and that the ICC is "simply sending a negative message to investors."[47]

Also after the ICC's decisions, Regulatory Research Associates ("RRA") lowered its rating of the Illinois regulatory jurisdiction from Average/2 to Average/3 due to the "concerning pattern of restrictive" rate actions in the state.

CAPM and ECAPM Analysis

Q. PLEASE BRIEFLY DESCRIBE THE CAPM.

A. The CAPM is a risk premium approach that estimates the cost of equity for a given security as a function of a risk-free return plus a risk premium to compensate investors for the non-diversifiable or "systematic" risk of that security.[48] This second component is the product

[44] Wells Fargo, "The ICC Delivers a Lump of Coal for AEE & EXC," December 14, 2023.
[45] BofA Securities, Ameren Corporation, "Illinois delivers downside surprise," December 15, 2023.
[46] *Id*.
[47] Guggenheim, "IL: Is Illinois Becoming the Next Connecticut? To Be Determined, but Taking a Neutral Stance on the State," December 15, 2023.
[48] Systematic risk is the risk inherent in the entire market or market segment, which cannot be diversified away using a portfolio of assets. Unsystematic risk is the risk of a specific company that can, theoretically, be mitigated through portfolio diversification.

of the market risk premium and the beta coefficient, which measures the relative riskiness of the security being evaluated.

The CAPM is defined by four components:

$$r_f + \beta(r_m - r_f) \qquad [3]$$

Where:

K_e = the required market ROE;

β = beta coefficient of an individual security;

r_f = the risk-free rate of return; and

r_m = the required return on the market as a whole.

In this specification, the term $(r_m - r_f)$ represents the market risk premium. According to the theory underlying the CAPM, because unsystematic risk can be diversified away, investors should only be concerned with systematic or non-diversifiable risk. Systematic risk is measured by beta, which is a measure of the volatility of a security as compared to the overall market. Beta is defined as:

$$\beta = \frac{Covariance(r_e, r_m)}{Variance(r_m)} \qquad [4]$$

Variance (r_m) represents the variance of the market return, which is a measure of the uncertainty of the general market. *Covariance* (r_e, r_m) represents the covariance between the return on a specific security and the general market, which reflects the extent to which the return on that security will respond to a given change in the general market return. Thus, beta represents the risk of the security relative to the general market.

Q. WHAT RISK-FREE RATE DID YOU USE IN YOUR CAPM ANALYSIS?

A. I relied on three sources for my estimate of the risk-free rate: (1) the current 30-day average yield on 30-year Treasury bonds;[49] (2) the average projected 30-year Treasury bond yield for the second quarter of 2024 through the second quarter of 2025;[50] and (3) the average projected 30-year Treasury bond yield for 2025 through 2029.[51]

Q. WHAT BETA COEFFICIENTS DID YOU USE IN YOUR CAPM ANALYSIS?

A. As shown in Exhibit AEB-5, I use the beta coefficients for the proxy group companies as reported by *Bloomberg Professional* ("*Bloomberg")* and *Value Line*. The beta coefficients reported by *Bloomberg* are calculated using ten years of weekly returns relative to the S&P 500 Index. The beta coefficients reported by *Value Line* are calculated based on five years of weekly returns relative to the New York Stock Exchange Composite Index. Additionally, as shown on Exhibit AEB-5 and Exhibit AEB-6, I also consider an additional CAPM analysis that relies on the long-term average beta coefficient reported by *Value Line* for the companies in my proxy group from 2013 through 2023.

Q. HOW DID YOU ESTIMATE THE MARKET RISK PREMIUM IN THE CAPM?

A. I estimate the market risk premium as the difference between the implied expected equity market return and the risk-free rate. In Exhibit AEB-7, the expected market return is calculated using the constant growth DCF model discussed earlier in my testimony for the companies in the S&P 500 Index. Based on an estimated market capitalization-weighted dividend yield of 1.57 percent and a weighted long-term growth rate of 11.05 percent, the

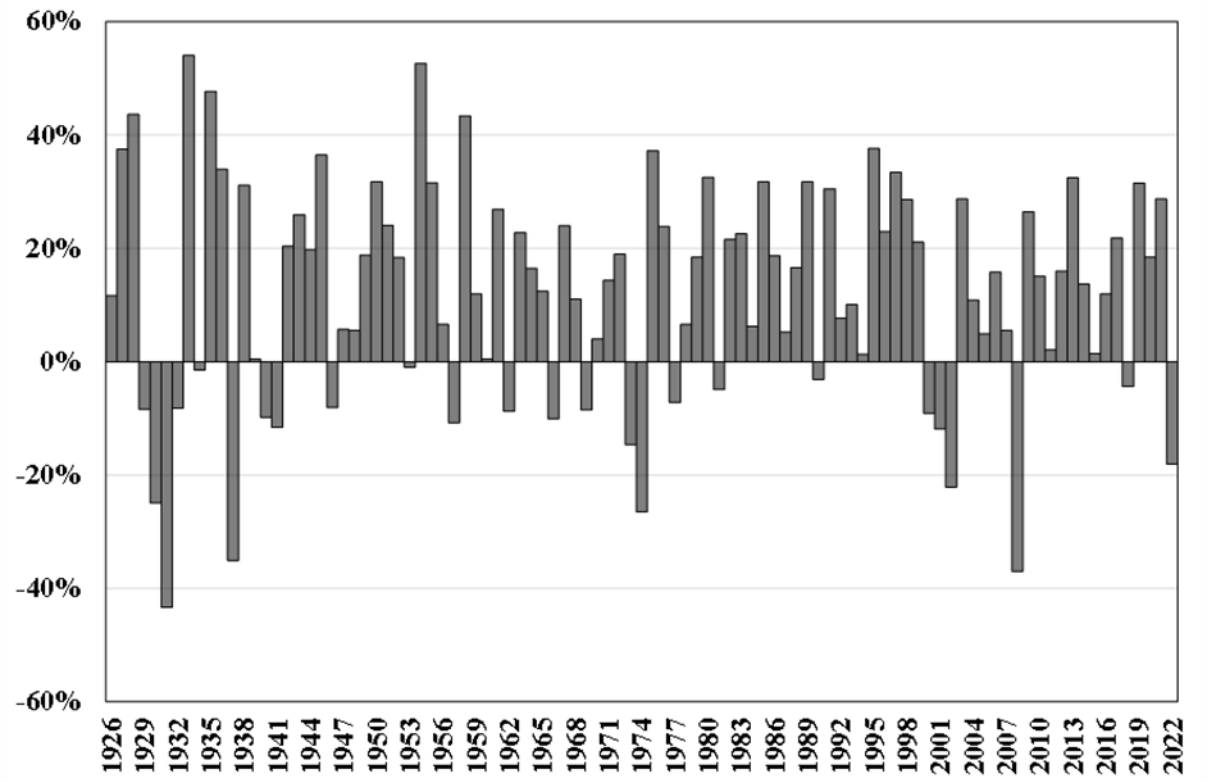
[49] Bloomberg Professional as of March 31, 2024.
[50] *Blue Chip Financial Forecasts*, Vol. 43, No. 4, April 1, 2024, at 2.
[51] *Blue Chip Financial Forecasts*, Vol. 42, No. 12, December 1, 2023, at 14.

estimated required market return for the S&P 500 Index as of March 31, 2024, is 12.70 percent.

Q. HOW DOES THE CURRENT EXPECTED MARKET RETURN COMPARE TO OBSERVED HISTORICAL RETURNS?

A. As shown in Figure 9, given the range of annual equity returns that have been observed over the past century, a current expected market return of 12.70 percent is not unreasonable. As shown, in 50 out of the past 97 years (or roughly 52 percent of observations), the realized equity market return was *at least* 12.70 percent.

Figure 9: Realized U.S. Equity Market Returns (1926-2022)[52]



[52] Depicts total annual returns on large company stocks, as reported in the 2022 *Kroll* SBBI Yearbook.

Q. DID YOU CONSIDER ANOTHER FORM OF THE CAPM IN YOUR ANALYSIS?

A. Yes. I have also considered the results of an ECAPM analysis in estimating the cost of equity for the Company.[53] The ECAPM calculates the product of the adjusted beta coefficient and the market risk premium and applies a weight of 75.00 percent to that result. The model then applies a 25.00 percent weight to the market risk premium without any effect from the beta coefficient. The results of the two calculations are summed, along with the risk-free rate, to produce the ECAPM result, as noted in Equation [5] below:

$$k_e = r_f + 0.75\beta(r_m - r_f) + 0.25(r_m - r_f) \quad [5]$$

Where:

k_e = the required market ROE

β = Adjusted Beta coefficient of an individual security

r_f = the risk-free rate of return

r_m = the required return on the market as a whole

The ECAPM addresses the tendency of the "traditional" CAPM to underestimate the cost of equity for companies with low beta coefficients such as regulated utilities. In that regard, the ECAPM is not redundant to the use of adjusted betas in the traditional CAPM; rather, it recognizes the results of academic research indicating that the risk-return relationship is different (in essence, flatter) than estimated by the CAPM, and that the CAPM underestimates the "alpha," or the constant return term.[54]

Consistent with my CAPM, my application of the ECAPM uses the same three yields on the 30-year Treasury bonds as the risk-free rate, forward-looking market risk premium estimate, and beta coefficients.

[53] *See, e.g.*, Roger A. Morin, *New Regulatory Finance*. Public Utilities Reports, Inc., 2006, at 189.
[54] *Id*., at 191.

Q. WHAT ARE THE RESULTS OF YOUR CAPM AND ECAPM ANALYSES?

A. The results of my CAPM and ECAPM analyses are summarized in Figure 10, as well as presented in Exhibit AEB-5.

Figure 10: Summary of CAPM and ECAPM Results

	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
CAPM:			
Current *Value Line* Beta	11.41%	11.37%	11.37%
Current Bloomberg Beta	10.71%	10.65%	10.65%
Long-term Avg. *Value Line* Beta	10.54%	10.47%	10.46%
ECAPM:			
Current *Value Line* Beta	11.74%	11.71%	11.70%
Current Bloomberg Beta	11.21%	11.16%	11.16%
Long-term Avg. *Value Line* Beta	11.08%	11.03%	11.02%

VIII. REGULATORY AND BUSINESS RISK

Q. DO THE RESULTS OF THE COST OF EQUITY ANALYSES ALONE PROVIDE AN APPROPRIATE ESTIMATE OF THE COST OF EQUITY FOR THE COMPANY?

A. No. These model results provide only a range for the appropriate estimate of the Company's cost of equity. Several additional factors must be considered when determining where the Company's cost of equity falls within the range of analytical results. These risk factors, discussed below, should be considered with respect to their overall effect on the Company's risk profile relative to the proxy group.

A. Flotation Costs

Q. WHAT ARE FLOTATION COSTS?

A. Flotation costs are the costs associated with the sale of new issues of common stock. These costs include out-of-pocket expenditures for preparation, filing, underwriting, and other issuance costs.

Q. WHY IS IT IMPORTANT TO CONSIDER FLOTATION COSTS IN THE ALLOWED ROE?

A. A regulated utility must have the opportunity to earn an ROE that is both competitive and compensatory to attract and retain new investors. To the extent that a company is denied the opportunity to recover prudently incurred flotation costs, actual returns will fall short of expected (or required) returns, thereby diluting equity share value.

Q. ARE FLOTATION COSTS PART OF THE UTILITY'S INVESTED COSTS OR PART OF THE UTILITY'S EXPENSES?

A. Flotation costs are part of the invested costs of the utility, which are properly reflected on the balance sheet under "paid in capital." They are not current expenses, and, therefore, are not reflected on the income statement. Rather, like investments in rate base or the issuance costs of long-term debt, flotation costs are incurred over time. As a result, the great majority of a utility's flotation cost is incurred prior to the test year but remains part of the cost structure that exists during the test year and beyond, and as such, should be recognized for ratemaking purposes. Therefore, it is irrelevant whether an issuance occurs during the test year or is planned for the test year because failure to allow recovery of past flotation costs may deny Tennessee-American the opportunity to earn its required rate of return in the future.

Q. PLEASE PROVIDE AN EXAMPLE OF WHY A FLOTATION COST ADJUSTMENT IS NECESSARY TO COMPENSATE INVESTORS FOR THE CAPITAL THEY HAVE INVESTED.

A. As shown in Exhibit AEB-8, in AWK's most recent stock issuance, the offering price was $135.50 per share of common stock. After paying flotation costs associated with the equity issuance, which include fees paid to underwriters and attorneys, among others, American Water's net proceeds are only $133.41 per share invested. American Water invests that $133.41 per share in plant used to serve its customers, which becomes part of the invested capital of the company. Absent a flotation cost adjustment, the investor will thereafter earn a return on only the $133.41 per share of invested capital, even though the contribution was $135.50. Making a small flotation cost adjustment gives the investor a reasonable opportunity to earn the authorized return, rather than the lower return that results when the authorized return is applied to an amount less than what the investor contributed.

Q. IS THE NEED TO CONSIDER FLOTATION COSTS ELIMINATED BECAUSE TENNESSEE-AMERICAN IS A WHOLLY-OWNED SUBSIDIARY OF AWK?

A. No. Although Tennessee-American is a wholly-owned subsidiary of AWK, it is appropriate to consider flotation costs because wholly-owned subsidiaries receive equity capital from their parent and provide returns on the capital that roll up to the parent, which is designated to attract and raise capital based upon the returns of those subsidiaries. To deny recovery of issuance costs associated with the capital that is invested in the subsidiaries ultimately penalizes the investors that fund the utility operations and could inhibit the utility's ability to obtain new equity capital at a reasonable cost.

Q. IS THE NEED TO CONSIDER FLOTATION COSTS RECOGNIZED BY THE ACADEMIC AND FINANCIAL COMMUNITIES?

A. Yes. The need to reimburse shareholders for the lost returns associated with equity issuance costs is recognized by the academic and financial communities in the same spirit that investors are reimbursed for the costs of issuing debt. This treatment is consistent with the philosophy of a fair rate of return. According to Dr. Shannon Pratt:

> Flotation costs occur when new issues of stock or debt are sold to the public. The firm usually incurs several kinds of flotation or transaction costs, which reduce the actual proceeds received by the firm. Some of these are direct out-of-pocket outlays, such as fees paid to underwriters, legal expenses, and prospectus preparation costs. Because of this reduction in proceeds, the firm's required returns on these proceeds equate to a higher return to compensate for the additional costs. Flotation costs can be accounted for either by amortizing the cost, thus reducing the cash flow to discount, or by incorporating the cost into the cost of capital. Because flotation costs are not typically applied to operating cash flow, one must incorporate them into the cost of capital.[55]

Q. HOW DID YOU CALCULATE THE FLOTATION COSTS FOR TENNESSEE-AMERICAN?

A. My flotation cost calculation is based on the costs incurred by AWK in that company's most recent equity offering as of February 28, 2023. That flotation cost percentage is then applied to the DCF analysis to estimate impact on ROE. As shown in Exhibit AEB-8, based on the flotation costs incurred in the most recent AWK issuance, the impact on the proxy group's cost of equity amounts to 8 basis points (*i.e.*, 0.08 percent) based on the median and 6 basis points (*i.e.*, 0.06 percent) based on the mean.

[55] Shannon P. Pratt, Cost of Capital Estimation and Applications, Second Edition, at 220-221.

Q. DO YOUR FINAL RESULTS INCLUDE AN ADJUSTMENT FOR FLOTATION COST RECOVERY?

A. No. While the final ROE results do not incorporate an explicit adjustment for flotation costs, I considered the estimated effect of flotation cost on ROE in identifying a recommended ROE within the range of ROE estimates from the various models.

Regulatory Risk

Q. HOW DOES THE REGULATORY ENVIRONMENT AFFECT INVESTORS' RISK ASSESSMENTS?

A. The ratemaking process is premised on the principle that, for investors and companies to commit the capital needed to provide safe and reliable utility service, the subject utility must have the opportunity to recover the market-required return on its invested capital. Regulatory commissions recognize that because utility operations are capital intensive, their decisions should enable the utility to attract capital at reasonable terms, and that doing so balances the long-term interests of investors and customers. Utilities must finance their operations and thus require the opportunity to earn a reasonable return on their invested capital to maintain their financial profiles. Tennessee-American is no exception. Therefore, the regulatory environment is one of the most important factors considered in both debt and equity investors' risk assessments.

From the perspective of debt investors, the authorized return should enable the utility to generate the cash flow needed to meet its near-term financial obligations, make the capital investments needed to maintain and expand its systems, and maintain the necessary levels of liquidity to fund unexpected events. This financial liquidity must be

derived not only from internally-generated funds, but also by efficient access to capital markets. Moreover, because fixed income investors have many investment alternatives, even within a given market sector, the utility's financial profile must be adequate on a relative basis to ensure its ability to attract capital under a variety of economic and financial market conditions.

Equity investors require that the authorized return be adequate to provide a risk-comparable return on the equity portion of the utility's capital investments. Because equity investors are the residual claimants on the utility's cash flows (*i.e.*, the equity return is subordinate to debt-service obligations), they are particularly concerned with the strength of regulatory support and its effect on future cash flows.

Q. DO CREDIT RATING AGENCIES CONSIDER REGULATORY RISK IN ESTABLISHING A COMPANY'S CREDIT RATING?

A. Yes. Both S&P and Moody's consider the overall regulatory framework in establishing credit ratings. Moody's establishes credit ratings based on four key factors: (1) regulatory framework; (2) the ability to recover costs and earn returns; (3) diversification; and (4) financial strength, liquidity and key financial metrics. Of these criteria, regulatory framework and the ability to recover costs and earn returns are each given a weighting factor of 25%. Taking these two together, half of Moody's overall assessment of business and financial risk for regulated utilities is affected by regulatory decisions.[56]

S&P also identifies the regulatory framework as an important factor in credit ratings for regulated utilities, stating: "One significant aspect of regulatory risk that influences

[56] Moody's Investors Service, Rating Methodology: Regulated Electric and Gas Utilities, June 23, 2017, at 4.

credit quality is the regulatory environment in the jurisdictions in which a utility operates."[57] S&P identifies four specific factors that it uses to assess the credit implications of the regulatory jurisdictions of investor-owned regulated utilities: (1) regulatory stability; (2) tariff-setting procedures and design; (3) financial stability; and (4) regulatory independence and insulation.[58]

Q. HOW DOES THE REGULATORY ENVIRONMENT IN WHICH A UTILITY OPERATES AFFECT ITS ACCESS TO AND COST OF CAPITAL?

A. The regulatory environment can significantly affect both the access to and cost of capital in several ways. First, the proportion and cost of debt capital available to utility companies are influenced by the rating agencies' assessment of the regulatory environment. As noted by Moody's, "the characteristics and transparency of the concession(s) and regulations under which the utility operates, the track record of the regulatory regime in setting tariffs and applying regulations consistently are key elements in assessing the overall stability of a water utility's business profile."[59]

Q. HAVE YOU CONDUCTED AN ANALYSIS OF THE REGULATORY ENVIRONMENT IN TENNESSEE AS COMPARED WITH THE REGULATORY JURISDICTIONS WHERE THE PROXY COMPANIES OPERATE?

A. Yes. I have evaluated the regulatory framework in Tennessee on three factors that are important in terms of providing a regulated utility a reasonable opportunity to earn its authorized ROE: (1) test year convention (*i.e.*, forecast vs. historical); (2) use of revenue

[57] Standard & Poor's Global Ratings. Ratings Direct. "Assessing U.S. Investor-Owned Utility Regulatory Environments." August 10, 2016, at 2.
[58] *Id*., at 1.
[59] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, June 8, 2018, at 7.

decoupling mechanisms or other clauses that provide revenue stabilization; and (3) the prevalence of capital cost recovery between rate cases. The results of this regulatory risk assessment are shown in Exhibit AEB-9 and are summarized as follows:

Test year convention: Tennessee-American uses a fully forecasted test year, referred to as the Attrition Year, that provides for the ability to recover the costs that are projected during the rate case. Approximately 51.79 percent of the operating companies held by the proxy group provide service in jurisdictions that use a fully or partially forecast test year. Forecasted test years have been relied on for several years and produce cost estimates that are more reflective of future costs which results in more accurate recovery of incurred costs and mitigates the regulatory lag associated with historical test years.

Volumetric Risk: Water revenues are highly weather-dependent and are at risk to declining use per customer. Tennessee-American does not currently have protection against volumetric risk, differentiating it from the 58.93 percent of the operating companies held by the proxy group that have some form of protection against volumetric risk.

Capital Cost Recovery: Tennessee-American has a Qualified Infrastructure Investment Program ("QIIP") to recover a portion of the Company's capital investment costs. In comparison, approximately 79 percent of the operating companies held by the proxy group have some form of capital cost recovery mechanism in place.

Q. WHAT IS YOUR CONCLUSION REGARDING THE RELATIVE REGULATORY RISK OF TENNESSEE-AMERICAN AS COMPARED TO YOUR PROXY GROUP?

A. While Tennessee-American relies on a future test year in setting rates (i.e., the Attrition Year), this is generally consistent with the proxy group companies. In addition, the majority of the operating utilities owned by the proxy group companies have implemented both decoupling and have capital tracking mechanisms. Therefore, Tennessee-American has slightly higher risk than the proxy group companies.

Small Size Risk

Q. IS THERE A RISK TO A FIRM ASSOCIATED WITH SMALL SIZE?

A. Yes. Both the financial and academic communities have long accepted the proposition that the cost of equity for small firms is subject to a "size effect." While empirical evidence of the size effect often is based on studies of industries other than regulated utilities, utility analysts also have noted the risk associated with small market capitalizations. Specifically, an analyst for Ibbotson Associates noted:

> For small utilities, investors face additional obstacles, such as a smaller customer base, limited financial resources, and a lack of diversification

across customers, energy sources, and geography. These obstacles imply a higher investor return. [60]

Q. HOW DOES THE SMALLER SIZE OF A UTILITY AFFECT ITS BUSINESS RISK?

A. In general, smaller companies are less able to withstand adverse events that affect their revenues and expenses. The impact of weather variability, the loss of large customers to bypass opportunities, or the erosion of demand as a result of general macroeconomic conditions or fuel price volatility will have a proportionately greater impact on the earnings and cash flow volatility of smaller utilities. Similarly, capital expenditures for non-revenue producing investments, such as system maintenance and replacements, will put proportionately greater pressure on customer costs, potentially leading to customer attrition or demand reduction. Taken together, these risks affect the return required by investors for smaller companies**.**

Q. HOW DO TENNESSEE-AMERICAN'S WATER DISTRIBUTION OPERATIONS IN TENNESSEE COMPARE IN SIZE TO THE PROXY GROUP COMPANIES?

A. The Company's water distribution operations are substantially smaller than the median for the proxy group companies in terms of market capitalization. While Tennessee-American is not publicly-traded on a stand-alone basis, as shown on Exhibit 10, Tennessee-American's common equity based on its 2023 net utility plant and equity ratio is substantially smaller than the median market capitalization of the proxy group companies.

[60] Michael Annin, "Equity and the Small-Stock Effect." Public Utilities Fortnightly, October 15, 1995.

Q. HOW DO YOU ESTIMATE THE SIZE PREMIUM FOR TENNESSEE-AMERICAN?

A. Given this relative size information, it is possible to estimate the impact of size on the cost of equity for the Company using *Kroll* Cost of Capital Navigator data that estimates the stock risk premia based on the size of a company's market capitalization.[61] As shown in Exhibit 10, the median market capitalization of the proxy group is approximately $3.20 billion, which corresponds to the fifth decile of *Kroll's* market capitalization data.[62] Based on *Kroll's* analysis, that decile corresponds to a size premium of 0.93 percent (*i.e.*, 93 basis points). In comparison, Tennessee-American's common equity of approximately $196 million results in an implied market capitalization of approximately $304 million, which falls within the ninth decile, corresponding to a size premium of 2.15 percent (*i.e.*, 215 basis points). The difference between the size premium for the Company and the size premium for the proxy group is 122 basis points (*i.e.*, 2.15 percent minus 0.93 percent).

