Exhibit No.:
Issue(s): Cost of Capital
Witness: Ann E. Bulkley
Type of Exhibit: Rebuttal Testimony
Sponsoring Party: Union Electric Company
File No.: ER-2022-0337
Date Testimony Prepared: February 15, 2023

MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. ER-2022-0337

REBUTTAL TESTIMONY

OF

ANN E. BULKLEY

ON

BEHALF OF

UNION ELECTRIC COMPANY

D/B/A AMEREN MISSOURI

St. Louis, Missouri
February 2023

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REBUTTAL TESTIMONY

OF

ANN E. BULKLEY

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I. Introduction

Q: Please state your name, occupation and business address.

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

Q: On whose behalf are you submitting this rebuttal testimony?

A: I am submitting this testimony on behalf of Ameren Missouri ("Ameren Missouri" or the "Company"), a wholly-owned subsidiary of Ameren Corporation ("Ameren").

Q: Did you previously submit direct testimony in this proceeding?

A: Yes. I submitted direct testimony regarding the appropriate return on equity ("ROE") for Ameren Missouri in this proceeding on August 1, 2022.

Q: What is the purpose of your rebuttal testimony?

A: The purpose of my rebuttal testimony is to respond to the direct testimonies of Dr. Seoung Joun Won on behalf of the Missouri Public Service Commission Staff

("Staff")[1] and David Murray on behalf of the Missouri Office of the Public Counsel ("OPC")[2] regarding their respective proposals for the return on equity for the Company in this proceeding.

Q: Have you prepared any exhibits to support your analysis and recommendations?

A: Yes. My recommendations are supported by the data presented in Schedule AEB-R1, Attachments 1 through 12, which have been prepared by me or under my direction.

Q: Have you updated the cost of equity analyses that you presented in your direct testimony to reflect current market conditions?

A: As discussed in more detail herein, I have updated my cost of equity analyses based on market data through December 31, 2022. These results provide additional support that the Company's requested ROE in this proceeding of 10.20 percent is reasonable. In addition, while the analytical results of the cost of equity estimation models provide a starting point, I continue to base my conclusion on consideration of not only the results of multiple cost of equity models, but also other factors, including capital market conditions, the capital attraction and comparable return standards, and Company-specific risks.

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[1] Missouri Public Service Commission, Direct Testimony Revenue Requirement of Seoung Joun Won, PhD, Case No. ER-2022-0337, January 10, 2022 ("Won Direct Testimony).

[2] Missouri Public Service Commission, Direct Testimony of David Murray, Case No. ER-2022-0337, January 13, 2022 ("Murray Direct Testimony").

Q: How is the remainder of your rebuttal testimony organized?

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

- Section II provides a summary and overview of my rebuttal testimony and the important factors to be considered in establishing the authorized ROE for the Company.
- Section III discuss the comparable return standard and compares the ROE recommendations of Dr. Won and Mr. Murray in this proceeding to the returns of vertically-integrated electric utilities nationwide.
- Section IV provides the update to my cost of equity analyses based on market data as of December 31, 2022.
- Section V discusses current and projected capital market conditions and the effect of those conditions on the Company's cost of equity.
- Section VI provides my response to Dr. Won.
- Section VII provides my response to Mr. Murray.

II. Summary and Overview

Q: What are your key conclusions and recommendations regarding the appropriate ROE and capital structure for Ameren Missouri in this proceeding?

A: My key conclusions are as follows:

Cost of Equity Estimation Methodologies

- The Company is requesting an ROE of 10.20 percent. Updating the cost of equity estimation models that I relied upon in my direct testimony to reflect the most current data continues to support the Company's proposed ROE.
- Reasonable adjustments to the Staff's and OPC's analyses also demonstrate that the Company's request is reasonable and appropriate.

- Dr. Won has not developed a comparative CAPM analysis; however, Staff has done so in the Missouri-American Water rate proceeding that is also currently before the Commission.[3] If Staff had conducted a comparative CAPM analysis in this proceeding, and estimated the ROE for the Company in the same way in which it has done in the Missouri-American Water proceeding, the result would be an ROE of 10.87 percent.
- While I do not agree with Staff's comparative approach to estimating the cost of equity, as shown in the remainder of my rebuttal testimony, I have updated Staff's DCF analysis to rely on data that was available as of the filing of Staff's testimony (*i.e.*, through the end of December 2022). In addition, I have updated Staff's DCF to exclude Pinnacle West Capital Corporation from the proxy group and to rely on EPS growth rates. Using the most current data and these changes result in an ROE of 10.33 percent, which supports the Company's request.
- These reasonable changes to the Staff methodology demonstrate that the Company's request is appropriate and that Staff is substantially understating Ameren Missouri's cost of equity.