Q. WERE UTILITY COMPANIES INCLUDED IN THE SMALL SIZE RISK PREMIUM STUDY CONDUCTED BY *KROLL*?

A. Yes. As shown in Exhibit 7.2 of the *Kroll* (formerly *Duff & Phelps*) 2019 Valuation Handbook, OGE Energy Corp. had the largest market capitalization of the companies contained in the fourth decile, which indicates that Kroll has included utility companies in its size risk premium study.[63]

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61 Kroll Cost of Capital Navigator – Size Premium.

62 Id.

63 *Kroll*, Valuation Handbook: Guide to Cost of Capital, 2019, Exhibit 7.2.

Q. IS THE SIZE PREMIUM APPLICABLE TO COMPANIES IN REGULATED INDUSTRIES SUCH AS WATER UTILITIES?

A. Yes. For example, Zepp (2003) provided the results of two studies that showed evidence of the required risk premium for small water utilities. The first study, which was conducted by the Staff of the California Public Utilities Commission, computed proxies for beta risk using accounting data from 1981 through 1991 for 58 water utilities and concluded that smaller water utilities had greater risk and required higher returns on equity than larger water utilities.[64] The second study examined the differences in required returns over the period of 1987 through 1997 for two large and two small water utilities in California. As Zepp (2003) showed, the required return for the two small water utilities calculated using the DCF model was on average 99 basis points higher than the two larger water utilities.[65] Additionally, Chrétien and Coggins (2011) studied the CAPM and its ability to estimate the risk premium for the utility industry, and in particular subgroups of utilities.[66] The article considered the CAPM, the Fama-French three-factor model, and a model similar to the ECAPM. In the study, the Fama-French three-factor model explicitly included an adjustment to the CAPM for risk associated with size. As Chrétien and Coggins (2011) show, the beta coefficient on the size variable for the U.S. natural gas utility group was positive and statistically significant indicating that small size risk was relevant for regulated natural gas utilities.[67]

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64 Thomas M. Zepp, "Utility Stocks and the Size Effect—Revisited," The Quarterly Review of Economics and Finance. Vol. 43, No. 3, 2003, at 578–582.

65 Id.

66 Stéphane Chrétien and Frank Coggins, "Cost Of Equity For Energy Utilities: Beyond The CAPM," Energy Studies Review, Vol. 18, No. 2, 2011.

67 Id.

Q. HAVE REGULATORS IN OTHER JURISDICTIONS MADE A SPECIFIC RISK ADJUSTMENT TO THE COST OF EQUITY RESULTS BASED ON A COMPANY'S SMALL SIZE?

A. Yes. For example, in Order No. 15, the Regulatory Commission of Alaska ("RCA") concluded that Alaska Electric Light and Power Company ("AEL&P") was riskier than the proxy group companies due to small size as well as other business risks. The RCA did "not believe that adopting the upper end of the range of ROE analyses in this case, without an explicit adjustment, would adequately compensate AEL&P for its greater risk." [68] Thus, the RCA awarded AEL&P an ROE of 12.875 percent, which was 108 basis points above the highest cost of equity estimate from any model presented in the case.[69] Similarly, the RCA has also noted that small size, as well as other business risks such as structural regulatory lag, weather risk, alternative rate mechanisms, gas supply risk, geographic isolation and economic conditions, increased the risk of ENSTAR Natural Gas Company.[70] Ultimately, the RCA concluded that:

> Although we agree that the risk factors identified by ENSTAR increase its risk, we do not attempt to quantify the amount of that increase. Rather, we take the factors into consideration when evaluating the remainder of the record and the recommendations presented by the parties. After applying our reasoned judgment to the record, we find that 11.875% represents a fair ROE for ENSTAR.[71]

Additionally, the Minnesota Public Utilities Commission ("Minnesota PUC") authorized an ROE for Otter Tail Power Company ("Otter Tail") above the mean DCF results as a result of multiple factors, including Otter Tail's small size. The Minnesota PUC stated:

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[68] Regulatory Commission of Alaska, Docket No. U-10-29, Order No. 15, September 2, 2011, at 37.
[69] *Id.*, at 32 and 37.
[70] Regulatory Commission of Alaska, Docket No. U-16-066, Order No. 19, September 22, 2017, at 50-52.
[71] *Id*.

> The record in this case establishes a compelling basis for selecting an ROE above the mean average within the DCF range, given Otter Tail's unique characteristics and circumstances relative to other utilities in the proxy group. These factors include the company's relatively smaller size, geographically diffuse customer base, and the scope of the Company's planned infrastructure investments. [72]

Finally, in Opinion Nos. 569 and 569-A, the Federal Energy Regulatory Commission ("FERC") adopted a size premium adjustment in its CAPM estimates for electric utilities. In those decisions, the FERC noted that "the size adjustment was necessary to correct for the CAPM's inability to fully account for the impact of firm size when determining the cost of equity."[73]

Q. HOW HAVE YOU CONSIDERED THE SMALLER SIZE OF TENNESSEE-AMERICAN IN YOUR RECOMMENDATION OF THE COMPANY'S ROE IN THIS PROCEEDING?

A. While I have estimated the effect of Tennessee-American's small size on the cost of equity, I am not proposing a specific adjustment for this risk factor. Rather, I have considered the small size of the Company's utility operations in evaluating where within the range of analytical results that the Company's ROE should fall. All else equal, the additional risk associated with the Company's small size supports an ROE that is above the average of the range of results produced by the cost of equity estimation models.

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[72] Minnesota Public Utilities Commission, Docket No. E017/GR-15-1033, Order, August 16, 2016, at 55.

[73] *Ass'n. of Businesses Advocating Tariff Equity, et. al., v. Midcontinent Indep. Sys. Operator, Inc., et. al.*, 171 FERC ¶ 61,154 (2020), at ¶ 75. The U.S. Court of Appeals recently vacated FERC Order No. 569 decisions that related to its risk premium model and remanded the case to FERC to reopen the proceedings. However, in its decision, the Court did not reject FERC's inclusion of the size premium to estimate the CAPM. (*See*, United States Court of Appeals Case No. 16-1325, Decision No. 16-1325, August 9, 2022 at 20).

IX. CAPITAL STRUCTURE

Q. WHAT IS THE COMPANY'S PROPOSED CAPITAL STRUCTURE?

A. The Company proposes to establish a ratemaking capital structure consisting of 54.52 percent common equity, 43.49 percent long-term debt and 1.99 percent short-term debt.

Q. IS THE CAPITAL STRUCTURE OF THE COMPANY AN IMPORTANT CONSIDERATION IN THE DETERMINATION OF THE APPROPRIATE ROE?

A. Yes. The equity ratio is the primary indicator of financial risk for a regulated utility. All else equal, a higher debt ratio increases the risk to investors. For debt holders, higher debt ratios result in a greater portion of the available cash flow being required to meet debt service, thereby increasing the risk associated with the payments on debt. The result of increased risk is a higher interest rate. The incremental risk of a higher debt ratio is more significant for common equity shareholders, whose claim on the cash flow of the Company is secondary to debt holders. Therefore, the greater the debt service requirement, the less cash flow is available for common equity holders.

Q. HOW SHOULD THE CAPITAL STRUCTURE BE SET FOR UTILITY OPERATING COMPANIES?

A. As is discussed in the Direct Testimony of Nicholas Furia, it is important to consider the quality and variability of cash flows, future revenues, future investment needs, the overall regulatory risk profile, and the targeted credit rating. For example, all else equal, a company with greater variability in cash flows or uncertainty in future revenues should have lower leverage than a company with more stable cash flows.

Q. DID YOU CONDUCT ANY ANALYSIS TO DETERMINE IF THE COMPANY'S REQUESTED EQUITY RATIO WAS REASONABLE?

A. Yes. I compared the Company's proposed capital structure relative to the actual capital structures of the utility operating subsidiaries of the companies in the proxy group.

Q. HOW DID YOU CONDUCT YOUR ANALYSIS OF THE PROXY GROUP CAPITAL STRUCTURES?

A. Specifically, I have calculated the average proportion of common equity, long-term debt, preferred equity and short-term debt for the most recent three years for each of the utility operating subsidiaries of the proxy group companies. As shown in Exhibit AEB-11, the common equity ratios for operating subsidiaries of the proxy group companies over the past three years ranged from 44.57 percent to 59.75 percent, with an average of 53.50 percent. Therefore, Tennessee-American's proposed equity ratio is well within the range of equity ratios for the utility operating subsidiaries of the proxy group companies.

Q. ARE THERE OTHER FACTORS TO BE CONSIDERED IN SETTING THE COMPANY'S CAPITAL STRUCTURE?

A. Yes, there are other factors that should be considered in setting the Company's capital structure, namely the challenges that the credit rating agencies have highlighted as placing pressure on the credit metrics for utilities.

For example, while Moody's recently revised its outlook for the utility sector from "negative" to "stable", Moody's continues to note that high interest rates and increased capital spending will place pressure on credit metrics. Thus, Moody's highlights

constructive regulatory outcomes that promote timely cost recovery as a key factor in supporting utility credit quality.[74]

S&P also recently revised its outlook for the industry; however, S&P downgraded its outlook from stable to negative.[75] S&P noted that for the fifth consecutive year it expects downgrades will exceed upgrades with the industry facing significant risks over the near-term as a result of physical risks due to climate change, increased levels of capital spending and cash-flow deficits that are not being "funded in a sufficiently credit supportive manner".[76] In regard to the effect of increased capital spending, S&P noted:

> The industry's capital spending remains at record levels, supporting initiatives for safety, reliability, energy transition, and growth. We consider these trends long term and expect that capital spending will only continue to increase over this decade.
>
> Accordingly, cash flow deficits have increased, pressuring the industry's credit quality. For 2024, our base case assumes that the industry will fund its approximate $85 billion of cash flow deficits with about $40 billion in asset sales and equity issuance.
>
> For 2023, the industry's actual equity issuance was considerably below our expectations, resulting in a weakening of financial performance and credit quality. If this trend persists, credit quality will again likely experience pressure in 2024.[77]

Further, S&P notes that Federal Regulation related to Per-and polyfluroalkyl substances ("PFAS") could pressure liquidity reserves and affordability in the water

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[74] Moody's Investors Service, Outlook, "Outlook turns stable on low prices and credit-supportive regulation," September 7, 2023.

[75] S&P Global Ratings, "Rising Risks: Outlook For North American Investor-Owned Regulated Utilities Weakens, February 14, 2024.

[76] Id.

[77] *Id.,* at 6-8.

utilities sector, which could affect the credit quality of the water utilities due to the potential increased capital and operating costs.[78]

Fitch Ratings ("Fitch") has stated that it is maintaining a "deteriorating outlook" on the U.S. utility sector in 2024 based on elevated capital spending and continuing higher interest rates that place pressure on credit metrics. Fitch noted that bill affordability will remain a major issue for the industry that could affect future regulatory outcomes, and that while it expects authorized ROEs to start trending up with the increase in interest rates, albeit with a lag, given the uncertain macroeconomic environment and bill pressure on customers, the lag could be longer than in previous cycles.[79]

The credit ratings agencies' continued concerns over the negative effects of inflation, higher interest rates, and increased capital expenditures underscore the importance of maintaining adequate cash flow metrics for the industry as a whole, and Tennessee-American in particular.

Q. WILL THE CAPITAL STRUCTURE AND ROE AUTHORIZED IN THIS PROCEEDING AFFECT THE COMPANY'S ACCESS TO CAPITAL AT REASONABLE RATES?

A. Yes. The level of earnings authorized by the Commission directly affects the Company's ability to fund its operations with internally generated funds. Both bond investors and rating agencies expect a significant portion of ongoing capital investments to be financed with internally-generated funds. In addition, it is important to recognize that because a

[78] S&P Global Ratings, "Pending Federal Regulation Could Significantly Affect Thousands of U.S. Water Utilities, December 11, 2023.

[79] Fitch Ratings, "North American Utilities, Power & Gas Outlook," S&P Market Intelligence, November 13, 2023.

utility's investment horizon is very long, investors require the assurance of a sufficiently high return to satisfy the long-term financing requirements of the assets placed into service. Those assurances, which often are measured by the relationship between internally generated cash flows and debt (or interest expense), depend quite heavily on the capital structure. As a consequence, both the ROE and capital structure are very important to debt and equity investors, particularly given the capital market conditions discussed previously.

Q. WHAT ARE YOUR CONCLUSIONS ABOUT TENNESSEE-AMERICAN'S PROPOSED CAPITAL STRUCTURE?

A. Considering the actual capital structures of the proxy group operating companies, I believe that Tennessee-American's proposed common equity ratio of 54.52 percent is reasonable. The proposed equity ratios are well within the range established by the capital structures of the utility operating subsidiaries of the proxy companies and below the average market value common equity ratio of the proxy group companies.

X. CONCLUSIONS AND RECOMMENDATION

Q. WHAT IS YOUR CONCLUSION REGARDING A FAIR ROE FOR TENNESSEE-AMERICAN?

A. Figure 11 summarizes the results of my cost of equity analyses. Based on the quantitative and qualitative analyses presented in my direct testimony, and the business and financial risks of the Company as compared to the proxy group, an ROE of 10.75 percent reasonably reflects the investor-required return.

Figure 11: Summary of Analytical Results[80]

	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
Constant Growth DCF			
Mean Results:			
30-Day Average	9.08%	10.08%	11.20%
90-Day Average	9.01%	10.02%	11.13%
180-Day Average	8.90%	9.90%	11.02%
Average	9.00%	10.00%	11.12%
Median Results:			
30-Day Average	8.86%	9.97%	10.94%
90-Day Average	8.80%	9.96%	10.88%
180-Day Average	8.75%	9.90%	10.80%
Average	8.81%	9.94%	10.87%

	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
CAPM:			
Current *Value Line* Beta	11.44%	11.41%	11.40%
Current Bloomberg Beta	10.74%	10.70%	10.68%
Long-term Avg. *Value Line* Beta	10.56%	10.51%	10.49%
ECAPM:			
Current *Value Line* Beta	11.76%	11.74%	11.73%
Current Bloomberg Beta	11.24%	11.21%	11.19%
Long-term Avg. *Value Line* Beta	11.10%	11.06%	11.05%

Q. WHAT IS YOUR CONCLUSION WITH RESPECT TO THE COMPANY'S PROPOSED CAPITAL STRUCTURE?

A. Tennessee-American's proposal to establish a capital structure based on 54.52 percent common equity, 43.49 percent long-term debt and 1.99 percent short-term debt is well within the range of actual capital structures of the proxy group companies. Further, taking into consideration the impact of current and projected market conditions on the cash flows

[80] DCF results exclude the results for Middlesex Water Company because they do not provide a reasonable equity risk premium over the current yields on the Moody's A rated and Baa rated utility bond indices, which were 5.57 percent and 5.80 percent, respectively, based on a 30-day average ending March 31, 2024.

of utilities as raised by the credit rating agencies, I conclude that the Company's proposal is reasonable and should be adopted for ratemaking purposes.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

Ann E. Bulkley

PRINCIPAL

Boston 508.981.0866 Ann.Bulkley@brattle.com

With more than 25 years of experience in the energy industry, Ms. Bulkley specializes in regulatory economics for the electric and natural gas and water utility sectors, including valuation of regulated and unregulated utility assets, cost of capital, and capital structure issues.

Ms. Bulkley has extensive state and federal regulatory experience, and she has provided expert testimony on the cost of capital in nearly 100 regulatory proceedings before 32 state regulatory commissions and the Federal Energy Regulatory Commission (FERC).

In addition to her regulatory experience, Ms. Bulkley has provided valuation and appraisal services for a variety of purposes, including the sale or acquisition of utility assets, regulated ratemaking, ad valorem tax disputes, and other litigation purposes. In addition, she has experience in the areas of contract and business unit valuation, strategic alliances, market restructuring, and regulatory and litigation support.

Ms. Bulkley is a Certified General Appraiser licensed in the Commonwealth of Massachusetts and the State of New Hampshire.

Prior to joining Brattle, Ms. Bulkley was a Senior Vice President at an economic consultancy and held senior positions at several other consulting firms.

AREAS OF EXPERTISE

- Regulatory Economics, Finance & Rates
- Regulatory Investigations & Enforcement
- Tax Controversy & Transfer Pricing
- Electricity Litigation & Regulatory Disputes
- M&A Litigation

EDUCATION

- **Boston University**
  MA in Economics
- **Simmons College**
  BA in Economics and Finance

PROFESSIONAL EXPERIENCE

- **The Brattle Group (2022–Present)**
  Principal
- **Concentric Energy Advisors, Inc. (2002–2021)**
  Senior Vice President
  Vice President
  Assistant Vice President
  Project Manager
- **Navigant Consulting, Inc. (1997–2002)**
  Project Manager
- **Reed Consulting Group (1995-1997)**
  Consultant- Project Manager
- **Cahners Publishing Company (1995)**
  Economist

SELECTED CONSULTING EXPERIENCE & EXPERT TESTIMONY

REGULATORY ANALYSIS AND RATEMAKING

Have provided a range of advisory services relating to regulatory policy analysis and many aspects of utility ratemaking, with specific services including:

- Cost of capital and return on equity testimony, cost of service and rate design analysis and testimony, development of ratemaking strategies
- Development of merchant function exit strategies

- Analysis and program development to address residual energy supply and/or provider of last resort obligations
- Stranded costs assessment and recovery
  Performance-based ratemaking analysis and design
- Many aspects of traditional utility ratemaking (e.g., rate design, rate base valuation)

COST OF CAPITAL

Have provided expert testimony on the cost of capital and capital structure in nearly 100 regulatory proceedings before state and federal regulatory commissions in the United States.

RATEMAKING

Have assisted several clients with analysis to support investor-owned and municipal utility clients in the preparation of rate cases. Sample engagements include:

- Assisted several investor-owned and municipal clients on cost allocation and rate design issues including the development of expert testimony supporting recommended rate alternatives.
- Worked with Canadian regulatory staff to establish filing requirements for a rate review of a newly regulated electric utility. Along with analyzing and evaluating rate application, attended hearings and conducted investigation of rate application for regulatory staff and prepared, supported, and defended recommendations for revenue requirements and rates for the company. Additionally, developed rates for gas utility for transportation program and ancillary services.

VALUATION

Have provided valuation services to utility clients, unregulated generators, and private equity clients for a variety of purposes, including ratemaking, fair value, ad valorem tax, litigation and damages, and acquisition. Appraisal practices are consistent with the national standards established by the Uniform Standards of Professional Appraisal Practice.

Representative projects/clients have included:

- Prepared appraisals of electric utility transmission and distribution assets for ad valorem tax purposes.
- Prepared appraisals of hydroelectric generating facilities for ad valorem tax purposes.
- Conducted appraisals of fossil fuel generating facilities for ad valorem tax purposes.
- Conducted appraisals of generating assets for the purposes of unwinding sale-leaseback agreements.
- For a confidential utility client, prepared valuation of fossil and nuclear generation assets for financing purposes for regulated utility client.

- Conducted a strategic review of the acquisition of nuclear generation assets. Review included the evaluation of the operating costs of the facilities and the long-term liabilities associated with the assets including the decommissioning of the assets.
- Prepared a valuation of a portfolio of generation assets for a large energy utility to be used for strategic planning purposes. Valuation approach included an income approach, a real options analysis, and a risk analysis.
- Assisted clients in the restructuring of NUG contracts through the valuation of the underlying assets. Performed analysis to determine the option value of a plant in a competitively priced electricity market following the settlement of the NUG contract.
- Prepared market valuations of several purchase power contracts for large electric utilities in the sale of purchase power contracts. Assignment included an assessment of the regional power market, analysis of the underlying purchase power contracts, and a traditional discounted cash flow valuation approach, as well as a risk analysis. Analyzed bids from potential acquirers using income and risk analysis approached. Prepared an assessment of the credit issues and value at risk for the selling utility.
- Prepared appraisal of a portfolio of generating facilities for a large electric utility to be used for financing purposes.
- Conducted a valuation of regulated utility assets for the fair value rate base estimate used in electric rate proceedings in Indiana.
- Prepared an appraisal of a fleet of fossil generating assets for a large electric utility to establish the value of assets transferred from utility property.
- Conducted due diligence on an electric transmission and distribution system as part of a buy-side due diligence team.
- Provided analytical support and prepared testimony regarding the valuation of electric distribution system assets in five communities in a condemnation proceeding.
- Prepared feasibility reports analyzing the expected net benefits resulting from municipal ownership of investor-owned utility operations.
- Prepared independent analyses of proposal for the proposed government condemnation of the investor-owned utilities in Maine and the formation of a public power district.
- Valued purchase power agreements in the transfer of assets to a deregulated electric market.

STRATEGIC AND FINANCIAL ADVISORY SERVICES

Have assisted several clients across North America with analytically-based strategic planning, due diligence, and financial advisory services.

Representative projects include:

- Preparation of feasibility studies for bond issuances for municipal and district steam clients.
- Assisted in the development of a generation strategy for an electric utility. Analyzed various NERC regions to identify potential market entry points. Evaluated potential competitors and alliance partners. Assisted in the development of gas and electric price forecasts. Developed a framework for the implementation of a risk management program.
- Assisted clients in identifying potential joint venture opportunities and alliance partners. Contacted interviewed and evaluated potential alliance candidates based on company-established criteria for several LDCs and marketing companies. Worked with several LDCs and unregulated marketing companies to establish alliances to enter into the retail energy market. Prepared testimony in support of several merger cases and participated in the regulatory process to obtain approval for these mergers.
- Assisted clients in several buy-side due diligence efforts, providing regulatory insight and developing valuation recommendations for acquisitions of both electric and gas properties.

Brattle

BULKLEY TESTIMONY LISTING

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Arizona Corporation Commission				
UNS Electric	11/22	UNS Electric	Docket No. E-04204A-15-0251	Return on Equity
Tucson Electric Power Company	6/22	Tucson Electric Power Company	Docket No. G-01933A-22-0107	Return on Equity
Southwest Gas Corporation	12/21	Southwest Gas Corporation	Docket No. G-01551A-21-0368	Return on Equity
Arizona Public Service Company	10/19	Arizona Public Service Company	Docket No. E-01345A-19-0236	Return on Equity
Tucson Electric Power Company	04/19	Tucson Electric Power Company	Docket No. E-01933A-19-0028	Return on Equity
Tucson Electric Power Company	11/15	Tucson Electric Power Company	Docket No. E-01933A-15-0322	Return on Equity
UNS Electric	05/15	UNS Electric	Docket No. E-04204A-15-0142	Return on Equity
UNS Electric	12/12	UNS Electric	Docket No. E-04204A-12-0504	Return on Equity
Arkansas Public Service Commission				
Oklahoma Gas and Electric Co	10/21	Oklahoma Gas and Electric Co	Docket No. D-18-046-FR	Return on Equity
Arkansas Oklahoma Gas Corporation	10/13	Arkansas Oklahoma Gas Corporation	Docket No. 13-078-U	Return on Equity
California Public Utilities Commission				
PacifiCorp, d/b/a Pacific Power	5/22	PacifiCorp, d/b/a Pacific Power	Docket No. A-22-05-006	Return on Equity
San Jose Water Company	05/21	San Jose Water Company	A2105004	Return on Equity
Colorado Public Utilities Commission				
Public Service Company of Colorado	01/24	Public Service Company of Colorado	Docket No. 24AL-___G	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Public Service Company of Colorado	11/22	Public Service Company of Colorado	Docket No. 22AL-0530E	Return on Equity
Public Service Company of Colorado	01/22	Public Service Company of Colorado	Docket No. 22AL-0046G	Return on Equity
Public Service Company of Colorado	07/21	Public Service Company of Colorado	21AL-0317E	Return on Equity
Public Service Company of Colorado	02/20	Public Service Company of Colorado	20AL-0049G	Return on Equity
Public Service Company of Colorado	05/19	Public Service Company of Colorado	19AL-0268E	Return on Equity
Public Service Company of Colorado	01/19	Public Service Company of Colorado	19AL-0063ST	Return on Equity
Atmos Energy Corporation	05/15	Atmos Energy Corporation	Docket No. 15AL-0299G	Return on Equity
Atmos Energy Corporation	04/14	Atmos Energy Corporation	Docket No. 14AL-0300G	Return on Equity
Atmos Energy Corporation	05/13	Atmos Energy Corporation	Docket No. 13AL-0496G	Return on Equity
Connecticut Public Utilities Regulatory Authority				
The Southern Connecticut Gas Company	11/23	The Southern Connecticut Gas Company	Docket No. 23-11-02	Return on Equity
Connecticut Natural Gas Corporation	11/23	Connecticut Natural Gas Corporation	Docket No. 23-11-02	Return on Equity
Connecticut Water Company	10/23	Connecticut Water Company	Docket No. 23-08-32	Return on Equity
United Illuminating	09/22	United Illuminating	Docket No. 22-08-08	Return on Equity
United Illuminating	05/21	United Illuminating	Docket No. 17-12-03RE11	Return on Equity
Connecticut Water Company	01/21	Connecticut Water Company	Docket No. 20-12-30	Return on Equity
Connecticut Natural Gas Corporation	06/18	Connecticut Natural Gas Corporation	Docket No. 18-05-16	Return on Equity
Yankee Gas Services Co. d/b/a Eversource Energy	06/18	Yankee Gas Services Co. d/b/a Eversource Energy	Docket No. 18-05-10	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
The Southern Connecticut Gas Company	06/17	The Southern Connecticut Gas Company	Docket No. 17-05-42	Return on Equity
The United Illuminating Company	07/16	The United Illuminating Company	Docket No. 16-06-04	Return on Equity
Federal Energy Regulatory Commission				
Sea Robin Pipeline	12/22	Sea Robin Pipeline	Docket No. RP22-___	Return on Equity
Northern Natural Gas Company	07/22	Northern Natural Gas Company	Docket No. RP22-___	Return on Equity
Transwestern Pipeline Company, LLC	07/22	Transwestern Pipeline Company, LLC	Docket No. RP22-___	Return on Equity
Florida Gas Transmission	02/21	Florida Gas Transmission	Docket No. RP21-441	Return on Equity
TransCanyon	01/21	TransCanyon	Docket No. ER21-1065	Return on Equity
Duke Energy	12/20	Duke Energy	Docket No. EL21-9-000	Return on Equity
Wisconsin Electric Power Company	08/20	Wisconsin Electric Power Company	Docket No. EL20-57-000	Return on Equity
Panhandle Eastern Pipe Line Company, LP	10/19	Panhandle Eastern Pipe Line Company, LP	Docket Nos. RP19-78-000 RP19-78-001	Return on Equity
Panhandle Eastern Pipe Line Company, LP	08/19	Panhandle Eastern Pipe Line Company, LP	Docket Nos. RP19-1523	Return on Equity
Sea Robin Pipeline Company LLC	11/18	Sea Robin Pipeline Company LLC	Docket# RP19-352-000	Return on Equity
Tallgrass Interstate Gas Transmission	10/15	Tallgrass Interstate Gas Transmission	RP16-137	Return on Equity
Idaho Public Utilities Commission				
Intermountain Gas Co	12/22	Intermountain Gas Co	C-INT-G-22-07	Return on Equity
PacifiCorp d/b/a Rocky Mountain Power	05/21	PacifiCorp d/b/a Rocky Mountain Power	Case No. PAC-E-21-07	Return on Equity
Illinois Commerce Commission				
Peoples Gas Light & Coke Company	01/23	Peoples Gas Light & Coke Company	D-23-0069	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
North Shore Gas Company	01/23	North Shore Gas Company	D-23-0068	Return on Equity
Illinois American Water	02/22	Illinois American Water	Docket No. 22-0210	Return on Equity
North Shore Gas Company	02/21	North Shore Gas Company	No. 20-0810	Return on Equity
Indiana Utility Regulatory Commission				
Southern Indiana Gas and Electric Company d/b/a CenterPoint Energy Indiana South	12/23	Southern Indiana Gas and Electric Company d/b/a CenterPoint Energy Indiana South	IURC Cause No. 45990	Return on Equity
Indiana Michigan Power Co.	08/23	Indiana Michigan Power Co.	IURC Cause No. 45933	Return on Equity
Indiana American Water Company	03/23	Indiana and Michigan American Water Company	IURC Cause No. 45870	Return on Equity
Indiana Michigan Power Co.	07/21	Indiana Michigan Power Co.	IURC Cause No. 45576	Return on Equity
Indiana Gas Company Inc.	12/20	Indiana Gas Company Inc.	IURC Cause No. 45468	Return on Equity
Southern Indiana Gas and Electric Company	10/20	Southern Indiana Gas and Electric Company	IURC Cause No. 45447	Return on Equity
Indiana and Michigan American Water Company	09/18	Indiana and Michigan American Water Company	IURC Cause No. 45142	Return on Equity
Indianapolis Power and Light Company	12/17	Indianapolis Power and Light Company	Cause No. 45029	Fair Value
Northern Indiana Public Service Company	09/17	Northern Indiana Public Service Company	Cause No. 44988	Fair Value
Indianapolis Power and Light Company	12/16	Indianapolis Power and Light Company	Cause No.44893	Fair Value
Northern Indiana Public Service Company	10/15	Northern Indiana Public Service Company	Cause No. 44688	Fair Value
Indianapolis Power and Light Company	09/15	Indianapolis Power and Light Company	Cause No. 44576 Cause No. 44602	Fair Value

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Kokomo Gas and Fuel Company	09/10	Kokomo Gas and Fuel Company	Cause No. 43942	Fair Value
Northern Indiana Fuel and Light Company, Inc.	09/10	Northern Indiana Fuel and Light Company, Inc.	Cause No. 43943	Fair Value
Iowa Department of Commerce Utilities Board				
MidAmerican Energy Company	06/23	MidAmerican Energy Company	Docket No. RPU-2023-___	Return on Equity
MidAmerican Energy Company	01/22	MidAmerican Energy Company	Docket No. RPU-2022-0001	Return on Equity
Iowa-American Water Company	08/20	Iowa-American Water Company	Docket No. RPU-2020-0001	Return on Equity
Kansas Corporation Commission				
Evergy Kansas	04/23	Evergy Kansas	Docket No. 23-EKCE-775-RTS	Return on Equity
Atmos Energy Corporation	08/15	Atmos Energy Corporation	Docket No. 16-ATMG-079-RTS	Return on Equity
Kentucky Public Service Commission				
Kentucky American Water Company	06/23	Kentucky American Water Company	Docket No. 2023-____	Return on Equity
Kentucky American Water Company	11/18	Kentucky American Water Company	Docket No. 2018-00358	Return on Equity
Maine Public Utilities Commission				
Central Maine Power	08/22	Central Maine Power	Docket No. 2022-00152	Return on Equity
Central Maine Power	10/18	Central Maine Power	Docket No. 2018-194	Return on Equity
Maryland Public Service Commission				
Maryland American Water Company	06/18	Maryland American Water Company	Case No. 9487	Return on Equity
Massachusetts Appellate Tax Board				
Hopkinton LNG Corporation	03/20	Hopkinton LNG Corporation	Docket No.	Valuation of LNG Facility

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
FirstLight Hydro Generating Company	06/17	FirstLight Hydro Generating Company	Docket No. F-325471 Docket No. F-325472 Docket No. F-325473 Docket No. F-325474	Valuation of Electric Generation Assets
Massachusetts Department of Public Utilities				
Massachusetts Electric Company Nantucket Electric Company d/b/a National Grid	11/23	Massachusetts Electric Company Nantucket Electric Company d/b/a National Grid	DPU 23-150	Return on Equity
National Grid USA	11/20	Boston Gas Company	DPU 20-120	Return on Equity
Berkshire Gas Company	05/18	Berkshire Gas Company	DPU 18-40	Return on Equity
Unitil Corporation	01/04	Fitchburg Gas and Electric	DTE 03-52	Integrated Resource Plan; Gas Demand Forecast
Michigan Public Service Commission				
Michigan Gas Utilities Corporation	03/24	Michigan Gas Utilities Corporation	Case No. U-21540	Return on Equity
Indiana Michigan Power Co.	09/23	Indiana Michigan Power Co.	Case No. U-21461	Return on Equity
Michigan Gas Utilities Corporation	03/23	Michigan Gas Utilities Corporation	Case No. U-21366	Return on Equity
Michigan Gas Utilities Corporation	03/21	Michigan Gas Utilities Corporation	Case No. U-20718	Return on Equity
Wisconsin Electric Power Company	12/11	Wisconsin Electric Power Company	Case No. U-16830	Return on Equity
Michigan Tax Tribunal				
New Covert Generating Co., LLC.	03/18	The Township of New Covert Michigan	MTT Docket No. 000248TT and 16-001888-TT	Valuation of Electric Generation Assets

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Covert Township	07/14	New Covert Generating Co., LLC.	Docket No. 399578	Valuation of Electric Generation Assets
Minnesota Public Utilities Commission				
ALLETE, Inc. d/b/a Minnesota Power	11/23	Allete, Inc. d/b/a Minnesota Power	D-E-015/GR-23-155	Return on Equity
CenterPoint Energy Resources	11/23	CenterPoint Energy Resources	D-G-008/GR-23-173	Return on Equity
Minnesota Energy Resources Corporation	11/22	Minnesota Energy Resources Corporation	Docket No. G011/GR-22-504	Return on Equity
CenterPoint Energy Resources	11/21	CenterPoint Energy Resources	D-G-008/GR-21-435	Return on Equity
ALLETE, Inc. d/b/a Minnesota Power	11/21	Allete, Inc. d/b/a Minnesota Power	D-E-015/GR-21-630	Return on Equity
Otter Tail Power Company	11/20	Otter Tail Power Company	E017/GR-20-719	Return on Equity
ALLETE, Inc. d/b/a Minnesota Power	11/19	Allete, Inc. d/b/a Minnesota Power	E015/GR-19-442	Return on Equity
CenterPoint Energy Resources Corporation d/b/a CenterPoint Energy Minnesota Gas	10/19	CenterPoint Energy Resources Corporation d/b/a CenterPoint Energy Minnesota Gas	G-008/GR-19-524	Return on Equity
Great Plains Natural Gas Co.	09/19	Great Plains Natural Gas Co.	Docket No. G004/GR-19-511	Return on Equity
Minnesota Energy Resources Corporation	10/17	Minnesota Energy Resources Corporation	Docket No. G011/GR-17-563	Return on Equity
Missouri Public Service Commission				
Evergy Missouri West	2/24	Evergy Missouri West	File No. ER-2024-0189	Return on Equity
Ameren Missouri	08/22	Ameren Missouri	File No. ER-2022-0337	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Missouri American Water Company	07/22	Missouri American Water Company	Case No. WR-2022-0303 Case No. SR-2022-0304	Return on Equity
Evergy Missouri West	1/22	Evergy Missouri West	File No. ER-2022-0130	Return on Equity
Evergy Missouri Metro	1/22	Evergy Missouri Metro	File No. ER-2022-0129	Return on Equity
Ameren Missouri	03/21	Ameren Missouri	Docket No. ER-2021-0240 Docket No. GR-2021-0241	Return on Equity
Missouri American Water Company	06/20	Missouri American Water Company	Case No. WR-2020-0344 Case No. SR-2020-0345	Return on Equity
Missouri American Water Company	06/17	Missouri American Water Company	Case No. WR-17-0285 Case No. SR-17-0286	Return on Equity
Montana Public Service Commission				
Montana-Dakota Utilities Co.	11/22	Montana-Dakota Utilities Co.	D2022.11.099	Return on Equity
Montana-Dakota Utilities Co.	06/20	Montana-Dakota Utilities Co.	D2020.06.076	Return on Equity
Montana-Dakota Utilities Co.	09/18	Montana-Dakota Utilities Co.	D2018.9.60	Return on Equity
New Hampshire - Board of Tax and Land Appeals				
Liberty Utilities (EnergyNorth Natural Gas)	07/23	Liberty Utilities (EnergyNorth Natural Gas)	Docket No. DG 23-067	Return on Equity
Liberty Utilities (Granite State Electric)	05/23	Liberty Utilities (Granite State Electric)	Docket No. DE 23-039	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Public Service Company of New Hampshire d/b/a Eversource Energy	11/19 12/19	Public Service Company of New Hampshire d/b/a Eversource Energy	Master Docket No. 28873-14-15-16-17PT	Valuation of Utility Property and Generating Assets
New Hampshire Public Utilities Commission				
Public Service Company of New Hampshire	05/19	Public Service Company of New Hampshire	DE-19-057	Return on Equity
New Hampshire-Merrimack County Superior Court				
Northern New England Telephone Operations, LLC d/b/a FairPoint Communications, NNE	04/18	Northern New England Telephone Operations, LLC d/b/a FairPoint Communications, NNE	220-2012-CV-1100	Valuation of Utility Property
New Hampshire-Rockingham Superior Court				
Eversource Energy	05/18	Public Service Commission of New Hampshire	218-2016-CV-00899 218-2017-CV-00917	Valuation of Utility Property
New Jersey Board of Public Utilities				
Elizabethtown Gas Company	2/24	Elizabethtown Gas Company	GR24020158	Return on Equity
Public Service Electric and Gas Company	11/23	Public Service Electric and Gas Company	ER23120924 GR23120925	Return on Equity
New Jersey American Water Company, Inc.	01/22	New Jersey American Water Company, Inc.	WR22010019	Return on Equity
Public Service Electric and Gas Company	10/20	Public Service Electric and Gas Company	EO18101115	Return on Equity
New Jersey American Water Company, Inc.	12/19	New Jersey American Water Company, Inc.	WR19121516	Return on Equity
Public Service Electric and Gas Company	04/19	Public Service Electric and Gas Company	EO18060629 GO18060630	Return on Equity
Public Service Electric and Gas Company	02/18	Public Service Electric and Gas Company	GR17070776	Return on Equity
Public Service Electric and Gas Company	01/18	Public Service Electric and Gas Company	ER18010029 GR18010030	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
New Mexico Public Regulation Commission				
Southwestern Public Service Company	07/19	Southwestern Public Service Company	19-00170-UT	Return on Equity
Southwestern Public Service Company	10/17	Southwestern Public Service Company	Case No. 17-00255-UT	Return on Equity
Southwestern Public Service Company	12/16	Southwestern Public Service Company	Case No. 16-00269-UT	Return on Equity
Southwestern Public Service Company	10/15	Southwestern Public Service Company	Case No. 15-00296-UT	Return on Equity
Southwestern Public Service Company	06/15	Southwestern Public Service Company	Case No. 15-00139-UT	Return on Equity
New York State Department of Public Service				
Liberty Utilities (New York Water)	5/23	Liberty Utilities (New York Water)	Case 23-W-0235	Return on Equity
New York State Electric and Gas Company Rochester Gas and Electric	05/22	New York State Electric and Gas Company Rochester Gas and Electric	22-E-0317 22-G-0318 22-E-0319 22-G-0320	Return on Equity
Corning Natural Gas Corporation	07/21	Corning Natural Gas Corporation	Case No. 21-G-0394	Return on Equity
Central Hudson Gas and Electric Corporation	08/20	Central Hudson Gas and Electric Corporation	Electric 20-E-0428 Gas 20-G-0429	Return on Equity
Niagara Mohawk Power Corporation	07/20	National Grid USA	Case No. 20-E-0380 20-G-0381	Return on Equity
Corning Natural Gas Corporation	02/20	Corning Natural Gas Corporation	Case No. 20-G-0101	Return on Equity
New York State Electric and Gas Company Rochester Gas and Electric	05/19	New York State Electric and Gas Company Rochester Gas and Electric	19-E-0378 19-G-0379 19-E-0380 19-G-0381	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Brooklyn Union Gas Company d/b/a National Grid NY KeySpan Gas East Corporation d/b/a National Grid	04/19	Brooklyn Union Gas Company d/b/a National Grid NY KeySpan Gas East Corporation d/b/a National Grid	19-G-0309 19-G-0310	Return on Equity
Central Hudson Gas and Electric Corporation	07/17	Central Hudson Gas and Electric Corporation	Electric 17-E-0459 Gas 17-G-0460	Return on Equity
Niagara Mohawk Power Corporation	04/17	National Grid USA	Case No. 17-E-0238 17-G-0239	Return on Equity
Corning Natural Gas Corporation	06/16	Corning Natural Gas Corporation	Case No. 16-G-0369	Return on Equity
National Fuel Gas Company	04/16	National Fuel Gas Company	Case No. 16-G-0257	Return on Equity
KeySpan Energy Delivery	01/16	KeySpan Energy Delivery	Case No. 15-G-0058 Case No. 15-G-0059	Return on Equity
New York State Electric and Gas Company Rochester Gas and Electric	05/15	New York State Electric and Gas Company Rochester Gas and Electric	Case No. 15-E-0283 Case No. 15-G-0284 Case No. 15-E-0285 Case No. 15-G-0286	Return on Equity
North Dakota Public Service Commission				
Otter Tail Power Company	11/23	Otter Tail Power Company	Case No. PU-23-___	Return on Equity
Montana-Dakota Utilities Co.	11/23	Montana-Dakota Utilities Co.	Case No. PU-23-___	Return on Equity
Montana-Dakota Utilities Co.	05/22	Montana-Dakota Utilities Co.	C-PU-22-194	Return on Equity
Montana-Dakota Utilities Co.	08/20	Montana-Dakota Utilities Co.	C-PU-20-379	Return on Equity
Northern States Power Company	12/12	Northern States Power Company	C-PU-12-813	Return on Equity
Northern States Power Company	12/10	Northern States Power Company	C-PU-10-657	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Oklahoma Corporation Commission				
Oklahoma Gas & Electric	12/23	Oklahoma Gas & Electric	Cause No. PUD2023-000087	Return on Equity
Oklahoma Gas & Electric	12/21	Oklahoma Gas & Electric	Cause No. PUD 202100164	Return on Equity
Arkansas Oklahoma Gas Corporation	01/13	Arkansas Oklahoma Gas Corporation	Cause No. PUD 201200236	Return on Equity
Oregon Public Service Commission				
PacifiCorp d/b/a Pacific Power & Light	03/22	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-399	Return on Equity
PacifiCorp d/b/a Pacific Power & Light	02/20	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-374	Return on Equity
Pennsylvania Public Utility Commission				
American Water Works Company Inc.	11/23	Pennsylvania-American Water Company	Docket No. R-2023-3043189 (water) Docket No. R-2023-3043190 (wastewater)	Return on Equity
American Water Works Company Inc.	04/22	Pennsylvania-American Water Company	Docket No. R-2020-3031672 (water) Docket No. R-2020-3031673 (wastewater)	Return on Equity
American Water Works Company Inc.	04/20	Pennsylvania-American Water Company	Docket No. R-2020-3019369 (water) Docket No. R-2020-3019371 (wastewater)	Return on Equity
American Water Works Company Inc.	04/17	Pennsylvania-American Water Company	Docket No. R-2017-2595853	Return on Equity
South Dakota Public Utilities Commission				
MidAmerican Energy Company	05/22	MidAmerican Energy Company	D-NG22-005	Return on Equity
Northern States Power Company	06/14	Northern States Power Company	Docket No. EL14-058	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Texas Public Utility Commission				
Entergy Texas, Inc.	07/22	Entergy Texas, Inc.	D-53719	Return on Equity
Southwestern Public Service Commission	08/19	Southwestern Public Service Commission	Docket No. D-49831	Return on Equity
Southwestern Public Service Company	01/14	Southwestern Public Service Company	Docket No. 42004	Return on Equity
Texas Railroad Commission				
CenterPoint Energy Entex and CenterPoint Energy Texas Gas	10/23	CenterPoint Energy Entex and CenterPoint Energy Texas Gas	2023 Texas Division Rate Case Case No. OS-23-00015513	Return on Equity
Utah Public Service Commission				
PacifiCorp d/b/a Rocky Mountain Power	05/20	PacifiCorp d/b/a Rocky Mountain Power	Docket No. 20-035-04	Return on Equity
Virginia State Corporation Commission				
Virginia American Water Company, Inc.	11/23	Virginia American Water Company, Inc.	Docket No. PUR-2023-00194	Return on Equity
Virginia American Water Company, Inc.	11/21	Virginia American Water Company, Inc.	Docket No. PUR-2021-00255	Return on Equity
Virginia American Water Company, Inc.	11/18	Virginia American Water Company, Inc.	Docket No. PUR-2018-00175	Return on Equity
Washington Utilities Transportation Commission				
Cascade Natural Gas Corporation	03/24	Cascade Natural Gas Corporation	Docket No. UG-24008	Return on Equity
PacifiCorp d/b/a Pacific Power & Light	03/23	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-230172	Return on Equity
Cascade Natural Gas Corporation	06/20	Cascade Natural Gas Corporation	Docket No. UG-200568	Return on Equity
PacifiCorp d/b/a Pacific Power & Light	12/19	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-191024	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Cascade Natural Gas Corporation	04/19	Cascade Natural Gas Corporation	Docket No. UG-190210	Return on Equity
West Virginia Public Service Commission				
West Virginia American Water Company	05/23	West Virginia American Water Company	Case No. 23-0383-W-42T	Return on Equity
West Virginia American Water Company	04/21	West Virginia American Water Company	Case No. 21-02369-W-42T	Return on Equity
West Virginia American Water Company	04/18	West Virginia American Water Company	Case No. 18-0573-W-42T Case No. 18-0576-S-42T	Return on Equity
Wisconsin Public Service Commission				
Wisconsin Power and Light	05/23	Wisconsin Power and Light	Docket No. 6680-UR-124	Return on Equity
Wisconsin Electric Power Company and Wisconsin Gas LLC	04/22	Wisconsin Electric Power Company and Wisconsin Gas LLC	Docket No. 05-UR-110	Return on Equity
Wisconsin Public Service Corp.	04/22	Wisconsin Public Service Corp.	6690-UR-127	Return on Equity
Alliant Energy		Alliant Energy		Return on Equity
Wisconsin Electric Power Company and Wisconsin Gas LLC	03/19	Wisconsin Electric Power Company and Wisconsin Gas LLC	Docket No. 05-UR-109	Return on Equity
Wisconsin Public Service Corp.	03/19	Wisconsin Public Service Corp.	6690-UR-126	Return on Equity
Wyoming Public Service Commission				
PacifiCorp d/b/a Rocky Mountain Power	02/23	PacifiCorp d/b/a Rocky Mountain Power	Docket No. 20000-633-ER-23	Return on Equity
PacifiCorp d/b/a Rocky Mountain Power	03/20	PacifiCorp d/b/a Rocky Mountain Power	Docket No. 20000-578-ER-20	Return on Equity
Montana-Dakota Utilities Co.	05/19	Montana-Dakota Utilities Co.	30013-351-GR-19	Return on Equity

CERTIFICATIONS/ACCREDITATIONS

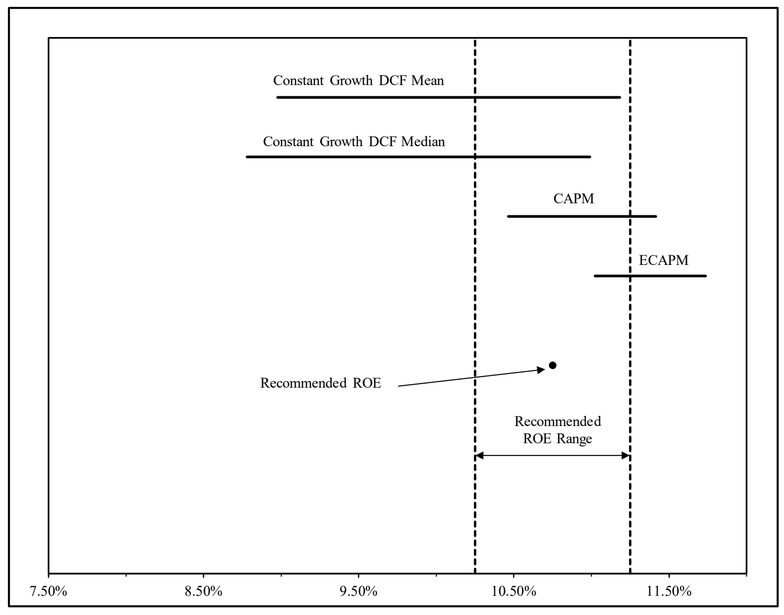
Certified General Appraiser, licensed in the Commonwealth of Massachusetts

SUMMARY OF COE ANALYSES RESULTS

	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
Constant Growth DCF			
Mean Results:			
30-Day Average	9.06%	10.10%	11.18%
90-Day Average	9.03%	10.06%	11.15%
180-Day Average	8.98%	10.01%	11.10%
Average	9.02%	10.06%	11.14%
Median Results:			
30-Day Average	8.86%	10.11%	10.99%
90-Day Average	8.79%	10.10%	10.87%
180-Day Average	8.78%	10.05%	10.85%
Average	8.81%	10.09%	10.90%

	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
CAPM:			
Current *Value Line* Beta	11.41%	11.37%	11.37%
Current Bloomberg Beta	10.71%	10.65%	10.65%
Long-term Avg. *Value Line* Beta	10.54%	10.47%	10.46%
ECAPM:			
Current *Value Line* Beta	11.74%	11.71%	11.70%
Current Bloomberg Beta	11.21%	11.16%	11.16%
Long-term Avg. *Value Line* Beta	11.08%	11.03%	11.02%

	X	Y
Constant Growth DCF Mean	8.98%	8.0
	11.18%	8.0
Constant Growth DCF Median	8.78%	7.0
	10.99%	7.0
CAPM	10.46%	6.0
	11.41%	6.0
ECAPM	11.02%	5.0
	11.74%	5.0
Lower End ROE Recommendation	10.25%	0.0
	10.25%	9.0
Higher End ROE Recommendation	11.25%	0.0
	11.25%	9.0
Recommendation	10.75%	3.5



PROXY GROUP SCREENING DATA AND RESULTS

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Company	Ticker	Dividends	S&P Credit Rating Between BBB- and AAA	Covered by More Than 1 Analyst	Positive Growth Rates from at least two sources (Value Line, Yahoo! First Call, and Zacks)	% Regulated Operating Income > 70%	Announced Merger	Electric Companies with < 10% Generation	Electric Companies with Water Operations
Atmos Energy Corporation	ATO	Yes	A-	Yes	Yes	100%	No	n/a	n/a
NiSource Inc.	NI	Yes	BBB+	Yes	Yes	100%	No	n/a	n/a
Northwest Natural Gas Company	NWN	Yes	A+	Yes	Yes	100%	No	n/a	n/a
ONE Gas, Inc.	OGS	Yes	A-	Yes	Yes	100%	No	n/a	n/a
Spire, Inc.	SR	Yes	A-	Yes	Yes	87%	No	n/a	n/a
Eversource Energy	ES	Yes	A-	Yes	Yes	92%	No	0.06%	Yes
American States Water Company	AWR	Yes	A	Yes	Yes	83%	No	n/a	n/a
California Water Service Group	CWT	Yes	A+	Yes	Yes	98%	No	n/a	n/a
Middlesex Water Company	MSEX	Yes	A	Yes	Yes	91%	No	n/a	n/a
SJW Group	SJW	Yes	A-	Yes	Yes	99%	No	n/a	n/a
Essential Utilities, Inc.	WTRG	Yes	A	Yes	Yes	99%	No	n/a	n/a

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional
[3] Source: Yahoo! Finance, and Zacks
[4] Source: Yahoo! Finance, Value Line Investment Survey, and Zacks
[5] Source: Form 10-K's for 2022, 2021, and 2020
[6] Source: SNL Financial News Releases
[7] Source: S&P Capital IQ Pro
[8] Source: S&P Capital IQ Pro

30-DAY CONSTANT GROWTH DCF

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
Atmos Energy Corporation	ATO	$3.22	$114.88	2.80%	2.90%	7.00%	7.50%	7.30%	7.27%	9.90%	10.17%	10.41%
NiSource Inc.	NI	$1.06	$26.58	3.99%	4.15%	9.50%	7.30%	7.20%	8.00%	11.33%	12.15%	13.68%
Northwest Natural Gas Company	NWN	$1.95	$36.99	5.27%	5.39%	6.50%	2.80%	n/a	4.65%	8.14%	10.04%	11.94%
ONE Gas, Inc.	OGS	$2.64	$61.41	4.30%	4.40%	4.00%	5.00%	5.00%	4.67%	8.39%	9.07%	9.41%
Spire, Inc.	SR	$3.02	$59.59	5.07%	5.21%	4.50%	6.36%	5.60%	5.49%	9.68%	10.69%	11.59%
Eversource Energy	ES	$2.86	$58.44	4.89%	5.00%	5.50%	3.25%	4.20%	4.32%	8.22%	9.32%	10.53%
American States Water Company	AWR	$1.72	$72.38	2.38%	2.44%	6.50%	4.40%	6.30%	5.73%	6.83%	8.18%	8.95%
California Water Service Group	CWT	$1.12	$46.36	2.42%	2.52%	6.50%	10.80%	n/a	8.65%	8.99%	11.17%	13.35%
Middlesex Water Company	MSEX	$1.30	$51.98	2.50%	2.55%	5.00%	2.70%	n/a	3.85%	5.23%	6.40%	7.56%
SJW Group	SJW	$1.60	$57.09	2.80%	2.91%	8.00%	7.50%	7.50%	7.67%	10.41%	10.58%	10.91%
Essential Utilities, Inc.	WTRG	$1.23	$35.75	3.44%	3.54%	7.50%	5.20%	5.60%	6.10%	8.73%	9.64%	11.06%
All Companies												
Mean				3.62%	3.73%	6.41%	5.71%	6.09%	6.04%	8.71%	9.76%	10.85%
Median				3.44%	3.54%	6.50%	5.20%	5.95%	5.73%	8.73%	10.04%	10.91%
Excluding Middlesex Water Company												
Mean										9.06%	10.10%	11.18%
Median										8.86%	10.11%	10.99%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 30-day average as of March 31, 2024
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

90-DAY CONSTANT GROWTH DCF

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Company	Ticker	Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Growth Rate	Low ROE	Mean ROE	High ROE
Atmos Energy Corporation	ATO	$3.22	$113.89	2.83%	2.93%	7.00%	7.50%	7.30%	7.27%	9.93%	10.20%	10.43%
NiSource Inc.	NI	$1.06	$26.13	4.06%	4.22%	9.50%	7.30%	7.20%	8.00%	11.40%	12.22%	13.75%
Northwest Natural Gas Company	NWN	$1.95	$37.33	5.22%	5.35%	6.50%	2.80%	n/a	4.65%	8.10%	10.00%	11.89%
ONE Gas, Inc.	OGS	$2.64	$60.99	4.33%	4.43%	4.00%	5.00%	5.00%	4.67%	8.41%	9.10%	9.44%
Spire, Inc.	SR	$3.02	$59.91	5.04%	5.18%	4.50%	6.36%	5.60%	5.49%	9.65%	10.67%	11.56%
Eversource Energy	ES	$2.86	$57.79	4.95%	5.06%	5.50%	3.25%	4.20%	4.32%	8.28%	9.37%	10.59%
American States Water Company	AWR	$1.72	$76.45	2.25%	2.31%	6.50%	4.40%	6.30%	5.73%	6.70%	8.05%	8.82%
California Water Service Group	CWT	$1.12	$48.35	2.32%	2.42%	6.50%	10.80%	n/a	8.65%	8.89%	11.07%	13.24%
Middlesex Water Company	MSEX	$1.30	$58.90	2.21%	2.25%	5.00%	2.70%	n/a	3.85%	4.94%	6.10%	7.26%
SJW Group	SJW	$1.60	$61.37	2.61%	2.71%	8.00%	7.50%	7.50%	7.67%	10.21%	10.37%	10.71%
Essential Utilities, Inc.	WTRG	$1.23	$36.04	3.41%	3.51%	7.50%	5.20%	5.60%	6.10%	8.70%	9.61%	11.04%
All Companies												
Mean				3.56%	3.67%	6.41%	5.71%	6.09%	6.04%	8.65%	9.70%	10.79%
Median				3.41%	3.51%	6.50%	5.20%	5.95%	5.73%	8.70%	10.00%	10.71%
Excluding Middlesex Water Company												
Mean										9.03%	10.06%	11.15%
Median										8.79%	10.10%	10.87%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 90-day average as of March 31, 2024
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

180-DAY CONSTANT GROWTH DCF

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]

Company	Ticker	Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Growth Rate	Low ROE	Mean ROE	High ROE
Atmos Energy Corporation	ATO	$3.22	$113.00	2.85%	2.95%	7.00%	7.50%	7.30%	7.27%	9.95%	10.22%	10.46%
NiSource Inc.	NI	$1.06	$25.96	4.08%	4.25%	9.50%	7.30%	7.20%	8.00%	11.43%	12.25%	13.78%
Northwest Natural Gas Company	NWN	$1.95	$38.08	5.12%	5.24%	6.50%	2.80%	n/a	4.65%	7.99%	9.89%	11.79%
ONE Gas, Inc.	OGS	$2.64	$65.30	4.04%	4.14%	4.00%	5.00%	5.00%	4.67%	8.12%	8.80%	9.14%
Spire, Inc.	SR	$3.02	$58.68	5.15%	5.29%	4.50%	6.36%	5.60%	5.49%	9.76%	10.77%	11.67%
Eversource Energy	ES	$2.86	$58.98	4.85%	4.95%	5.50%	3.25%	4.20%	4.32%	8.18%	9.27%	10.48%
American States Water Company	AWR	$1.72	$79.10	2.17%	2.24%	6.50%	4.40%	6.30%	5.73%	6.62%	7.97%	8.75%
California Water Service Group	CWT	$1.12	$48.87	2.29%	2.39%	6.50%	10.80%	n/a	8.65%	8.87%	11.04%	13.22%
Middlesex Water Company	MSEX	$1.30	$65.15	2.00%	2.03%	5.00%	2.70%	n/a	3.85%	4.72%	5.88%	7.05%
SJW Group	SJW	$1.60	$62.59	2.56%	2.65%	8.00%	7.50%	7.50%	7.67%	10.15%	10.32%	10.66%
Essential Utilities, Inc.	WTRG	$1.23	$36.08	3.41%	3.51%	7.50%	5.20%	5.60%	6.10%	8.69%	9.61%	11.03%
All Companies												
Mean				3.50%	3.60%	6.41%	5.71%	6.09%	6.04%	8.59%	9.64%	10.73%
Median				3.41%	3.51%	6.50%	5.20%	5.95%	5.73%	8.69%	9.89%	10.66%
Excluding Middlesex Water Company												
Mean										8.98%	10.01%	11.10%
Median										8.78%	10.05%	10.85%

Notes:

[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 180-day average as of March 31, 2024
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VL BETA

$$K = Rf + \beta\,(Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.38%	0.85	12.70%	8.32%	11.45%	11.76%
NiSource Inc.	NI	4.38%	0.90	12.70%	8.32%	11.87%	12.08%
Northwest Natural Gas Company	NWN	4.38%	0.85	12.70%	8.32%	11.45%	11.76%
ONE Gas, Inc.	OGS	4.38%	0.85	12.70%	8.32%	11.45%	11.76%
Spire, Inc.	SR	4.38%	0.85	12.70%	8.32%	11.45%	11.76%
Eversource Energy	ES	4.38%	0.95	12.70%	8.32%	12.28%	12.39%
American States Water Company	AWR	4.38%	0.70	12.70%	8.32%	10.20%	10.83%
California Water Service Group	CWT	4.38%	0.75	12.70%	8.32%	10.62%	11.14%
Middlesex Water Company	MSEX	4.38%	0.75	12.70%	8.32%	10.62%	11.14%
SJW Group	SJW	4.38%	0.85	12.70%	8.32%	11.45%	11.76%
Essential Utilities, Inc.	WTRG	4.38%	1.00	12.70%	8.32%	12.70%	12.70%
Mean			0.85			11.41%	11.74%

Notes:
[1] Source: Bloomberg Professional, 30-day average as of March 31, 2024
[2] Source: Value Line Reports, February 23, 2024, February 9, 2024, and January 5, 2024.
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & VL BETA

$$K = Rf + \beta\,(Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q1 2024 - Q2 2025)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.12%	0.85	12.70%	8.58%	11.41%	11.73%
NiSource Inc.	NI	4.12%	0.90	12.70%	8.58%	11.84%	12.06%
Northwest Natural Gas Company	NWN	4.12%	0.85	12.70%	8.58%	11.41%	11.73%
ONE Gas, Inc.	OGS	4.12%	0.85	12.70%	8.58%	11.41%	11.73%
Spire, Inc.	SR	4.12%	0.85	12.70%	8.58%	11.41%	11.73%
Eversource Energy	ES	4.12%	0.95	12.70%	8.58%	12.27%	12.38%
American States Water Company	AWR	4.12%	0.70	12.70%	8.58%	10.13%	10.77%
California Water Service Group	CWT	4.12%	0.75	12.70%	8.58%	10.56%	11.09%
Middlesex Water Company	MSEX	4.12%	0.75	12.70%	8.58%	10.56%	11.09%
SJW Group	SJW	4.12%	0.85	12.70%	8.58%	11.41%	11.73%
Essential Utilities, Inc.	WTRG	4.12%	1.00	12.70%	8.58%	12.70%	12.70%
Mean			0.85			11.37%	11.71%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 43, No. 4, April 1, 2023, at 2
[2] Source: Value Line Reports, February 23, 2024, February 9, 2024, and January 5, 2024.
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & VL BETA

$$K = Rf + \beta\,(Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2025-2029)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.10%	0.85	12.70%	8.60%	11.41%	11.73%
NiSource Inc.	NI	4.10%	0.90	12.70%	8.60%	11.84%	12.06%
Northwest Natural Gas Company	NWN	4.10%	0.85	12.70%	8.60%	11.41%	11.73%
ONE Gas, Inc.	OGS	4.10%	0.85	12.70%	8.60%	11.41%	11.73%
Spire, Inc.	SR	4.10%	0.85	12.70%	8.60%	11.41%	11.73%
Eversource Energy	ES	4.10%	0.95	12.70%	8.60%	12.27%	12.38%
American States Water Company	AWR	4.10%	0.70	12.70%	8.60%	10.12%	10.77%
California Water Service Group	CWT	4.10%	0.75	12.70%	8.60%	10.55%	11.09%
Middlesex Water Company	MSEX	4.10%	0.75	12.70%	8.60%	10.55%	11.09%
SJW Group	SJW	4.10%	0.85	12.70%	8.60%	11.41%	11.73%
Essential Utilities, Inc.	WTRG	4.10%	1.00	12.70%	8.60%	12.70%	12.70%
Mean			0.85			11.37%	11.70%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 42, No. 12, December 1, 2023, at 14
[2] Source: Value Line Reports, February 23, 2024, February 9, 2024, and January 5, 2024.
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.38%	0.75	12.70%	8.32%	10.66%	11.17%
NiSource Inc.	NI	4.38%	0.81	12.70%	8.32%	11.10%	11.50%
Northwest Natural Gas Company	NWN	4.38%	0.70	12.70%	8.32%	10.21%	10.83%
ONE Gas, Inc.	OGS	4.38%	0.78	12.70%	8.32%	10.86%	11.32%
Spire, Inc.	SR	4.38%	0.77	12.70%	8.32%	10.80%	11.27%
Eversource Energy	ES	4.38%	0.80	12.70%	8.32%	11.07%	11.48%
American States Water Company	AWR	4.38%	0.65	12.70%	8.32%	9.77%	10.50%
California Water Service Group	CWT	4.38%	0.69	12.70%	8.32%	10.12%	10.76%
Middlesex Water Company	MSEX	4.38%	0.77	12.70%	8.32%	10.78%	11.26%
SJW Group	SJW	4.38%	0.80	12.70%	8.32%	11.05%	11.46%
Essential Utilities, Inc.	WTRG	4.38%	0.85	12.70%	8.32%	11.45%	11.76%
Mean			0.76			10.71%	11.21%

Notes:
[1] Source: Bloomberg Professional, 30-day average as of March 31, 2024
[2] Source: Bloomberg Professional, as of March 31, 2024
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q1 2024 - Q2 2025)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.12%	0.75	12.70%	8.58%	10.60%	11.12%
NiSource Inc.	NI	4.12%	0.81	12.70%	8.58%	11.05%	11.46%
Northwest Natural Gas Company	NWN	4.12%	0.70	12.70%	8.58%	10.13%	10.77%
ONE Gas, Inc.	OGS	4.12%	0.78	12.70%	8.58%	10.80%	11.27%
Spire, Inc.	SR	4.12%	0.77	12.70%	8.58%	10.74%	11.23%
Eversource Energy	ES	4.12%	0.80	12.70%	8.58%	11.02%	11.44%
American States Water Company	AWR	4.12%	0.65	12.70%	8.58%	9.67%	10.43%
California Water Service Group	CWT	4.12%	0.69	12.70%	8.58%	10.04%	10.70%
Middlesex Water Company	MSEX	4.12%	0.77	12.70%	8.58%	10.72%	11.21%
SJW Group	SJW	4.12%	0.80	12.70%	8.58%	11.00%	11.42%
Essential Utilities, Inc.	WTRG	4.12%	0.85	12.70%	8.58%	11.41%	11.73%
Mean			0.76			10.65%	11.16%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 43, No. 4, April 1, 2023, at 2
[2] Source: Bloomberg Professional, as of March 31, 2024
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2025-2029)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.10%	0.75	12.70%	8.60%	10.59%	11.12%
NiSource Inc.	NI	4.10%	0.81	12.70%	8.60%	11.05%	11.46%
Northwest Natural Gas Company	NWN	4.10%	0.70	12.70%	8.60%	10.13%	10.77%
ONE Gas, Inc.	OGS	4.10%	0.78	12.70%	8.60%	10.79%	11.27%
Spire, Inc.	SR	4.10%	0.77	12.70%	8.60%	10.73%	11.22%
Eversource Energy	ES	4.10%	0.80	12.70%	8.60%	11.02%	11.44%
American States Water Company	AWR	4.10%	0.65	12.70%	8.60%	9.67%	10.43%
California Water Service Group	CWT	4.10%	0.69	12.70%	8.60%	10.03%	10.70%
Middlesex Water Company	MSEX	4.10%	0.77	12.70%	8.60%	10.71%	11.21%
SJW Group	SJW	4.10%	0.80	12.70%	8.60%	10.99%	11.42%
Essential Utilities, Inc.	WTRG	4.10%	0.85	12.70%	8.60%	11.41%	11.73%
Mean			0.76			10.65%	11.16%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 42, No. 12, December 1, 2023, at 14
[2] Source: Bloomberg Professional, as of March 31, 2024
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$$K = Rf + \beta (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.38%	0.75	12.70%	8.32%	10.62%	11.14%
NiSource Inc.	NI	4.38%	0.76	12.70%	8.32%	10.67%	11.18%
Northwest Natural Gas Company	NWN	4.38%	0.71	12.70%	8.32%	10.28%	10.89%
ONE Gas, Inc.	OGS	4.38%	0.74	12.70%	8.32%	10.52%	11.06%
Spire, Inc.	SR	4.38%	0.74	12.70%	8.32%	10.54%	11.08%
Eversource Energy	ES	4.38%	0.76	12.70%	8.32%	10.71%	11.21%
American States Water Company	AWR	4.38%	0.69	12.70%	8.32%	10.13%	10.77%
California Water Service Group	CWT	4.38%	0.70	12.70%	8.32%	10.24%	10.86%
Middlesex Water Company	MSEX	4.38%	0.74	12.70%	8.32%	10.51%	11.06%
SJW Group	SJW	4.38%	0.76	12.70%	8.32%	10.73%	11.23%
Essential Utilities, Inc.	WTRG	4.38%	0.79	12.70%	8.32%	10.96%	11.40%
Mean			0.74			10.54%	11.08%

Notes:
[1] Source: Bloomberg Professional, 30-day average as of March 31, 2024
[2] Source: Schedule AEB-6
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$$K = Rf + \beta (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q1 2024 - Q2 2025)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.12%	0.75	12.70%	8.58%	10.56%	11.09%
NiSource Inc.	NI	4.12%	0.76	12.70%	8.58%	10.60%	11.13%
Northwest Natural Gas Company	NWN	4.12%	0.71	12.70%	8.58%	10.20%	10.83%
ONE Gas, Inc.	OGS	4.12%	0.74	12.70%	8.58%	10.45%	11.01%
Spire, Inc.	SR	4.12%	0.74	12.70%	8.58%	10.48%	11.03%
Eversource Energy	ES	4.12%	0.76	12.70%	8.58%	10.65%	11.16%
American States Water Company	AWR	4.12%	0.69	12.70%	8.58%	10.05%	10.71%
California Water Service Group	CWT	4.12%	0.70	12.70%	8.58%	10.17%	10.80%
Middlesex Water Company	MSEX	4.12%	0.74	12.70%	8.58%	10.44%	11.00%
SJW Group	SJW	4.12%	0.76	12.70%	8.58%	10.67%	11.18%
Essential Utilities, Inc.	WTRG	4.12%	0.79	12.70%	8.58%	10.91%	11.35%
Mean			0.74			10.47%	11.03%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 43, No. 4, April 1, 2023, at 2
[2] Source: Schedule AEB-6
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$$K = Rf + \beta (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2025-2029)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE
Atmos Energy Corporation	ATO	4.10%	0.75	12.70%	8.60%	10.55%	11.09%
NiSource Inc.	NI	4.10%	0.76	12.70%	8.60%	10.60%	11.12%
Northwest Natural Gas Company	NWN	4.10%	0.71	12.70%	8.60%	10.20%	10.82%
ONE Gas, Inc.	OGS	4.10%	0.74	12.70%	8.60%	10.44%	11.01%
Spire, Inc.	SR	4.10%	0.74	12.70%	8.60%	10.47%	11.03%
Eversource Energy	ES	4.10%	0.76	12.70%	8.60%	10.65%	11.16%
American States Water Company	AWR	4.10%	0.69	12.70%	8.60%	10.04%	10.71%
California Water Service Group	CWT	4.10%	0.70	12.70%	8.60%	10.16%	10.79%
Middlesex Water Company	MSEX	4.10%	0.74	12.70%	8.60%	10.43%	11.00%
SJW Group	SJW	4.10%	0.76	12.70%	8.60%	10.67%	11.18%
Essential Utilities, Inc.	WTRG	4.10%	0.79	12.70%	8.60%	10.90%	11.35%
Mean			0.74			10.46%	11.02%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 42, No. 12, December 1, 2023, at 14
[2] Source: Schedule AEB-6
[3] Source: Schedule AEB-7
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

HISTORICAL BETA - 2013 - 2023

Company	Ticker	[1] 12/31/2013	[2] 12/31/2014	[3] 12/31/2015	[4] 12/31/2016	[5] 12/31/2017	[6] 12/31/2018	[7] 12/31/2019	[8] 12/31/2020	[9] 12/31/2021	[10] 12/31/2022	[11] 12/31/2023	[12] Average
Atmos Energy Corporation	ATO	0.80	0.80	0.80	0.70	0.70	0.60	0.60	0.80	0.80	0.80	0.85	0.75
NiSource Inc.	NI	0.85	0.85	NMF	NMF	0.60	0.50	0.55	0.85	0.85	0.85	0.90	0.76
Northwest Natural Gas Company	NWN	0.65	0.70	0.65	0.65	0.70	0.60	0.60	0.80	0.85	0.80	0.80	0.71
ONE Gas, Inc.	OGS				0.70	0.70	0.65	0.65	0.80	0.80	0.80	0.80	0.74
Spire, Inc.	SR	0.65	0.70	0.70	0.70	0.70	0.65	0.65	0.85	0.85	0.85	0.85	0.74
Eversource Energy	ES			0.75	0.70	0.65	0.60	0.55	0.90	0.90	0.90	0.90	0.76
American States Water Company	AWR	0.65	0.70	0.70	0.75	0.80	0.70	0.65	0.65	0.65	0.65	0.70	0.69
California Water Service Group	CWT	0.60	0.70	0.75	0.75	0.80	0.70	0.70	0.65	0.70	0.70	0.70	0.70
Middlesex Water Company	MSEX	0.75	0.70	0.70	0.75	0.80	0.75	0.75	0.75	0.70	0.70	0.75	0.74
SJW Group	SJW	0.85	0.85	0.75	0.75	0.70	0.60	0.60	0.85	0.80	0.80	0.85	0.76
Essential Utilities, Inc.	WTRG	0.60	0.70	0.75	0.70	0.75	0.70	0.65	0.95	0.95	0.95	1.00	0.79
Mean		0.71	0.74	0.73	0.72	0.72	0.64	0.63	0.80	0.80	0.80	0.83	0.74

Notes:
[1] Value Line, dated December 26, 2013.
[2] Value Line, dated December 31, 2014.
[3] Value Line, dated December 30, 2015.
[4] Value Line, dated December 29, 2016.
[5] Value Line, dated December 28, 2017.
[6] Value Line, dated December 27, 2018.
[7] Value Line, dated December 26, 2019.
[8] Value Line, dated December 30, 2020.
[9] Value Line, dated December 29, 2021.
[10] Value Line, dated December 30, 2022.
[11] Value Line, dated December 29, 2023.
[12] Average ([1] - [11])

MARKET RISK PREMIUM DERIVED FROM S&P 500 INDEX

[1] Estimated Weighted Average Dividend Yield	1.57%
[2] Estimated Weighted Average Long-Term Growth Rate	11.05%
[3] S&P 500 Estimated Required Market Return	12.70%

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Bloomberg Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
LyondellBasell Industries NV	LYB	324.52	102.28	33,192	0.10%	4.89%	0.00%	8.00%	0.01%
American Express Co	AXP	720.04	227.69	163,946	0.50%	1.23%	0.01%	14.29%	0.07%
Verizon Communications Inc	VZ	4,210.00	41.96	176,652	0.54%	6.34%	0.03%	1.40%	0.01%
Broadcom Inc	AVGO	463.42	1,325.41	614,223	1.88%	1.58%	0.03%	14.20%	0.27%
Boeing Co/The	BA	610.14	192.99	117,750					
Caterpillar Inc	CAT	499.38	366.43	182,987	0.56%	1.42%	0.01%	15.00%	0.08%
JPMorgan Chase & Co	JPM	2,880.37	200.30	576,938	1.77%	2.30%	0.04%	3.50%	0.06%
Chevron Corp	CVX	1,857.27	157.74	292,966	0.90%	4.13%	0.04%	3.00%	0.03%
Coca-Cola Co/The	KO	4,311.19	61.18	263,759	0.81%	3.17%	0.03%	6.36%	0.05%
AbbVie Inc	ABBV	1,770.65	182.10	322,435	0.99%	3.40%	0.03%	8.93%	0.09%
Walt Disney Co/The	DIS	1,834.30	122.36	224,445	0.69%	0.74%	0.01%	19.24%	0.13%
FleetCor Technologies Inc	FLT	71.85	308.54	22,170	0.07%			13.71%	0.01%
Extra Space Storage Inc	EXR	211.58	147.00	31,102	0.10%	4.41%	0.00%	1.62%	0.00%
Exxon Mobil Corp	XOM	3,967.84	116.24	461,222		3.27%		-12.00%	
Phillips 66	PSX	427.82	163.34	69,881		2.57%		-8.00%	
General Electric Co	GE	1,093.27	175.53	191,901		0.18%		23.50%	
HP Inc	HPQ	978.48	30.22	29,570	0.09%	3.65%	0.00%	0.50%	0.00%
Home Depot Inc/The	HD	991.02	383.60	380,154	1.17%	2.35%	0.03%	4.31%	0.05%
Monolithic Power Systems Inc	MPWR	48.66	677.42	32,964	0.10%	0.74%	0.00%	16.00%	0.02%
International Business Machines Corp	IBM	916.75	190.96	175,062	0.54%	3.48%	0.02%	5.14%	0.03%
Johnson & Johnson	JNJ	2,409.78	158.19	381,204	1.17%	3.01%	0.04%	3.76%	0.04%
Lululemon Athletica Inc	LULU	120.89	390.65	47,226	0.14%			20.00%	0.03%
McDonald's Corp	MCD	722.05	281.95	203,582	0.62%	2.37%	0.01%	7.39%	0.05%
Merck & Co Inc	MRK	2,532.64	131.95	334,182		2.33%		29.28%	
3M Co	MMM	553.36	88.68	49,073	0.15%	6.81%	0.01%	5.50%	0.01%
American Water Works Co Inc	AWK	194.76	122.21	23,801	0.07%	2.32%	0.00%	7.70%	0.01%
Bank of America Corp	BAC	7,890.64	37.92	299,213		2.53%		-6.00%	
Pfizer Inc	PFE	5,646.78	27.75	156,698	0.48%	6.05%	0.03%	10.08%	0.05%
Procter & Gamble Co/The	PG	2,353.02	162.25	381,778	1.17%	2.32%	0.03%	8.09%	0.09%
AT&T Inc	T	7,152.79	17.60	125,889	0.39%	6.31%	0.02%	1.98%	0.01%
Travelers Cos Inc/The	TRV	229.13	230.14	52,731	0.16%	1.74%	0.00%	18.29%	0.03%
RTX Corp	RTX	1,329.65	97.53	129,680	0.40%	2.42%	0.01%	11.64%	0.05%
Analog Devices Inc	ADI	495.91	197.79	98,086		1.86%		-1.00%	
Walmart Inc	WMT	8,058.05	60.17	484,853	1.49%	1.38%	0.02%	7.00%	0.10%
Cisco Systems Inc	CSCO	4,049.19	49.91	202,095	0.62%	3.21%	0.02%	7.50%	0.05%
Intel Corp	INTC	4,228.00	44.17	186,751	0.57%	1.13%	0.01%	1.38%	0.01%
General Motors Co	GM	1,154.43	45.35	52,354	0.16%	1.06%	0.00%	15.71%	0.03%
Microsoft Corp	MSFT	7,430.44	420.72	3,126,133	9.58%	0.71%	0.07%	18.78%	1.80%
Dollar General Corp	DG	219.67	156.06	34,282		1.51%		-1.47%	
Cigna Group/The	CI	283.65	363.19	103,018	0.32%	1.54%	0.00%	11.62%	0.04%
Kinder Morgan Inc	KMI	2,219.37	18.34	40,703	0.12%	6.16%	0.01%	3.00%	0.00%
Citigroup Inc	C	1,911.37	63.24	120,875		3.35%		21.67%	
American International Group Inc	AIG	680.95	78.17	53,230	0.16%	1.84%	0.00%	9.50%	0.02%
Altria Group Inc	MO	1,763.46	43.62	76,922	0.24%	8.99%	0.02%	4.50%	0.01%
HCA Healthcare Inc	HCA	264.49	333.53	88,214	0.27%	0.79%	0.00%	9.15%	0.02%
International Paper Co	IP	346.35	39.02	13,515		4.74%		-2.00%	
Hewlett Packard Enterprise Co	HPE	1,300.00	17.73	23,049	0.07%	2.93%	0.00%	2.86%	0.00%
Abbott Laboratories	ABT	1,735.18	113.66	197,221	0.60%	1.94%	0.01%	8.00%	0.05%
Aflac Inc	AFL	575.41	85.86	49,405	0.15%	2.33%	0.00%	6.69%	0.01%
Air Products and Chemicals Inc	APD	222.30	242.27	53,857	0.17%	2.92%	0.00%	9.39%	0.02%
Royal Caribbean Cruises Ltd	RCL	58.55	1,010.03	59,137				53.91%	
Hess Corp	HES	256.65	139.01	35,677				27.45%	
Archer-Daniels-Midland Co	ADM	307.15	152.64	46,884		1.15%			
Automatic Data Processing Inc	ADP	509.85	62.81	32,024		3.18%		-2.35%	
Verisk Analytics Inc	VRSK	410.79	249.74	102,591	0.31%	2.24%	0.01%	16.00%	0.05%
AutoZone Inc	AZO	143.39	235.73	33,801	0.10%	0.66%	0.00%	11.97%	0.01%
Linde PLC	LIN	17.30	3,151.65	54,533	0.17%			14.75%	0.02%
Avery Dennison Corp	AVY	481.58	464.32	223,605	0.69%	1.20%	0.01%	11.00%	0.08%
Enphase Energy Inc	ENPH	80.51	223.25	17,974	0.06%	1.45%	0.00%	7.00%	0.00%
MSCI Inc	MSCI	135.76	120.98	16,424				31.38%	
Ball Corp	BALL	79.09	560.45	44,327	0.14%	1.14%	0.00%	12.24%	0.02%
Axon Enterprise Inc	AXON	315.64	67.36	21,262	0.07%	1.19%	0.00%	9.50%	0.01%
Dayforce Inc	DAY	75.46	312.88	23,611					
Carrier Global Corp	CARR	156.60	66.21	10,368					
Bank of New York Mellon Corp/The	BK	900.10	58.13	52,323	0.16%	1.31%	0.00%	5.33%	0.01%
Otis Worldwide Corp	OTIS	754.44	57.62	43,471	0.13%	2.92%	0.00%	10.00%	0.01%
Baxter International Inc	BAX	405.46	99.27	40,250	0.12%	1.37%	0.00%	9.00%	0.01%
Becton Dickinson & Co	BDX	508.00	42.74	21,712	0.07%	2.71%	0.00%	2.73%	0.00%
Berkshire Hathaway Inc	BRK/B	288.90	247.45	71,489	0.22%	1.54%	0.00%	8.36%	0.02%
Best Buy Co Inc	BBY	1,311.00	420.52	551,300					
Boston Scientific Corp	BSX	215.38	82.03	17,668	0.05%	4.58%	0.00%	3.36%	0.00%
Bristol-Myers Squibb Co	BMY	1,469.90	68.49	100,673	0.31%			12.33%	0.04%
Brown-Forman Corp	BF/B	2,022.19	54.23	109,664		4.43%		-1.71%	
Coterra Energy Inc	CTRA	303.42	51.62	15,662	0.05%	1.69%	0.00%	2.73%	0.00%
Campbell Soup Co	CPB	751.85	27.88	20,961		3.01%			
Hilton Worldwide Holdings Inc	HLT	298.10	44.45	13,251	0.04%	3.33%	0.00%	3.54%	0.00%
Carnival Corp	CCL	252.16	213.31	53,788	0.16%	0.28%	0.00%	15.28%	0.03%

Qorvo Inc	QRVO	1,119.45	16.34	18,292					
Builders FirstSource Inc	BLDR	96.55	114.83	11,087	0.03%			17.72%	0.01%
UDR Inc	UDR	121.94	208.55	25,431	0.08%			11.84%	0.01%
Clorox Co/The	CLX	329.22	37.41	12,316	0.04%	4.54%	0.00%	6.06%	0.00%
Paycom Software Inc	PAYC	124.11	153.11	19,002	0.06%	3.14%	0.00%	13.86%	0.01%
CMS Energy Corp	CMS	57.55	199.01	11,453	0.04%	0.75%	0.00%	5.50%	0.00%
Colgate-Palmolive Co	CL	291.76	60.34	17,605	0.05%	3.41%	0.00%	7.37%	0.00%
EPAM Systems Inc	EPAM	821.99	90.05	74,020	0.23%	2.22%	0.01%	8.18%	0.02%
Comerica Inc	CMA	57.83	276.16	15,970	0.05%			2.97%	0.00%
Conagra Brands Inc	CAG	132.49	54.99	7,286		5.16%		31.00%	
Airbnb Inc	ABNB	478.01	29.64	14,168	0.04%	4.72%	0.00%	2.08%	0.00%
Consolidated Edison Inc	ED	438.09	164.96	72,267	0.22%			18.96%	0.04%
Corning Inc	GLW	344.92	90.81	31,323	0.10%	3.66%	0.00%	5.00%	0.00%
Cummins Inc	CMI	855.35	32.96	28,192	0.09%	3.40%	0.00%	9.34%	0.01%
Caesars Entertainment Inc	CZR	141.86	294.65	41,798	0.13%	2.28%	0.00%	6.07%	0.01%
Danaher Corp	DHR	216.30	43.74	9,461					
Target Corp	TGT	740.54	249.72	184,929	0.57%	0.43%	0.00%	3.66%	0.02%
Deere & Co	DE	461.69	177.21	81,816		2.48%		-2.13%	
Dominion Energy Inc	D	278.36	410.74	114,333		1.43%		-4.67%	
Dover Corp	DOV	837.59	49.19	41,201	0.13%	5.43%	0.01%	10.65%	0.01%
Alliant Energy Corp	LNT	137.38	177.19	24,342	0.07%	1.15%	0.00%	9.50%	0.01%
Steel Dynamics Inc	STLD	252.72	50.40	12,737	0.04%	3.81%	0.00%	7.00%	0.00%
Duke Energy Corp	DUK	158.16	148.23	23,443		1.24%		-12.80%	
Regency Centers Corp	REG	771.00	96.71	74,563	0.23%	4.24%	0.01%	6.77%	0.02%
Eaton Corp PLC	ETN	184.58	60.56	11,178	0.03%	4.43%	0.00%	3.63%	0.00%
Ecolab Inc	ECL	399.89	312.68	125,038	0.38%	1.20%	0.00%	15.00%	0.06%
Revvity Inc	RVTY	285.91	230.90	66,017	0.20%	0.99%	0.00%	12.50%	0.03%
Emerson Electric Co	EMR	123.53	105.00	12,970	0.04%	0.27%	0.00%	8.26%	0.00%
EOG Resources Inc	EOG	571.70	113.42	64,842	0.20%	1.85%	0.00%	14.13%	0.03%
Aon PLC	AON	580.00	127.84	74,147	0.23%	2.85%	0.01%	5.00%	0.01%
Entergy Corp	ETR	198.30	333.72	66,176	0.20%	0.74%	0.00%	9.16%	0.02%
Equifax Inc	EFX	213.24	105.68	22,536	0.07%	4.28%	0.00%	7.00%	0.00%
EQT Corp	EQT	124.23	267.52	33,234	0.10%	0.58%	0.00%	16.00%	0.02%
IQVIA Holdings Inc	IQV	440.72	37.07	16,338		1.70%		31.59%	
Gartner Inc	IT	182.01	252.89	46,030	0.14%			8.92%	0.01%
FedEx Corp	FDX	77.97	476.67	37,165					
FMC Corp	FMC	246.08	289.74	71,300	0.22%	1.74%	0.00%	13.00%	0.03%
Brown & Brown Inc	BRO	124.82	63.70	7,951		3.64%			
Ford Motor Co	F	285.80	87.54	25,019	0.08%	0.59%	0.00%	8.05%	0.01%
NextEra Energy Inc	NEE	3,902.78	13.28	51,829		1.36%		-11.00%	
Franklin Resources Inc	BEN	2,023.71	63.91	129,336	0.40%	3.22%	0.01%	8.10%	0.03%
Garmin Ltd	GRMN	526.56	28.11	14,802		4.41%		-7.00%	
Freeport-McMoRan Inc	FCX	191.78	148.87	28,550		2.02%			
Dexcom Inc	DXCM	1,434.41	47.02	67,446		1.28%			
General Dynamics Corp	GD	385.52	138.70	53,471				30.07%	
General Mills Inc	GIS	274.37	282.49	77,506	0.24%	2.01%	0.00%	11.59%	0.03%
Genuine Parts Co	GPC	564.55	69.97	39,501	0.12%	3.37%	0.00%	4.00%	0.00%
Atmos Energy Corp	ATO	139.42	154.93	21,601		2.58%			
WW Grainger Inc	GWW	150.84	118.87	17,930	0.05%	2.71%	0.00%	7.00%	0.00%
Halliburton Co	HAL	49.13	1,017.30	49,983		0.73%			
L3Harris Technologies Inc	LHX	890.10	39.42	35,088	0.11%	1.73%	0.00%	16.34%	0.02%
Healthpeak Properties Inc	PEAK	709.58	18.75	13,305	0.04%	6.40%	0.00%	1.14%	0.00%
Insulet Corp	PODD	190.11	213.10	40,512	0.12%	2.18%	0.00%	7.29%	0.01%
Catalent Inc	CTLT	69.93	171.40	11,985				33.03%	
Fortive Corp	FTV	180.74	56.45	10,203				35.27%	
Hershey Co/The	HSY	351.38	86.02	30,226	0.09%	0.37%	0.00%	9.71%	0.01%
Synchrony Financial	SYF	149.60	194.50	29,097	0.09%	2.82%	0.00%	8.00%	0.01%
Hormel Foods Corp	HRL	406.84	43.12	17,543		2.32%			
Arthur J Gallagher & Co	AJG	547.69	34.89	19,109	0.06%	3.24%	0.00%	6.59%	0.00%
Mondelez International Inc	MDLZ	216.80	250.04	54,209	0.17%	0.96%	0.00%	12.18%	0.02%
CenterPoint Energy Inc	CNP	1,346.48	70.00	94,253	0.29%	2.43%	0.01%	8.55%	0.02%
Humana Inc	HUM	633.03	28.49	18,035	0.06%	2.81%	0.00%	8.01%	0.00%
Willis Towers Watson PLC	WTW	120.55	346.72	41,797		1.02%		-3.07%	
Illinois Tool Works Inc	ITW	102.48	275.00	28,182	0.09%	1.28%	0.00%	12.42%	0.01%
CDW Corp/DE	CDW	298.75	268.33	80,162	0.25%	2.09%	0.01%	6.77%	0.02%
Trane Technologies PLC	TT	134.22	255.78	34,330	0.11%	0.97%	0.00%	8.93%	0.01%
Interpublic Group of Cos Inc/The	IPG	227.07	300.20	68,167	0.21%	1.12%	0.00%	12.86%	0.03%
International Flavors & Fragrances Inc	IFF	378.73	32.63	12,358	0.04%	4.05%	0.00%	5.25%	0.00%
Generac Holdings Inc	GNRC	255.32	85.99	21,955		1.86%		-1.97%	
NXP Semiconductors NV	NXPI	60.27	126.14	7,602	0.02%			7.00%	0.00%
Kellanova	K	256.46	247.77	63,543	0.19%	1.64%	0.00%	20.00%	0.04%
Broadridge Financial Solutions Inc	BR	340.68	57.29	19,517	0.06%	3.91%	0.00%	8.42%	0.01%
Kimberly-Clark Corp	KMB	117.77	204.86	24,127		1.56%			
Kimco Realty Corp	KIM	336.91	129.35	43,580	0.13%	3.77%	0.01%	6.71%	0.01%
Oracle Corp	ORCL	674.13	19.61	13,220	0.04%	4.90%	0.00%	3.26%	0.00%
Kroger Co/The	KR	2,748.51	125.61	345,241	1.06%	1.27%	0.01%	14.30%	0.15%
Lennar Corp	LEN	719.42	57.13	41,101	0.13%	2.03%	0.00%	4.76%	0.01%
Eli Lilly & Co	LLY	245.57	171.98	42,233	0.13%	1.16%	0.00%	8.82%	0.01%
Bath & Body Works Inc	BBWI	950.77	777.96	739,658		0.67%		38.68%	
Charter Communications Inc	CHTR	224.90	50.02	11,249		1.60%			
Loews Corp	L	161.28	290.63	46,873	0.14%			13.97%	0.02%
Lowe's Cos Inc	LOW	222.20	78.29	17,396		0.32%			
Hubbell Inc	HUBB	572.18	254.73	145,752	0.45%	1.73%	0.01%	2.12%	0.01%
IDEX Corp	IEX	53.68	415.05	22,281	0.07%	1.18%	0.00%	18.00%	0.01%
Marsh & McLennan Cos Inc	MMC	75.65	244.02	18,459		1.05%			
Masco Corp	MAS	491.66	205.98	101,271	0.31%	1.38%	0.00%	9.79%	0.03%
S&P Global Inc	SPGI	219.77	78.88	17,335	0.05%	1.47%	0.00%	7.81%	0.00%
Medtronic PLC	MDT	320.26	425.45	136,253	0.42%	0.86%	0.00%	12.63%	0.05%
Viatris Inc	VTRS	1,327.82	87.15	115,720	0.35%	3.17%	0.01%	4.33%	0.02%
CVS Health Corp	CVS	1,187.57	11.94	14,180		4.02%		-1.69%	
DuPont de Nemours Inc	DD	1,258.45	79.76	100,374	0.31%	3.34%	0.01%	7.62%	0.02%
Micron Technology Inc	MU	417.58	76.67	32,016	0.10%	1.98%	0.00%	6.89%	0.01%
Motorola Solutions Inc	MSI	1,107.37	117.89	130,548		0.39%		73.84%	

Cboe Global Markets Inc	CBOE	166.12	354.98	58,970	0.18%	1.10%	0.00%	8.85%	0.02%
Laboratory Corp of America Holdings	LH	105.58	183.73	19,399	0.06%	1.20%	0.00%	13.55%	0.01%
Newmont Corp	NEM	84.10	218.46	18,372	0.06%	1.32%	0.00%	1.23%	0.00%
NIKE Inc	NKE	1,152.55	35.84	41,307		2.79%			
NiSource Inc	NI	1,217.23	93.98	114,395	0.35%	1.57%	0.01%	11.62%	0.04%
Norfolk Southern Corp	NSC	447.53	27.66	12,379	0.04%	3.83%	0.00%	7.00%	0.00%
Principal Financial Group Inc	PFG	246.22	254.87	62,753		2.12%			
Eversource Energy	ES	235.87	86.31	20,358	0.06%	3.20%	0.00%	10.55%	0.01%
Northrop Grumman Corp	NOC	350.73	59.77	20,963		4.79%			
Wells Fargo & Co	WFC	148.14	478.66	70,909	0.22%	1.56%	0.00%	19.54%	0.04%
Nucor Corp	NUE	3,540.40	57.96	205,202	0.63%	2.42%	0.02%	13.41%	0.08%
Occidental Petroleum Corp	OXY	239.98	197.90	47,492		1.09%		-10.80%	
Omnicom Group Inc	OMC	879.50	64.99	57,159		1.35%		-19.00%	
ONEOK Inc	OKE	197.99	96.76	19,158	0.06%	2.89%	0.00%	6.91%	0.00%
Raymond James Financial Inc	RJF	583.16	80.17	46,752	0.14%	4.94%	0.01%	8.93%	0.01%
PG&E Corp	PCG	209.03	128.42	26,843	0.08%	1.40%	0.00%	13.15%	0.01%
Parker-Hannifin Corp	PH	2,133.51	16.76	35,758	0.11%	0.24%	0.00%	7.47%	0.01%
Rollins Inc	ROL	128.41	555.79	71,370	0.22%	1.07%	0.00%	16.28%	0.04%
PPL Corp	PPL	483.89	46.27	22,389	0.07%	1.30%	0.00%	12.75%	0.01%
ConocoPhillips	COP	737.12	27.53	20,293	0.06%	3.74%	0.00%	6.74%	0.00%
PulteGroup Inc	PHM	1,176.41	127.28	149,733		2.45%			
Pinnacle West Capital Corp	PNW	212.11	120.62	25,585	0.08%	0.66%	0.00%	5.41%	0.00%
PNC Financial Services Group Inc/The	PNC	123.31	74.73	9,215	0.03%	4.71%	0.00%	7.78%	0.00%
PPG Industries Inc	PPG	397.85	161.60	64,292		3.84%		31.00%	
Progressive Corp/The	PGR	235.36	144.90	34,104	0.10%	1.79%	0.00%	10.27%	0.01%
Veralto Corp	VLTO	585.70	206.82	121,134		0.19%		32.56%	
Public Service Enterprise Group Inc	PEG	246.54	88.66	21,858		0.41%			
Robert Half Inc	RHI	498.59	66.78	33,296	0.10%	3.59%	0.00%	6.01%	0.01%
Cooper Cos Inc/The	COO	105.21	79.28	8,341		2.67%			
Edison International	EIX	198.76	101.46	20,166	0.06%			11.77%	0.01%
Schlumberger NV	SLB	383.93	70.73	27,155	0.08%	4.41%	0.00%	6.98%	0.01%
Charles Schwab Corp/The	SCHW	1,432.74	54.81	78,529		2.01%		20.37%	
Sherwin-Williams Co/The	SHW	1,773.48	72.34	128,293		1.38%			
West Pharmaceutical Services Inc	WST	254.47	347.33	88,383	0.27%	0.82%	0.00%	10.94%	0.03%
J M Smucker Co/The	SJM	73.21	395.71	28,968	0.09%	0.20%	0.00%	7.72%	0.01%
Snap-on Inc	SNA	106.18	125.87	13,364	0.04%	3.37%	0.00%	7.04%	0.00%
AMETEK Inc	AME	52.84	296.22	15,652	0.05%	2.51%	0.00%	3.83%	0.00%
Uber Technologies Inc	UBER	231.21	182.90	42,288		0.61%			
Southern Co/The	SO	2,081.54	76.99	160,258				51.75%	
Truist Financial Corp	TFC	1,091.52	71.74	78,305	0.24%	3.90%	0.01%	8.00%	0.02%
Southwest Airlines Co	LUV	1,334.53	38.98	52,020	0.16%	5.34%	0.01%	7.33%	0.01%
W R Berkley Corp	WRB	596.67	29.19	17,417		2.47%		23.02%	
Stanley Black & Decker Inc	SWK	256.55	88.44	22,689	0.07%	0.50%	0.00%	12.00%	0.01%
Public Storage	PSA	153.80	97.93	15,062	0.05%	3.31%	0.00%	10.00%	0.00%
Arista Networks Inc	ANET	175.83	290.06	51,001	0.16%	4.14%	0.01%	3.51%	0.01%
Sysco Corp	SYY	312.63	289.98	90,658	0.28%			15.67%	0.04%
Corteva Inc	CTVA	497.83	81.18	40,414	0.12%	2.46%	0.00%	14.00%	0.02%
Texas Instruments Inc	TXN	687.80	57.67	39,665	0.12%	1.11%	0.00%	14.14%	0.02%
Textron Inc	TXT	909.29	174.21	158,407	0.49%	2.98%	0.01%	10.00%	0.05%
Thermo Fisher Scientific Inc	TMO	192.85	95.93	18,500	0.06%	0.08%	0.00%	10.12%	0.01%
TJX Cos Inc/The	TJX	381.31	581.21	221,622		0.27%			
Globe Life Inc	GL	1,139.68	101.42	115,586	0.35%	1.31%	0.00%	10.00%	0.04%
Johnson Controls International plc	JCI	94.04	116.37	10,943		0.82%			
Ulta Beauty Inc	ULTA	681.48	65.32	44,514	0.14%	2.27%	0.00%	9.77%	0.01%
Union Pacific Corp	UNP	48.27	522.88	25,239	0.08%			6.90%	0.01%
Keysight Technologies Inc	KEYS	610.10	245.93	150,041	0.46%	2.11%	0.01%	11.00%	0.05%
UnitedHealth Group Inc	UNH	174.56	156.38	27,297				-0.99%	
Blackstone Inc	BX	921.93	494.70	456,081	1.40%	1.52%	0.02%	10.61%	0.15%
Marathon Oil Corp	MRO	714.64	131.37	93,883	0.29%	2.86%	0.01%	16.04%	0.05%
Bio-Rad Laboratories Inc	BIO	577.20	28.34	16,358	0.05%	1.55%	0.00%	7.00%	0.00%
Ventas Inc	VTR	23.42	345.87	8,101					
VF Corp	VFC	402.46	43.54	17,523	0.05%	4.13%	0.00%	5.41%	0.00%
Vulcan Materials Co	VMC	388.82	15.34	5,964		2.35%		-4.90%	
Weyerhaeuser Co	WY	132.27	272.92	36,100	0.11%	0.67%	0.00%	16.35%	0.02%
Whirlpool Corp	WHR	729.62	35.91	26,201		2.23%			
Williams Cos Inc/The	WMB	1,218.43	38.97	47,482	0.15%	4.88%	0.01%	3.00%	0.00%
Constellation Energy Corp	CEG	315.12	184.85	58,250	0.18%	0.76%	0.00%	9.00%	0.02%
WEC Energy Group Inc	WEC	315.56	82.12	25,914	0.08%	4.07%	0.00%	6.77%	0.01%
Adobe Inc	ADBE	448.00	504.60	226,061	0.69%			16.73%	0.12%
AES Corp/The	AES	710.29	17.93	12,735	0.04%	3.85%	0.00%	7.95%	0.00%
Expeditors International of Washington Inc	EXPD	143.90	121.57	17,494	0.05%	1.14%	0.00%	2.85%	0.00%
Amgen Inc	AMGN	535.92	284.32	152,372	0.47%	3.17%	0.01%	4.33%	0.02%
Apple Inc	AAPL	15,441.88	171.48	2,647,974	8.12%	0.56%	0.05%	11.00%	0.89%
Autodesk Inc	ADSK	213.92	260.42	55,708	0.17%			12.76%	0.02%
Cintas Corp	CTAS	101.44	687.03	69,695	0.21%	0.79%	0.00%	10.83%	0.02%
Comcast Corp	CMCSA	3,962.41	43.35	171,771	0.53%	2.86%	0.02%	9.02%	0.05%
Molson Coors Beverage Co	TAP	198.00	67.25	13,316	0.04%	2.62%	0.00%	4.67%	0.00%
KLA Corp	KLAC	135.23	698.57	94,470	0.29%	0.83%	0.00%	8.03%	0.02%
Marriott International Inc/MD	MAR	288.26	252.31	72,731	0.22%	0.82%	0.00%	14.53%	0.03%
Fiserv Inc	FI	590.40	159.82	94,358	0.29%			15.57%	0.05%
McCormick & Co Inc/MD	MKC	251.75	76.81	19,337	0.06%	2.19%	0.00%	5.96%	0.00%
PACCAR Inc	PCAR	524.01	123.89	64,920	0.20%	0.87%	0.00%	12.00%	0.02%
Costco Wholesale Corp	COST	443.50	732.63	324,924	1.00%	0.56%	0.01%	10.32%	0.10%
Stryker Corp	SYK	380.47	357.87	136,159	0.42%	0.89%	0.00%	8.20%	0.03%
Tyson Foods Inc	TSN	286.34	58.73	16,817		3.34%		53.71%	
Lamb Weston Holdings Inc	LW	144.37	106.53	15,380	0.05%	1.35%	0.00%	15.46%	0.01%
Applied Materials Inc	AMAT	830.90	206.23	171,356	0.53%	0.78%	0.00%	14.23%	0.07%
American Airlines Group Inc	AAL	653.54	15.35	10,032				-2.05%	
Cardinal Health Inc	CAH	243.23	111.90	27,218	0.08%	1.79%	0.00%	12.91%	0.01%
Cincinnati Financial Corp	CINF	156.67	124.17	19,453	0.06%	2.61%	0.00%	14.97%	0.01%
Paramount Global	PARA	611.78	11.77	7,201		1.70%		52.78%	
DR Horton Inc	DHI	331.82	164.55	54,600	0.17%	0.73%	0.00%	4.49%	0.01%
Electronic Arts Inc	EA	267.35	132.67	35,469	0.11%	0.57%	0.00%	11.65%	0.01%

Fair Isaac Corp	FICO	24.85	1,249.61	31,055					
Fastenal Co	FAST	572.34	77.14	44,150		2.02%			
M&T Bank Corp	MTB	166.62	145.44	24,234	0.07%	3.58%	0.00%	8.08%	0.01%
Xcel Energy Inc	XEL	555.16	53.75	29,840	0.09%	4.07%	0.00%	5.60%	0.01%
Fifth Third Bancorp	FITB	681.05	37.21	25,342		3.76%		25.00%	
Gilead Sciences Inc	GILD	1,245.08	73.25	91,202	0.28%	4.20%	0.01%	3.02%	0.01%
Hasbro Inc	HAS	138.79	56.52	7,844	0.02%	4.95%	0.00%	11.61%	0.00%
Huntington Bancshares Inc/OH	HBAN	1,455.81	13.95	20,309		4.44%		-5.65%	
Welltower Inc	WELL	568.88	93.44	53,156	0.16%	2.61%	0.00%	14.52%	0.02%
Biogen Inc	BIIB	145.36	215.63	31,344	0.10%			7.82%	0.01%
Northern Trust Corp	NTRS	204.84	88.92	18,215	0.06%	3.37%	0.00%	2.57%	0.00%
Packaging Corp of America	PKG	89.62	189.78	17,009	0.05%	2.63%	0.00%	3.00%	0.00%
Paychex Inc	PAYX	359.82	122.80	44,186	0.14%	2.90%	0.00%	7.00%	0.01%
QUALCOMM Inc	QCOM	1,116.00	169.30	188,939	0.58%	1.89%	0.01%	10.65%	0.06%
Ross Stores Inc	ROST	336.67	146.76	49,409	0.15%	1.00%	0.00%	10.00%	0.02%
IDEXX Laboratories Inc	IDXX	83.09	539.93	44,862	0.14%			11.65%	0.02%
Starbucks Corp	SBUX	1,132.20	91.39	103,472	0.32%	2.49%	0.01%	15.41%	0.05%
KeyCorp	KEY	927.47	15.81	14,663		5.19%		-1.67%	
Fox Corp	FOXA	239.30	31.27	7,483		1.66%			
Fox Corp	FOX	235.58	28.62	6,742		1.82%			
State Street Corp	STT	301.94	77.32	23,346	0.07%	3.57%	0.00%	7.85%	0.01%
Norwegian Cruise Line Holdings Ltd	NCLH	425.66	20.93	8,909				48.23%	
US Bancorp	USB	1,558.31	44.70	69,657	0.21%	4.38%	0.01%	6.00%	0.01%
A O Smith Corp	AOS	121.31	89.46	10,852		1.43%			
Gen Digital Inc	GEN	636.91	22.40	14,267	0.04%	2.23%	0.00%	11.51%	0.01%
T Rowe Price Group Inc	TROW	223.64	121.92	27,267	0.08%	4.07%	0.00%	3.50%	0.00%
Waste Management Inc	WM	401.60	213.15	85,601	0.26%	1.41%	0.00%	9.15%	0.02%
Constellation Brands Inc	STZ	182.80	271.76	49,677	0.15%	1.31%	0.00%	10.63%	0.02%
DENTSPLY SIRONA Inc	XRAY	207.36	33.19	6,882	0.02%	1.93%	0.00%	14.08%	0.00%
Zions Bancorp NA	ZION	449.20	16.59	7,452	0.02%	4.82%	0.00%	4.00%	0.00%
Invesco Ltd	IVZ	279.98	650.00	181,986	0.56%	0.55%	0.00%	18.76%	0.10%
Intuit Inc	INTU	1,635.27	94.16	153,977	0.47%	3.61%	0.02%	5.28%	0.02%
Morgan Stanley	MS	540.39	89.71	48,478	0.15%	2.01%	0.00%	2.30%	0.00%
Microchip Technology Inc	MCHP	405.76	259.13	105,144	0.32%	1.33%	0.00%	6.00%	0.02%
Chubb Ltd	CB	234.73	77.96	18,300	0.06%			8.68%	0.00%
Hologic Inc	HOLX	458.40	36.29	16,635		4.63%		-6.96%	
Citizens Financial Group Inc	CFG	127.55	133.95	17,085	0.05%	0.24%	0.00%	12.00%	0.01%
Jabil Inc	JBL	59.04	1,128.88	66,646	0.20%			11.13%	0.02%
O'Reilly Automotive Inc	ORLY	263.07	173.01	45,513		2.13%		161.00%	
Allstate Corp/The	ALL	379.29	63.11	23,937	0.07%	4.28%	0.00%	3.94%	0.00%
Equity Residential	EQR	230.96	34.74	8,023	0.02%	1.27%	0.00%	6.40%	0.00%
BorgWarner Inc	BWA	1,387.59	30.67	42,557	0.13%	2.80%	0.00%	7.06%	0.01%
Keurig Dr Pepper Inc	KDP	703.60	20.68	14,550		3.87%			
Host Hotels & Resorts Inc	HST	224.53	56.97	12,791				29.70%	
Incyte Corp	INCY	325.77	156.49	50,979	0.16%	4.98%	0.01%	1.58%	0.00%
Simon Property Group Inc	SPG	117.60	100.22	11,786		3.23%		-6.00%	
Eastman Chemical Co	EMN	142.03	185.56	26,354	0.08%	3.66%	0.00%	5.95%	0.00%
AvalonBay Communities Inc	AVB	359.00	117.40	42,147	0.13%	4.43%	0.01%	10.20%	0.01%
Prudential Financial Inc	PRU	727.84	148.63	108,179	0.33%	4.39%	0.01%	8.29%	0.03%
United Parcel Service Inc	UPS	862.71	21.69	18,712		4.61%		-1.67%	
Walgreens Boots Alliance Inc	WBA	98.81	224.82	22,215		0.93%			
STERIS PLC	STE	131.41	536.85	70,546	0.22%	0.46%	0.00%	10.33%	0.02%
McKesson Corp	MCK	240.50	454.87	109,394	0.34%	2.77%	0.01%	5.39%	0.02%
Lockheed Martin Corp	LMT	199.48	242.99	48,472	0.15%	0.84%	0.00%	10.10%	0.02%
Cencora Inc	COR	382.10	148.89	56,891		1.61%		50.08%	
Capital One Financial Corp	COF	59.20	344.23	20,379	0.06%			7.23%	0.00%
Waters Corp	WAT	57.19	274.54	15,701		0.99%			
Nordson Corp	NDSN	217.98	133.15	29,024	0.09%			14.10%	0.01%
Dollar Tree Inc	DLTR	119.41	167.15	19,960	0.06%	3.13%	0.00%	10.97%	0.01%
Darden Restaurants Inc	DRI	229.58	53.38	12,255	0.04%	4.81%	0.00%	5.69%	0.00%
Evergy Inc	EVRG	268.01	36.28	9,723				36.66%	
Match Group Inc	MTCH	34.81	496.88	17,298	0.05%	1.22%	0.00%	13.31%	0.01%
Domino's Pizza Inc	DPZ	3.20	8,099.96	25,904	0.08%			4.41%	0.00%
NVR Inc	NVR	206.38	104.97	21,663	0.07%	1.91%	0.00%	7.40%	0.00%
NetApp Inc	NTAP	217.67	219.31	47,738	0.15%	0.47%	0.00%	14.22%	0.02%
Old Dominion Freight Line Inc	ODFL	87.70	138.05	12,107	0.04%			14.97%	0.01%
DaVita Inc	DVA	297.30	103.05	30,637	0.09%	1.82%	0.00%	7.00%	0.01%
Hartford Financial Services Group Inc/The	HIG	292.28	80.21	23,443		3.24%			
Iron Mountain Inc	IRM	232.93	154.15	35,906	0.11%	1.71%	0.00%	17.63%	0.02%
Estee Lauder Cos Inc/The	EL	272.24	311.28	84,743	0.26%			15.12%	0.04%
Cadence Design Systems Inc	CDNS	42.28	425.01	17,968					
Tyler Technologies Inc	TYL	59.97	182.46	10,942	0.03%	0.44%	0.00%	12.38%	0.00%
Universal Health Services Inc	UHS	160.44	108.32	17,379	0.05%	2.51%	0.00%	9.03%	0.00%
Skyworks Solutions Inc	SWKS	111.06	133.11	14,783		2.25%		-0.82%	
Quest Diagnostics Inc	DGX	114.59	291.33	33,384	0.10%	1.72%	0.00%	10.84%	0.01%
Rockwell Automation Inc	ROK	1,215.64	36.90	44,857	0.14%	4.34%	0.01%	3.87%	0.01%
Kraft Heinz Co/The	KHC	466.35	197.59	92,146		3.28%		24.36%	
American Tower Corp	AMT	107.94	962.49	103,895	0.32%			13.00%	0.04%
Regeneron Pharmaceuticals Inc	REGN	10,387.38	180.38	1,873,676				23.50%	
Amazon.com Inc	AMZN	72.87	173.73	12,659	0.04%	1.27%	0.00%	7.69%	0.00%
Jack Henry & Associates Inc	JKHY	39.04	187.76	7,331	0.02%	1.60%	0.00%	12.64%	0.00%
Ralph Lauren Corp	RL	156.94	65.31	10,250	0.03%	6.00%	0.00%	0.37%	0.00%
Boston Properties Inc	BXP	599.86	115.35	69,193	0.21%	0.76%	0.00%	9.39%	0.02%
Amphenol Corp	APH	410.30	68.43	28,077	0.09%	0.29%	0.00%	14.19%	0.01%
Howmet Aerospace Inc	HWM	233.62	262.50	61,326		3.90%		-13.00%	
Pioneer Natural Resources Co	PXD	329.45	170.69	56,235		2.51%		24.00%	
Valero Energy Corp	VLO	152.54	571.50	87,179	0.27%			18.71%	0.05%
Synopsys Inc	SNPS	118.49	68.72	8,143	0.02%			4.48%	0.00%
Etsy Inc	ETSY	116.99	76.14	8,908	0.03%	3.20%	0.00%	5.00%	0.00%
CH Robinson Worldwide Inc	CHRW	670.42	346.61	232,375	0.71%	1.49%	0.01%	10.00%	0.07%
Accenture PLC	ACN	55.61	1,231.60	68,484	0.21%			14.52%	0.03%
TransDigm Group Inc	TDG	281.34	138.65	39,007	0.12%	1.93%	0.00%	8.67%	0.01%
Yum! Brands Inc	YUM	924.88	130.22	120,438	0.37%	2.95%	0.01%	9.19%	0.03%

Prologis Inc	PLD	574.44	38.62	22,185		4.40%			
FirstEnergy Corp	FE	100.90	189.51	19,122	0.06%			8.70%	0.01%
VeriSign Inc	VRSN	145.75	259.80	37,866	0.12%	0.14%	0.00%	10.00%	0.01%
Quanta Services Inc	PWR	128.51	75.52	9,705	0.03%			9.38%	0.00%
Henry Schein Inc	HSIC	266.51	73.96	19,711	0.06%	3.62%	0.00%	6.00%	0.00%
Ameren Corp	AEE	87.02	347.16	30,209	0.09%			8.63%	0.01%
ANSYS Inc	ANSS	38.09	454.39	17,306	0.05%	0.86%	0.00%	11.18%	0.01%
FactSet Research Systems Inc	FDS	2,500.00	903.56	2,258,900		0.02%		37.63%	
NVIDIA Corp	NVDA	497.84	73.29	36,487	0.11%	1.64%	0.00%	12.00%	0.01%
Cognizant Technology Solutions Corp	CTSH	354.45	399.09	141,457	0.43%			12.00%	0.05%
Intuitive Surgical Inc	ISRG	170.59	148.49	25,330				22.76%	
Take-Two Interactive Software Inc	TTWO	314.61	190.90	60,061	0.18%	1.12%	0.00%	9.04%	0.02%
Republic Services Inc	RSG	518.00	52.78	27,340	0.08%	2.05%	0.00%	1.99%	0.00%
eBay Inc	EBAY	324.53	417.69	135,552	0.42%	2.63%	0.01%	8.36%	0.03%
Goldman Sachs Group Inc/The	GS	108.11	216.70	23,427	0.07%	1.81%	0.00%	8.00%	0.01%
SBA Communications Corp	SBAC	629.33	71.83	45,205	0.14%	3.45%	0.00%	5.95%	0.01%
Sempra	SRE	182.50	393.03	71,728	0.22%	0.87%	0.00%	9.42%	0.02%
Moody's Corp	MCO	427.33	73.55	31,430	0.10%			5.17%	0.00%
ON Semiconductor Corp	ON	34.17	3,627.88	123,968	0.38%	0.96%	0.00%	15.00%	0.06%
Booking Holdings Inc	BKNG	58.81	189.59	11,149	0.03%			7.09%	0.00%
F5 Inc	FFIV	151.53	108.76	16,480	0.05%			8.33%	0.00%
Akamai Technologies Inc	AKAM	51.35	270.95	13,913	0.04%			14.00%	0.01%
Charles River Laboratories International Inc	CRL	37.87	219.25	8,303		1.35%			
MarketAxess Holdings Inc	MKTX	635.00	50.18	31,864		3.51%			
Devon Energy Corp	DVN	157.19	70.39	11,065	0.03%	0.45%	0.00%	2.00%	0.00%
Alphabet Inc	GOOGL	5,893.00	150.93	889,430	2.73%			12.08%	0.33%
Bio-Techne Corp	TECH	47.06	226.17	10,643	0.03%	0.60%	0.00%	7.21%	0.00%
Teleflex Inc	TFX	87.55	134.71	11,794	0.04%	1.43%	0.00%	6.98%	0.00%
Allegion plc	ALLE	432.76	607.33	262,828				31.81%	
Netflix Inc	NFLX	2,439.69	8.73	21,298				35.28%	
Warner Bros Discovery Inc	WBD	293.06	145.27	42,573		0.65%			
Agilent Technologies Inc	A	245.69	64.36	15,812					
Trimble Inc	TRMB	232.67	518.54	120,648	0.37%	1.26%	0.00%	10.25%	0.04%
Elevance Health Inc	ELV	360.03	215.29	77,510	0.24%	2.14%	0.01%	7.72%	0.02%
CME Group Inc	CME	324.38	37.06	12,022	0.04%	2.37%	0.00%	4.78%	0.00%
Juniper Networks Inc	JNPR	148.94	833.70	124,173	0.38%	2.45%	0.01%	9.00%	0.03%
BlackRock Inc	BLK	206.93	112.14	23,205	0.07%	3.64%	0.00%	7.00%	0.00%
DTE Energy Co	DTE	108.91	171.86	18,717	0.06%	1.63%	0.00%	4.32%	0.00%
Celanese Corp	CE	575.21	63.10	36,296	0.11%	1.39%	0.00%	9.08%	0.01%
Nasdaq Inc	NDAQ	1,552.46	91.62	142,236	0.44%	5.68%	0.02%	8.28%	0.04%
Philip Morris International Inc	PM	403.44	94.95	38,306		0.08%			
Ingersoll Rand Inc	IR	970.00	301.18	292,145		0.53%		22.50%	
Salesforce Inc	CRM	107.02	560.84	60,022		0.53%			
Roper Technologies Inc	ROP	39.61	291.47	11,545		1.78%		40.00%	
Huntington Ingalls Industries Inc	HII	723.02	74.11	53,583	0.16%	2.81%	0.00%	14.54%	0.02%
MetLife Inc	MET	229.37	47.48	10,890	0.03%	2.95%	0.00%	11.00%	0.00%
Tapestry Inc	TPR	1,959.13	37.07	72,625	0.22%	1.29%	0.00%	11.49%	0.03%
CSX Corp	CSX	601.30	95.56	57,460	0.18%			10.00%	0.02%
Edwards Lifesciences Corp	EW	100.19	438.44	43,928		1.23%			
Ameriprise Financial Inc	AMP	51.38	301.44	15,488					
Zebra Technologies Corp	ZBRA	205.08	131.98	27,067	0.08%	0.73%	0.00%	6.89%	0.01%
Zimmer Biomet Holdings Inc	ZBH	106.97	98.40	10,526	0.03%	4.19%	0.00%	5.93%	0.00%
Camden Property Trust	CPT	305.70	97.24	29,726					
CBRE Group Inc	CBRE	925.72	481.57	445,800	1.37%	0.55%	0.01%	16.79%	0.23%
Mastercard Inc	MA	157.92	87.11	13,756				25.76%	
CarMax Inc	KMX	572.62	137.43	78,695	0.24%	1.31%	0.00%	9.36%	0.02%
Intercontinental Exchange Inc	ICE	576.47	74.18	42,762	0.13%	1.94%	0.00%	16.00%	0.02%
Fidelity National Information Services Inc	FIS	27.42	2,906.77	79,707					
Chipotle Mexican Grill Inc	CMG	112.07	102.23	11,457		0.98%			
Wynn Resorts Ltd	WYNN	230.80	105.77	24,412					
Live Nation Entertainment Inc	LYV	51.98	188.24	9,784	0.03%	1.53%	0.00%	5.13%	0.00%
Assurant Inc	AIZ	208.02	67.69	14,081		2.41%		20.17%	
NRG Energy Inc	NRG	1,040.64	59.28	61,689	0.19%			12.53%	0.02%
Monster Beverage Corp	MNST	918.86	21.04	19,333	0.06%	4.56%	0.00%	1.41%	0.00%
Regions Financial Corp	RF	1,000.88	33.50	33,530		2.51%		20.16%	
Baker Hughes Co	BKR	321.69	32.46	10,442	0.03%	2.59%	0.00%	16.00%	0.01%
Mosaic Co/The	MOS	130.77	137.75	18,013	0.06%			16.90%	0.01%
Expedia Group Inc	EXPE	188.34	83.21	15,672	0.05%	2.40%	0.00%	2.50%	0.00%
CF Industries Holdings Inc	CF	301.55	34.38	10,367		2.91%			
APA Corp	APA	135.03	131.09	17,701	0.05%	1.16%	0.00%	8.16%	0.00%
Leidos Holdings Inc	LDOS	5,671.00	152.26	863,466	2.65%			12.08%	0.32%
Alphabet Inc	GOOG	107.03	168.80	18,066				43.03%	
First Solar Inc	FSLR	308.80	145.24	44,850	0.14%	1.79%	0.00%	5.27%	0.01%
TE Connectivity Ltd	TEL	250.57	131.09	32,847	0.10%	2.14%	0.00%	12.28%	0.01%
Discover Financial Services	DFS	1,581.59	279.08	441,390	1.35%	0.75%	0.01%	13.41%	0.18%
Visa Inc	V	116.69	131.58	15,354	0.05%	4.47%	0.00%	2.99%	0.00%
Mid-America Apartment Communities Inc	MAA	241.77	129.24	31,246		1.11%			
Xylem Inc/NY	XYL	360.34	201.50	72,608		1.64%		-13.00%	
Marathon Petroleum Corp	MPC	107.93	261.72	28,248	0.09%	1.68%	0.00%	3.30%	0.00%
Tractor Supply Co	TSCO	1,615.79	180.49	291,633				34.03%	
Advanced Micro Devices Inc	AMD	146.88	198.03	29,087	0.09%	0.97%	0.00%	8.67%	0.01%
ResMed Inc	RMD	21.39	1,331.29	28,474	0.09%			9.18%	0.01%
Mettler-Toledo International Inc	MTD	1,043.14	29.79	31,075		5.57%			
VICI Properties Inc	VICI	961.46	57.92	55,688					
Copart Inc	CPRT	125.65	153.73	19,316		0.75%			
Jacobs Solutions Inc	J	117.53	131.74	15,483		1.21%		-15.23%	
Albemarle Corp	ALB	763.03	68.31	52,123	0.16%			18.05%	0.03%
Fortinet Inc	FTNT	382.88	106.56	40,800	0.13%			18.02%	0.02%
Moderna Inc	MRNA	64.18	244.81	15,713	0.05%	4.00%	0.00%	5.09%	0.00%
Essex Property Trust Inc	ESS	408.41	96.60	39,452	0.12%			20.00%	0.02%
CoStar Group Inc	CSGP	861.12	54.10	46,587	0.14%	5.70%	0.01%	4.82%	0.01%
Realty Income Corp	O	256.97	49.45	12,707	0.04%	2.45%	0.00%	5.63%	0.00%
Westrock Co	WRK	177.03	145.68	25,790	0.08%	0.55%	0.00%	12.91%	0.01%

Westinghouse Air Brake Technologies Corp	WAB	38.38	403.50	15,485	0.05%	1.09%	0.00%	6.21%	0.00%
Pool Corp	POOL	326.17	68.24	22,257				-11.96%	
Western Digital Corp	WDC	1,374.43	175.01	240,539	0.74%	2.89%	0.02%	8.45%	0.06%
PepsiCo Inc	PEP	178.45	198.17	35,363		6.22%			
Diamondback Energy Inc	FANG	323.10	284.13	91,802				20.50%	
Palo Alto Networks Inc	PANW	205.00	762.40	156,292				30.00%	
ServiceNow Inc	NOW	243.91	104.31	25,442	0.08%	1.09%	0.00%	6.74%	0.01%
Church & Dwight Co Inc	CHD	82.78	102.12	8,453	0.03%	4.27%	0.00%	5.14%	0.00%
Federal Realty Investment Trust	FRT	317.02	47.21	14,966	0.05%			11.94%	0.01%
MGM Resorts International	MGM	526.59	86.10	45,339		4.09%			
American Electric Power Co Inc	AEP	611.96	35.61	21,792	0.07%	3.15%	0.00%	6.43%	0.00%
Invitation Homes Inc	INVH	119.55	188.94	22,588				21.10%	
PTC Inc	PTC	103.30	199.25	20,582	0.06%	0.86%	0.00%	15.00%	0.01%
JB Hunt Transport Services Inc	JBHT	131.10	971.57	127,376	0.39%	0.82%	0.00%	11.37%	0.04%
Lam Research Corp	LRCX	63.70	130.89	8,337				-1.82%	
Mohawk Industries Inc	MHK	455.36	90.91	41,397	0.13%	0.13%	0.00%	12.03%	0.02%
GE HealthCare Technologies Inc	GEHC	166.02	85.44	14,184		1.08%			
Pentair PLC	PNR	258.31	418.01	107,975	0.33%			14.48%	0.05%
Vertex Pharmaceuticals Inc	VRTX	1,445.34	9.51	13,745	0.04%	5.26%	0.00%	1.33%	0.00%
Amcor PLC	AMCR	2,200.05	485.58	1,068,300	3.27%	0.41%	0.01%	19.18%	0.63%
Meta Platforms Inc	META	1,186.87	163.22	193,721	0.59%	1.59%	0.01%	5.00%	0.03%
T-Mobile US Inc	TMUS	67.17	721.11	48,437	0.15%	0.90%	0.00%	2.70%	0.00%
United Rentals Inc	URI	174.97	128.91	22,555	0.07%	3.94%	0.00%	4.62%	0.00%
Alexandria Real Estate Equities Inc	ARE	652.18	205.25	133,860	0.41%	2.10%	0.01%	8.50%	0.03%
Honeywell International Inc	HON	643.32	47.87	30,796	0.09%	0.84%	0.00%	10.23%	0.01%
Delta Air Lines Inc	DAL	328.02	47.88	15,705					
United Airlines Holdings Inc	UAL	209.51	93.05	19,495		3.01%		-4.90%	
Seagate Technology Holdings PLC	STX	191.10	27.06	5,171		0.74%			
News Corp	NWS	534.86	78.48	41,976	0.13%			5.97%	0.01%
Centene Corp	CNC	61.82	613.94	37,955	0.12%	0.48%	0.00%	9.71%	0.01%
Martin Marietta Materials Inc	MLM	152.97	112.83	17,260		0.43%		-3.00%	
Teradyne Inc	TER	1,071.74	66.99	71,796	0.22%			6.03%	0.01%
PayPal Holdings Inc	PYPL	3,184.79	175.79	559,854				-4.00%	
Tesla Inc	TSLA	374.15	92.44	34,587	0.11%			5.50%	0.01%
Arch Capital Group Ltd	ACGL	703.27	57.93	40,740		4.83%		23.26%	
Dow Inc	DOW	43.38	397.50	17,244	0.05%	1.76%	0.00%	3.86%	0.00%
Everest Group Ltd	EG	47.38	429.32	20,342	0.06%			7.56%	0.00%
Teledyne Technologies Inc	TDY	380.02	26.18	9,949		0.76%			
News Corp	NWSA	999.74	37.57	37,560	0.12%	4.05%	0.00%	5.00%	0.01%
Exelon Corp	EXC	257.99	133.66	34,482	0.11%	0.75%	0.00%	11.98%	0.01%
Global Payments Inc	GPN	434.22	105.83	45,953	0.14%	5.92%	0.01%	7.00%	0.01%
Crown Castle Inc	CCI	272.68	79.65	21,719	0.07%			11.44%	0.01%
Aptiv PLC	APTV	75.10	327.92	24,628	0.08%			7.26%	0.01%
Align Technology Inc	ALGN	158.90	137.32	21,820	0.07%			3.00%	0.00%
Illumina Inc	ILMN	1,914.58	21.46	41,087	0.13%	3.73%	0.00%	11.31%	0.01%
Kenvue Inc	KVUE	223.16	111.99	24,991	0.08%	1.79%	0.00%	9.00%	0.01%
Targa Resources Corp	TRGP	140.99	102.52	14,454		2.58%		-7.43%	
Bunge Global SA	BG	266.78	53.41	14,249		2.25%			
LKQ Corp	LKQ	25.67	941.26	24,160				20.01%	
Zoetis Inc	ZTS	457.87	169.21	77,476	0.24%	1.02%	0.00%	10.61%	0.03%
Equinix Inc	EQIX	94.62	825.33	78,094	0.24%	2.06%	0.00%	14.03%	0.03%
Digital Realty Trust Inc	DLR	311.61	144.04	44,884	0.14%	3.39%	0.00%	4.80%	0.01%
Molina Healthcare Inc	MOH	58.40	410.83	23,992	0.07%			13.22%	0.01%
Las Vegas Sands Corp	LVS	753.62	51.70	38,962		1.55%			

Notes:
[1] Equals sum of Col. [9]
[2] Equals sum of Col. [11]
[3] Equals ([1] x (1 + (0.5 x [2]))) + [2]
[4] Source: Bloomberg Professional as of March 31, 2024
[5] Source: Bloomberg Professional as of March 31, 2024
[6] Equals [4] x [5]
[7] Equals weight in the S&P 500
[8] Source: Bloomberg Professional as of March 31, 2024
[9] Equals [7] x [8]
[10] Source: Bloomberg Professional, as of March 31, 2024
[11] Equals [7] x [10]

FLOTATION COST ADJUSTMENT

Company	Ticker	Date [i]	[1] Shares Issued (000)	[2] Offering Price	[3] Under-writing Discount [ii]	[4] Offering Expense ($000)	[5] Net Proceeds Per Share	[6] Total Flotation Costs ($000)	[7] Gross Equity Issue Before Costs ($000)	[8] Net Proceeds ($000)	[9] Flotation Cost Percentage	
American Water Works Company	AWK	2/28/2023	12,650	135.50	2.033	700	133.41	26,411	1,714,075	1,687,664	1.54%	[iii]

[i] Offering Completion Date
[ii] Underwriting discount is calculated as the market price minus the offering price when not explicitly given in the prospectus.
[iii] American Water Works Company: AWK Prospectus 424B7 02.28.2023

The flotation cost adjustment is derived by dividing the dividend yield by 1 − F (where F = flotation costs expressed in percentage terms), or by 0.9846, and adding that result to the constant growth rate to determine the cost of equity. Using the formulas shown previously in my testimony, the Constant Growth DCF calculation is modified as follows to accommodate an adjustment for flotation costs:

$$k = \frac{D \times (1 + 0.5g)}{P \times (1 - F)} + g$$

Company	Ticker	[10] Annualized Dividend	[11] Stock Price	[12] Dividend Yield	[13] Expected Dividend Yield	[14] Expected Dividend Yield Adjusted for Flotation Costs	[15] Value Line Earnings Growth	[16] Yahoo! Finance Earnings Growth	[17] Zacks Earnings Growth	[18] Average Earnings Growth	[19] Cost of Equity: Mean Growth Rate	[20] Cost of Equity Adjusted for Flotation Costs	
Atmos Energy Corporation	ATO	$ 3.22	$ 114.88	2.80%	2.90%	2.95%	7.00%	7.50%	7.30%	7.27%	10.17%	10.22%	
NiSource Inc.	NI	$ 1.06	$ 26.58	3.99%	4.15%	4.21%	9.50%	7.30%	7.20%	8.00%	12.15%	12.21%	
Northwest Natural Gas Company	NWN	$ 1.95	$ 36.99	5.27%	5.39%	5.48%	6.50%	2.80%	n/a	4.65%	10.04%	10.13%	
ONE Gas, Inc.	OGS	$ 2.64	$ 61.41	4.30%	4.40%	4.47%	4.00%	5.00%	5.00%	4.67%	9.07%	9.14%	
Spire, Inc.	SR	$ 3.02	$ 59.59	5.07%	5.21%	5.29%	4.50%	6.36%	5.60%	5.49%	10.69%	10.78%	
Eversource Energy	ES	$ 2.86	$ 58.44	4.89%	5.00%	5.08%	5.50%	3.25%	4.20%	4.32%	9.32%	9.39%	
American States Water Company	AWR	$ 1.72	$ 72.38	2.38%	2.44%	2.48%	6.50%	4.40%	6.30%	5.73%	8.18%	8.22%	
California Water Service Group	CWT	$ 1.12	$ 46.36	2.42%	2.52%	2.56%	6.50%	10.80%	n/a	8.65%	11.17%	11.21%	
Middlesex Water Company	MSEX	$ 1.30	$ 51.98	2.50%	2.55%	2.59%	5.00%	2.70%	n/a	3.85%	6.40%	6.44%	
SJW Group	SJW	$ 1.60	$ 57.09	2.80%	2.91%	2.96%	8.00%	7.50%	7.50%	7.67%	10.58%	10.62%	
Essential Utilities, Inc.	WTRG	$ 1.23	$ 35.75	3.44%	3.54%	3.60%	7.50%	5.20%	5.60%	6.10%	9.64%	9.70%	
Mean											9.76%	9.82%	
Median											10.04%	10.13%	
Flotation Cost Adjustment (Mean)												0.06%	[21]
Flotation Cost Adjustment (Median)												0.08%	[22]

Notes:
[1] - [4] See Notes [i] to [iii] above
[5] Equals [8]/[1]
[6] Equals [4] + ([1] x [3])
[7] Equals [1] x [2]
[8] Equals [7] - [6]
[9] Equals [6] / [7]
[10] Bloomberg Professional
[11] Bloomberg Professional, equals 30-day average as of February 29, 2024
[12] Equals [10] / [11]
[13] Equals [12] x (1 + 0.5 x [18])
[14] Equals [13] / (1 − Flotation Cost)
[15] Value Line
[16] Yahoo! Finance
[17] Zacks Investment Research
[18] Equals Average of [15], [16], [17]
[19] Equals [13] + [18]
[20] Equals [14] + [18]
[21] Equals [20] (Mean) − [19] (Mean)
[22] Equals [20] (Median) − [19] (Median)

COMPARISON OF TNAWC AND PROXY GROUP COMPANIES
COST RECOVERY MECHANISMS

Company	Ticker	State	Utility Type	Infrastructure Cost Recovery Mechanism	Future Test Year	Revenue Stabilization or Decoupling	Citations
American States Water Co							
	AWR	California	Water	Yes	Fully Forecast	Full	Infrastructure Cost Recovery: 2022 10-K, p. 28 and p. 54. Revenue Stabilization or Decoupling: 2022 10-K, p. 29 and p. 43
	AWR	California	Electric	Yes	Fully Forecast	Full	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles
Atmos Energy Corporation							
	ATO	Colorado	Gas	Yes	Historical	No	Infrastructure Cost Recovery: 2022 10-K, p. 9
	ATO	Kansas	Gas	Yes	Historical	Partial	Revenue Stabilization or Decoupling: 2022 10-K, p.9, S&P Global Market Intelligence,
	ATO	Kentucky	Gas	Yes	Fully Forecast	Partial	Regulatory Focus: Adjustment Clauses, dated 7/18/22, Company Tariffs (CO and VA).
	ATO	Louisiana	Gas	No	Historical	FRP	
	ATO	Mississippi	Gas	Yes	Historical	FRP	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles; Company Tariffs
	ATO	Tennessee	Gas	No	Historical	FRP	(LA, MS, TN); 2022 10-K, p. 10
	ATO	Texas	Gas	Yes	Historical	FRP	
	ATO	Virginia	Gas	Yes	Historical	Partial	
California Water Service Group							
	CWT	California	Water	Yes	Fully Forecast	Full	Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: 2022 10-K, p.9
	CWT	Hawaii	Water	No	Fully Forecast	No	(California Water); Tariffs (HI, WA, NM)
	CWT	New Mexico	Water	No	Historical	No	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles
	CWT	Washington	Water	Yes	Historical	No	
Essential Utilities, Inc.							
	WTRG	Pennsylvania	Water	Yes	Fully Forecast	No	Infrastructure Cost Recovery: 2022 10-K, p. 9; S&P Global Market Intelligence, Regulatory
	WTRG	Pennsylvania	Gas	Yes	Fully Forecast	No	Focus: Adjustment Clauses, dated 7/18/22
	WTRG	Ohio	Water	Yes	Partially Forecast	No	Revenue Stabilization or Decoupling: 2022 10-K, p. 11
	WTRG	Illinois	Water	Yes	Fully Forecast	Full	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles
	WTRG	Texas	Water	Yes	Historical	No	
	WTRG	New Jersey	Water	Yes	Partially Forecast	No	
	WTRG	North Carolina	Water	Yes	Historical	No	
	WTRG	Indiana	Water	Yes	Fully Forecast	No	
	WTRG	Virginia	Water	Yes	Historical	No	
	WTRG	Kentucky	Gas	Yes	Fully Forecast	Partial	
	WTRG	West Virginia	Gas	No	Historical	No	
Eversource Energy							
	ES	Connecticut	Electric	Yes	Fully Forecast	Full	Infrastructure Cost Recovery: 2022 10-K, p. 11 (water); S&P Global Market Intelligence,
	ES	Connecticut	Gas	Yes	Fully Forecast	Full	Regulatory Focus: Adjustment Clauses, dated 7/18/22 (electric and natural gas)
	ES	Connecticut	Water	Yes	Fully Forecast	Full	
	ES	Massachusetts	Electric	Yes	Historical	Full	
	ES	Massachusetts	Gas	Yes	Historical	Full	Revenue Stabilization or Decoupling: 2022 10-K, p. 11 (water); S&P Global Market
	ES	Massachusetts	Water	Yes	Historical	No	Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22 (electric and natural gas)
	ES	New Hampshire	Electric	Yes	Historical	Partial	Test Year: S&P Cap IQ Pro, Rate Case History
	ES	New Hampshire	Water	Yes	Historical	No	
Middlesex Water Company							
	MSEX	New Jersey	Water	Yes	Partially Forecast	No	Infrastructure Cost Recovery/ Revenue Decoupling: Tariffs (NJ, DE, PA)
	MSEX	Delaware	Water	Yes	Historical	No	Test Year: S&P Cap IQ Pro, Rate Case History
	MSEX	Pennsylvania	Water	No	Fully Forecast	No	
NiSource Inc.							
	NI	Indiana	Electric	Yes	Fully Forecast	Partial	Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: S&P Global Market
	NI	Indiana	Gas	Yes	Fully Forecast	No	Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22
	NI	Kentucky	Gas	Yes	Fully Forecast	Partial	Test Year: S&P Cap IQ Pro, Rate Case History
	NI	Maryland	Gas	Yes	Partially Forecast	Partial	
	NI	Ohio	Gas	Yes	Partially Forecast	SFV	
	NI	Pennsylvania	Gas	Yes	Fully Forecast	Partial	
	NI	Virginia	Gas	Yes	Historical	Partial	
Northwest Natural Gas Company							Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: S&P Global Market
	NWN	Oregon	Gas	Yes	Fully Forecast	Partial	Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22
	NWN	Washington	Gas	No	Historical	No	Test Year: S&P Cap IQ Pro, Rate Case History
ONE Gas, Inc.							
	OGS	Kansas	Gas	Yes	Historical	Partial	Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: S&P Global Market
	OGS	Oklahoma	Gas	No	Historical	FRP	Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22; 2022 10-K, p. 7.
	OGS	Texas	Gas	Yes	Historical	FRP	Test Year: S&P Cap IQ Pro, Rate Case History
SJW Group							
	SJW	California	Water	Yes	Fully Forecast	No	Infrastructure Cost Recovery: 2022 10-K, pp. 5-8
	SJW	Connecticut	Water	Yes	Fully Forecast	Full	Revenue Stabilization or Decoupling: 2022 10-K, p. 60.
	SJW	Maine	Water	Yes	Historical	No	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles
	SJW	Texas	Water	No	Historical	No	
Spire, Inc.							Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: S&P Global Market
	SR	Alabama (AL)	Gas	No	Fully Forecast	FRP	Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22, Company Tariffs (AL
	SR	Alabama (Gulf)	Gas	No	Fully Forecast	FRP	and MS)
	SR	Mississippi	Gas	No	Historical	FRP	Test Year: S&P Cap IQ Pro, Rate Case History; 2022 10-K, pgs. 117-121
	SR	Missouri	Gas	Yes	Partially Forecast	Partial	

Proxy Group Totals			Yes	44	Historical	27	Full	10
			No	12	Fully Forecast	23	Partial	13
					Partially Forecast	6	FRP	9
							SFV	1
							No	23
			CCRM	78.57%	FTY	51.79%		58.93%
Tennessee- American		Tennessee	Water		Yes		Future Test Year	No		American Water Works Company, Inc., 2023 10-K, p. 6,

SIZE PREMIUM CALCULATION

Proxy Group Market Capitalization and Market-to-Book Ratio

Company	Ticker	[1] Market Capitalization ($ billions)	[2] Market-to-Book Ratio
Atmos Energy Corporation	ATO	17.07	1.53
NiSource Inc.	NI	10.83	1.76
Northwest Natural Gas Company	NWN	1.37	1.11
ONE Gas, Inc.	OGS	3.36	1.26
Spire, Inc.	SR	3.20	1.16
Eversource Energy	ES	19.49	1.29
American States Water Company	AWR	2.78	3.46
California Water Service Group	CWT	2.68	1.90
Middlesex Water Company	MSEX	0.99	2.35
SJW Group	SJW	1.90	1.55
Essential Utilities, Inc.	WTRG	9.81	1.66
Median		3.20	1.55

Tennessee-American Water Company		
2023 Net Utility Plant In Service ($millions)	[3]	$ 359.99
Company-Projected Common Equity Ratio	[4]	54.52%
Implied Common Equity ($millions)	[5]	$ 196.27
Implied Market Capitalization ($millions)	[6]	$ 304.91
Market Capitalization of Proxy Group (median) ($millions)	[7]	$ 3,202.87
As % of Proxy Group Market Capitalization (median)	[8]	9.52%

Kroll Cost of Capital Navigator -- Size Premium

Breakdown of Deciles 1-10	[9] Market Capitalization of Largest Company ($ millions)	[10] Size Premium
1-Largest	2,203,381.29	-0.26%
2	31,316.51	0.45%
3	12,323.85	0.57%

4		5,916.02	0.58%
5		3,769.88	0.93%
6		2,365.08	1.16%
7		1,389.12	1.37%
8		782.38	1.18%
9		373.88	2.15%
10-Smallest		218.23	4.83%
Tennessee-American - Implied Market Capitalization	[6]	304.91	2.15%
Proxy Group Market Capitalization (median)	[7]	3,202.87	0.93%
Size Premium	[11]		1.22%

Notes:

[1]-[2] S&P Capital IQ Pro, equals 30-day average as of February 29, 2024
[3] Data provided by the Company
[4] Data provided by the Company
[5] Equals [3] x [4]
[6] Equals [5] x median market-to-book ratio of proxy group
[7] Equals median market capitalization of proxy group x 1000
[8] Equals [6] / [7]
[9]-[10] Kroll Cost of Capital Navigator - Size Premium: Annual Data as of 12/31/2022
[11] Size Premium of TAWC less Size Premium of Proxy Group

CAPITAL STRUCTURE ANALYSIS

COMMON EQUITY RATIO [1]

Proxy Group Company	Ticker	2022	2021	2020	3-yr Avg.
American States Water Company	AWR	54.16%	56.91%	56.73%	55.93%
Atmos Energy Corporation	ATO	60.01%	59.88%	58.31%	59.40%
California Water Service Group	CWT	50.01%	48.82%	45.07%	47.96%
Essential Utilities, Inc.	WTRG	54.27%	53.58%	52.53%	53.46%
Eversource Energy	ES	55.31%	53.25%	54.23%	54.26%
Middlesex Water Company	MSEX	57.46%	57.39%	59.10%	57.98%
NiSource Inc.	NI	54.17%	54.85%	54.43%	54.48%
Northwest Natural Gas Company	NWN	47.72%	44.08%	41.92%	44.57%
ONE Gas, Inc.	OGS	58.23%	61.09%	60.04%	59.79%
SJW Group	SJW	50.22%	50.91%	51.52%	50.88%
Spire, Inc.	SR	47.30%	49.08%	52.75%	49.71%
Proxy Group					
MEAN		53.53%	53.62%	53.33%	53.50%
LOW		47.30%	44.08%	41.92%	44.57%
HIGH		60.01%	61.09%	60.04%	59.79%

COMMON EQUITY RATIO - UTILITY OPERATING COMPANIES

Company Name	Ticker	2022	2021	2020	3-yr Avg.
Golden State Water / Bear Valley	AWR	54.16%	56.91%	56.73%	54.16%
Atmos Energy Corporation	ATO	60.01%	59.88%	58.31%	60.01%
California Water Service	CWT	49.58%	48.07%	43.98%	49.58%
New Mexico Water Service Water Division	CWT		67.75%	64.62%	67.75%
New Mexico Water Service Sewer Division	CWT		61.90%	57.80%	61.90%
Washington Water Service	CWT	60.27%	65.96%	71.93%	60.27%
Hawaii Water Service Kaanapali Division	CWT	49.85%	51.93%	48.93%	49.85%
Hawaii Water Service Pukalani Division	CWT	65.87%	65.58%	64.56%	65.87%
Aqua Pennsylvania Water	WTRG		53.84%	50.48%	53.84%
Aqua Pennsylvania Wastewater	WTRG		98.06%	97.07%	98.06%
Peoples Natural Gas Company	WTRG	54.40%	53.44%	54.18%	54.40%
Peoples Gas Company	WTRG	56.67%	54.83%	51.71%	56.67%
Aqua Ohio Water	WTRG	54.03%	52.11%	64.62%	54.03%
Aqua Ohio Wastewater	WTRG	74.40%	73.67%	72.82%	74.40%
Aqua Illinois	WTRG	56.55%	57.99%	54.57%	56.55%
Aqua Texas	WTRG		49.81%	50.06%	49.81%
Aqua New Jersey, Inc. Water	WTRG	55.74%	53.19%	50.28%	55.74%
Aqua New Jersey, Inc. Wastewater	WTRG	81.40%	79.06%	74.37%	81.40%
Aqua North Carolina	WTRG	50.21%	48.75%	50.62%	50.21%
Aqua Virginia	WTRG	47.83%	48.83%	55.23%	47.83%
Delta Natural Gas Company	WTRG	52.45%	49.69%	49.16%	52.45%
Peoples Gas of WV	WTRG	31.35%	39.38%	46.47%	31.35%
Connecticut Light and Power Company	ES	57.03%	54.86%	55.42%	57.03%
Yankee Gas Company	ES	58.44%	57.37%	55.83%	58.44%
Aquarion Water Company CT	ES	55.32%	56.14%	56.27%	55.32%
NSTAR Electric Company	ES	55.89%	54.13%	53.68%	55.89%
NSTAR Gas Company	ES	50.96%	48.03%	48.33%	50.96%
Aquarion Water Company MA	ES	67.75%	68.10%	68.63%	67.75%
Eversource Gas of MA	ES	49.62%	47.20%	68.01%	49.62%
Public Service Company of NH	ES	51.22%	47.48%	47.96%	51.22%
Aquarion Water Company NH	ES	69.12%	52.71%	54.30%	69.12%
Middlesex Water Company	MSEX	57.50%	57.46%	59.03%	57.50%
Pinelands Water	MSEX	52.71%	51.34%	67.73%	52.71%
Pinelands WW	MSEX	55.29%	51.48%	72.23%	55.29%
Northern Indiana Public Service Company LLC	NI	56.92%	58.59%	58.01%	56.92%
Columbia Gas of Kentucky, Inc.	NI	54.91%	53.87%	54.68%	54.91%
Columbia Gas of Maryland, Inc.	NI	51.96%	55.26%	54.95%	51.96%
Columbia Gas of Ohio, Inc.	NI	50.67%	50.79%	50.45%	50.67%
Columbia Gas of Pennsylvania, Inc.	NI	56.64%	56.05%	55.68%	56.64%
Columbia Gas of Virginia, Inc.	NI	44.25%	44.52%	43.69%	44.25%
Northwest Natural Gas Company	NWN	47.72%	44.08%	41.92%	47.72%
Kansas Gas Service Company, Inc.	OGS	58.37%	61.37%	60.33%	58.37%
Oklahoma Natural Gas Company	OGS		60.99%	59.85%	60.99%
Texas Gas Service Company, Inc.	OGS	58.13%	60.98%	59.99%	58.13%
San Jose Water	SJW	48.74%	50.22%	49.84%	48.74%
CT Water	SJW	52.92%	50.95%	53.94%	52.92%
Maine Water Co.	SJW	48.68%	49.13%	49.71%	48.68%
Canyon Lake Water Service Company	SJW		59.53%	58.08%	59.53%
Spire Alabama Inc.	SR	52.01%	56.67%	58.82%	52.01%
Spire Gulf Inc.	SR	41.35%	41.14%	39.49%	41.35%
Spire Mississippi Inc.	SR		39.18%	38.74%	39.18%
Spire Missouri Inc.	SR	45.49%	46.20%	50.65%	45.49%

Notes:
[1] Ratios are weighted by actual common capital, preferred equity, long-term debt, and short-term debt of Operating Subsidiaries.
[2] Electric, Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2022, 2021 and 2020 were removed from the analysis.

CAPITAL STRUCTURE ANALYSIS

LONG-TERM DEBT RATIO [1]

Proxy Group Company	Ticker	2022	2021	2020	3-yr Avg.
American States Water Company	AWR	34.94%	38.45%	43.23%	38.87%
Atmos Energy Corporation	ATO	39.99%	40.12%	41.69%	40.60%
California Water Service Group	CWT	48.28%	51.11%	41.22%	46.87%
Essential Utilities, Inc.	WTRG	39.62%	43.68%	42.36%	41.89%
Eversource Energy	ES	42.29%	43.44%	42.65%	42.79%
Middlesex Water Company	MSEX	35.79%	39.54%	40.36%	38.56%
NiSource Inc.	NI	45.83%	45.15%	45.57%	45.52%
Northwest Natural Gas Company	NWN	45.46%	44.85%	46.45%	45.59%
ONE Gas, Inc.	OGS	41.77%	38.91%	39.96%	40.21%
SJW Group	SJW	43.16%	46.89%	39.25%	43.10%
Spire, Inc.	SR	39.78%	39.42%	37.24%	38.82%
Proxy Group					
MEAN		41.54%	42.87%	41.82%	42.07%
LOW		34.94%	38.45%	37.24%	38.56%
HIGH		48.28%	51.11%	46.45%	46.87%

LONG-TERM DEBT RATIO - UTILITY OPERATING COMPANIES

Company Name	Ticker	2022	2021	2020	3-yr Avg.
Golden State Water / Bear Valley	AWR	34.94%	38.45%	43.23%	34.94%
Atmos Energy Corporation	ATO	39.99%	40.12%	41.69%	39.99%
California Water Service	CWT	48.78%	51.85%	41.68%	48.78%
New Mexico Water Service Water Division	CWT		30.18%	31.74%	31.74%
New Mexico Water Service Sewer Division	CWT		36.53%	39.39%	39.39%
Washington Water Service	CWT	35.60%	34.04%	28.07%	35.60%
Hawaii Water Service Kaanapali Division	CWT	50.15%	48.07%	51.07%	50.15%
Hawaii Water Service Pukalani Division	CWT	34.13%	34.42%	35.44%	34.13%
Aqua Pennsylvania Water	WTRG		45.28%	48.22%	48.22%
Aqua Pennsylvania Wastewater	WTRG		1.94%	2.93%	2.93%
Peoples Natural Gas Company	WTRG	38.05%	39.09%	33.95%	38.05%
Peoples Gas Company	WTRG	27.32%	43.12%	13.26%	27.32%
Aqua Ohio Water	WTRG	45.97%	47.89%	35.38%	45.97%
Aqua Ohio Wastewater	WTRG	25.60%	26.33%	27.18%	25.60%
Aqua Illinois	WTRG	43.45%	42.01%	45.43%	43.45%
Aqua Texas	WTRG		49.99%	49.72%	49.72%
Aqua New Jersey, Inc. Water	WTRG	44.26%	46.81%	49.72%	44.26%
Aqua New Jersey, Inc. Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua North Carolina	WTRG	49.79%	51.25%	49.38%	49.79%
Aqua Virginia	WTRG	52.17%	51.17%	44.77%	52.17%
Delta Natural Gas Company	WTRG	37.19%	41.51%	37.19%	37.19%
Peoples Gas of WV	WTRG	21.98%	43.11%	49.45%	21.98%
Connecticut Light and Power Company	ES	41.82%	43.93%	43.30%	41.82%
Yankee Gas Company	ES	36.40%	36.50%	34.27%	36.40%
Aquarion Water Company CT	ES	43.57%	41.40%	39.49%	43.57%
NSTAR Electric Company	ES	43.68%	43.63%	43.49%	43.68%
NSTAR Gas Company	ES	40.11%	38.45%	38.69%	40.11%
Aquarion Water Company MA	ES	10.19%	11.42%	2.83%	10.19%
Eversource Gas of MA	ES	43.66%	43.14%	31.06%	43.66%
Public Service Company of NH	ES	44.04%	49.23%	50.60%	44.04%
Aquarion Water Company NH	ES	22.71%	35.52%	38.03%	22.71%
Middlesex Water Company	MSEX	36.24%	40.01%	40.62%	36.24%
Pinelands Water	MSEX	0.00%	0.00%	0.00%	0.00%
Pinelands WW	MSEX	0.00%	0.00%	0.00%	0.00%
Northern Indiana Public Service Company LLC	NI	43.08%	41.41%	41.99%	43.08%
Columbia Gas of Kentucky, Inc.	NI	45.09%	46.13%	45.32%	45.09%
Columbia Gas of Maryland, Inc.	NI	48.04%	44.74%	45.05%	48.04%
Columbia Gas of Ohio, Inc.	NI	49.33%	49.21%	49.55%	49.33%
Columbia Gas of Pennsylvania, Inc.	NI	43.36%	43.95%	44.32%	43.36%
Columbia Gas of Virginia, Inc.	NI	55.75%	55.48%	56.31%	55.75%
Northwest Natural Gas Company	NWN	45.46%	44.85%	46.45%	45.46%
Kansas Gas Service Company, Inc.	OGS	41.63%	38.63%	39.67%	41.63%
Oklahoma Natural Gas Company	OGS		39.01%	40.15%	40.15%
Texas Gas Service Company, Inc.	OGS	41.87%	39.02%	40.01%	41.87%
San Jose Water	SJW	42.87%	49.72%	42.42%	42.87%
CT Water	SJW	43.98%	45.81%	37.30%	43.98%
Maine Water Co.	SJW	41.60%	36.18%	32.93%	41.60%
Canyon Lake Water Service Company	SJW		40.28%	20.35%	20.35%
Spire Alabama Inc.	SR	33.01%	40.18%	32.80%	33.01%
Spire Gulf Inc.	SR	38.77%	42.00%	57.90%	38.77%
Spire Mississippi Inc.	SR		0.00%	0.00%	0.00%
Spire Missouri Inc.	SR	42.91%	39.42%	38.72%	42.91%

Notes:
[1] Ratios are weighted by actual common capital, preferred equity, long-term debt, and short-term debt of Operating Subsidiaries.
[2] Electric, Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2022, 2021 and 2020 were removed from the analysis.

CAPITAL STRUCTURE ANALYSIS

PREFERRED EQUITY RATIO [1]

Proxy Group Company	Ticker	2022	2021	2020	3-yr Avg.
American States Water Company	AWR	0.00%	0.00%	0.00%	0.00%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%	0.00%
California Water Service Group	CWT	0.00%	0.00%	0.00%	0.00%
Essential Utilities, Inc.	WTRG	0.00%	0.00%	0.00%	0.00%
Eversource Energy	ES	0.52%	0.56%	0.61%	0.56%
Middlesex Water Company	MSEX	0.30%	0.32%	0.35%	0.32%
NiSource Inc.	NI	0.00%	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	0.00%	0.00%	0.00%	0.00%
ONE Gas, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
SJW Group	SJW	0.00%	0.00%	0.00%	0.00%
Spire, Inc.	SR	0.00%	0.00%	0.00%	0.00%
Proxy Group					
MEAN		0.07%	0.08%	0.09%	0.08%
LOW		0.00%	0.00%	0.00%	0.00%
HIGH		0.52%	0.56%	0.61%	0.56%

PREFERRED EQUITY RATIO - UTILITY OPERATING COMPANIES

Company Name	Ticker	2022	2021	2020	3-yr Avg.
Golden State Water / Bear Valley	AWR	0.00%	0.00%	0.00%	0.00%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%	0.00%
California Water Service	CWT	0.00%	0.00%	0.00%	0.00%
New Mexico Water Service Water Division	CWT		0.00%	0.00%	0.00%
New Mexico Water Service Sewer Division	CWT		0.00%	0.00%	0.00%
Washington Water Service	CWT	0.00%	0.00%	0.00%	0.00%
Hawaii Water Service Kaanapali Division	CWT	0.00%	0.00%	0.00%	0.00%
Hawaii Water Service Pukalani Division	CWT	0.00%	0.00%	0.00%	0.00%
Aqua Pennsylvania Water	WTRG		0.00%	0.00%	0.00%
Aqua Pennsylvania Wastewater	WTRG		0.00%	0.00%	0.00%
Peoples Natural Gas Company	WTRG	0.00%	0.00%	0.00%	0.00%
Peoples Gas Company	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Ohio Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Ohio Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Illinois	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Texas	WTRG		0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua North Carolina	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Virginia	WTRG	0.00%	0.00%	0.00%	0.00%
Delta Natural Gas Company	WTRG	0.00%	0.00%	0.00%	0.00%
Peoples Gas of WV	WTRG	0.00%	0.00%	0.00%	0.00%
Connecticut Light and Power Company	ES	1.15%	1.20%	1.28%	1.15%
Yankee Gas Company	ES	0.00%	0.00%	0.00%	0.00%
Aquarion Water Company CT	ES	0.00%	0.00%	0.00%	0.00%
NSTAR Electric Company	ES	0.42%	0.47%	0.51%	0.42%
NSTAR Gas Company	ES	0.00%	0.00%	0.00%	0.00%
Aquarion Water Company MA	ES	0.00%	0.00%	0.00%	0.00%
Eversource Gas of MA	ES	0.00%	0.00%	0.00%	0.00%
Public Service Company of NH	ES	0.00%	0.00%	0.00%	0.00%
Aquarion Water Company NH	ES	0.01%	0.01%	0.01%	0.01%
Middlesex Water Company	MSEX	0.30%	0.33%	0.36%	0.30%
Pinelands Water	MSEX	0.00%	0.00%	0.00%	0.00%
Pinelands WW	MSEX	0.00%	0.00%	0.00%	0.00%
Northern Indiana Public Service Company LLC	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Kentucky, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Maryland, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Ohio, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Pennsylvania, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Virginia, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	0.00%	0.00%	0.00%	0.00%
Kansas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
Oklahoma Natural Gas Company	OGS		0.00%	0.00%	0.00%
Texas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
San Jose Water	SJW	0.00%	0.00%	0.00%	0.00%
CT Water	SJW	0.00%	0.00%	0.00%	0.00%
Maine Water Co.	SJW	0.00%	0.00%	0.00%	0.00%
Canyon Lake Water Service Company	SJW		0.00%	0.00%	0.00%
Spire Alabama Inc.	SR	0.00%	0.00%	0.00%	0.00%
Spire Gulf Inc.	SR	0.00%	0.00%	0.00%	0.00%
Spire Mississippi Inc.	SR		0.00%	0.00%	0.00%
Spire Missouri Inc.	SR	0.00%	0.00%	0.00%	0.00%

Notes:
[1] Ratios are weighted by actual common capital, preferred equity, long-term debt, and short-term debt of Operating Subsidiaries.
[2] Electric, Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2022, 2021 and 2020 were removed from the analysis.

CAPITAL STRUCTURE ANALYSIS

SHORT-TERM DEBT RATIO [1]

Proxy Group Company	Ticker	2022	2021	2020	3-yr Avg.
American States Water Company	AWR	10.90%	4.64%	0.03%	5.19%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%	0.00%
California Water Service Group	CWT	1.72%	0.08%	13.71%	5.17%
Essential Utilities, Inc.	WTRG	6.11%	2.74%	5.12%	4.65%
Eversource Energy	ES	1.89%	2.75%	2.51%	2.38%
Middlesex Water Company	MSEX	6.45%	2.75%	0.19%	3.13%
NiSource Inc.	NI	0.00%	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	6.82%	11.07%	11.63%	9.84%
ONE Gas, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
SJW Group	SJW	6.62%	2.20%	9.23%	6.01%
Spire, Inc.	SR	12.92%	11.49%	10.01%	11.47%
Proxy Group					
MEAN		4.86%	3.43%	4.77%	4.35%
LOW		0.00%	0.00%	0.00%	0.00%
HIGH		12.92%	11.49%	13.71%	11.47%

SHORT-TERM DEBT RATIO - UTILITY OPERATING COMPANIES

Company Name	Ticker	2022	2021	2020	3-yr Avg.
Golden State Water / Bear Valley	AWR	10.90%	4.64%	0.03%	10.90%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%	0.00%
California Water Service	CWT	1.64%	0.07%	14.34%	1.64%
New Mexico Water Service Water Division	CWT		2.07%	3.64%	3.64%
New Mexico Water Service Sewer Division	CWT		1.57%	2.81%	2.81%
Washington Water Service	CWT	4.13%	0.00%	0.00%	4.13%
Hawaii Water Service Kaanapali Division	CWT	0.00%	0.00%	0.00%	0.00%
Hawaii Water Service Pukalani Division	CWT	0.00%	0.00%	0.00%	0.00%
Aqua Pennsylvania Water	WTRG		0.87%	1.30%	1.30%
Aqua Pennsylvania Wastewater	WTRG		0.00%	0.00%	0.00%
Peoples Natural Gas Company	WTRG	7.55%	7.47%	11.87%	7.55%
Peoples Gas Company	WTRG	16.01%	2.05%	35.02%	16.01%
Aqua Ohio Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Ohio Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Illinois	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Texas	WTRG		0.20%	0.22%	0.22%
Aqua New Jersey, Inc. Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Wastewater	WTRG	18.60%	20.94%	25.63%	18.60%
Aqua North Carolina	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Virginia	WTRG	0.00%	0.00%	0.00%	0.00%
Delta Natural Gas Company	WTRG	10.36%	8.80%	13.65%	10.36%
Peoples Gas of WV	WTRG	46.66%	17.51%	4.08%	46.66%
Connecticut Light and Power Company	ES	0.00%	0.00%	0.00%	0.00%
Yankee Gas Company	ES	5.16%	6.12%	9.91%	5.16%
Aquarion Water Company CT	ES	1.11%	2.46%	4.24%	1.11%
NSTAR Electric Company	ES	0.00%	1.77%	2.32%	0.00%
NSTAR Gas Company	ES	8.93%	13.52%	12.98%	8.93%
Aquarion Water Company MA	ES	22.06%	20.47%	28.54%	22.06%
Eversource Gas of MA	ES	6.73%	9.66%	0.93%	6.73%
Public Service Company of NH	ES	4.74%	3.30%	1.44%	4.74%
Aquarion Water Company NH	ES	8.17%	11.76%	7.66%	8.17%
Middlesex Water Company	MSEX	5.96%	2.20%	0.00%	5.96%
Pinelands Water	MSEX	47.29%	48.66%	32.27%	47.29%
Pinelands WW	MSEX	44.71%	48.52%	27.77%	44.71%
Northern Indiana Public Service Company LLC	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Kentucky, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Maryland, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Ohio, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Pennsylvania, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Virginia, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	6.82%	11.07%	11.63%	6.82%
Kansas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
Oklahoma Natural Gas Company	OGS		0.00%	0.00%	0.00%
Texas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
San Jose Water	SJW	8.40%	0.05%	7.74%	8.40%
CT Water	SJW	3.10%	3.24%	8.76%	3.10%
Maine Water Co.	SJW	9.71%	14.68%	17.36%	9.71%
Canyon Lake Water Service Company	SJW		0.19%	21.56%	21.56%
Spire Alabama Inc.	SR	14.98%	3.15%	8.38%	14.98%
Spire Gulf Inc.	SR	19.88%	16.86%	2.61%	19.88%
Spire Mississippi Inc.	SR		60.82%	61.26%	61.26%
Spire Missouri Inc.	SR	11.60%	14.38%	10.63%	11.60%

Notes:
[1] Ratios are weighted by actual common capital, preferred equity, long-term debt, and short-term debt of Operating Subsidiaries.
[2] Electric, Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2022, 2021 and 2020 were removed from the analysis.

BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION
NASHVILLE, TENNESSEE

PETITION OF TENNESSEE-AMERICAN WATER COMPANY TO CHANGE AND INCREASE CERTAIN RATES AND CHARGES	))))	**DOCKET NO. 24-_____**

VERIFICATION

COMMONWEALTH OF MASSACHUSETTS)
)
COUNTY OF SUFFOLK)

I, ANN E. BULKLEY, being duly sworn, state that I am authorized to testify on behalf of Tennessee-American Water Company in the above-referenced docket, that if present before the Commission and duly sworn, my testimony would be as set forth in my pre-filed testimony in this matter, and that my testimony herein is true and correct to the best of my knowledge, information, and belief.

Ann E Bulkley
ANN E. BULKLEY

Sworn to and subscribed before me
this 25th day of APRIL, 2024.

Gerard M. Rooney
Notary Public

My Commission Expires: 6/30/2028

Gerard M. Rooney
NOTARY PUBLIC
Commonwealth of
Massachusetts
My Commission Expires
6/30/2028

GERARD M. ROONEY NOTARY PUBLIC COMMONWEALTH OF MASSACHUSETTS MY COMMISSION EXPIRES JUNE 30, 2028