- Mr. Murray develops multiple cost of equity estimation methodologies; however, he abandons the results of his analyses when setting both his recommended ROE range and point estimate of 9.25 percent.
  - It appears that Mr. Murray's entire recommendation is based on a comparison of the dividend yields in his current DCF analyses as compared to the dividend yields that occurred at the time of the Company's 2014 base rate proceeding, in which he also recommended a 9.25 percent ROE.
  - While I disagree with these types of historical comparisons as a basis for setting the ROE, Mr. Murray's approach in this circumstance lacks analytical foundation given that Mr. Murray's recommendation in the Company's 2014 rate case was also not supported by his cost of equity model results, but rather was based simply on his judgment.
  - Comparing the dividend yields in analytical models that were not used as a basis for his recommendation to the dividend yields used in analytical models in this proceeding that do not form the basis for his current ROE recommendation cannot reasonably validate his unsupported recommendation of a 9.25 percent ROE in this proceeding. Since the analytical models have not been the foundation at any time in Mr. Murray's recommendation, it is unreasonable to compare the assumptions in these models and

[3] Missouri Public Service Commission, Case No. WR-2022-0303, Direct Testimony of Randall T. Jennings, November 22, 2022, Schedule RTJ-d14 and Schedule RTJ-d15.

claim that this analysis will support Mr. Murray's judgement that is used to recommend 9.25 percent as the ROE in this proceeding.

Market Conditions

- The Staff and OPC witnesses have not appropriately considered the implications of current and prospective capital market conditions on the Company's ROE to be set in this proceeding.
- Interest rates have increased from the 1.00 to 2.00 percent range in 2020 when the Company's current rates were found to be just and reasonable to approximately 3.50 to 4.00 percent as of December 31, 2022.
- Inflation increased from 1.94 percent in December 2021 to a peak of 9.00 percent in June 2022 and remained at 6.42 percent in December 2022.
- While increases in authorized ROEs have lagged the increase in interest rates, authorized ROEs for vertically-integrated electric utilities were significantly higher in the fourth quarter of 2022, averaging 9.93 percent.
- These macroeconomic indicators demonstrate that the cost of equity is increasing. As shown in Figure 1 herein, historical authorized ROEs were in the range of 9.90 percent to 10.75 percent when interest rates were at levels comparable to the yields in the current market environment.
- While Dr. Won recognizes an increase in the cost of equity as compared to when the Commission issued its decision in the 2019 Empire District Electric Company rate proceeding ("2019 Empire Case"), his recommendation is significantly below historically authorized returns in comparable market conditions and the conditions today are far different than they were when the Commission decided the 2019 Empire Case.[4]
- Mr. Murray essentially suggests that the Company's cost of equity has decreased since the Commission's last rate determination, as he proposes an ROE of 9.25 percent, which is lower than the 9.53 percent that was authorized by the Commission in the Company's last litigated rate proceeding in 2014. As shown in Figure 1, that determination was made in an interest rate environment that was significantly lower than the current interest rate environment. Therefore, Mr. Murray's recommendation is not supported by either his cost of equity analyses nor current market conditions.

[4] Missouri Public Service Commission, Case No ER-2019-0374, Amended Order and Report, July 23, 2020.

III. Comparable Return Standard

Q: How should authorized ROEs be considered in setting the ROE?

A: The decisions of other regulatory commissions can provide a basic test of reasonableness and a benchmark that investors consider in comparing the authorized ROE in one jurisdiction to the returns available from other regulated utilities with comparable risk. The *Hope* and *Bluefield* decisions require that authorized ROEs must be comparable to other investments of commensurate risk. However, it is important to consider several factors that affect these regulatory decisions, specifically: (1) the market conditions at the time that the ROE was authorized; (2) any performance adjustments that were reflected in the authorized ROE (positive or negative) that are company specific; and (3) whether or not the ROE is established based on a regulatory construct that is consistent with the regulatory environment for the subject utility. With these factors addressed, it is reasonable to consider recently authorized ROEs as a basic test of reasonableness.

Q: Have Dr. Won or Mr. Murray conducted a meaningful review of previously authorized ROEs?

A: While Dr. Won and Mr. Murray each discuss prior authorized ROEs in their testimony, neither provide the necessary insight to draw meaningful conclusions about the forward-looking investor-required return. These witnesses have not considered the necessary factors to ensure that the authorized ROEs cited are for risk-comparable companies, nor have they considered the differences in the market

conditions that existed when the return was authorized relative to current market conditions.

Regulatory commissions consider a variety of factors in establishing the ROE for a utility, including the results of the cost of equity estimation methodologies, risk factors and market conditions. Therefore, when reviewing the authorized ROE data from other jurisdictions and time periods, it is important to identify and understand these factors to determine whether the authorized ROE would be reasonable in current market conditions.

Specifically, it is important to recognize that the market conditions in 2022 were significantly different from the conditions in 2020 and 2021 (*i.e.*, much higher inflation and interest rates in 2022). Therefore, considering the change in market conditions that occurred between 2021 and 2022 and the average length of time to complete a rate case (*i.e.,* eight to twelve months), recent historical authorized ROEs over the period from 2020 through 2021 and the earlier months of 2022 are not reflective of the recent change in market conditions and cannot reasonably be compared to ROEs necessary to reflect the cost of equity for utilities in the current market environment without recognizing these differences.

Q: Have analysts recognized that market conditions are an important factor in the authorized ROE data?

A: Yes. Recently Moody's Investors Service ("Moody's") noted that authorized ROEs throughout 2023 could increase as a result of the increase in interest rates, but noted that regulatory lag could result in a delay in the timing of those increases.[5]

Q: Recognizing these limitations, did you analyze recently-authorized return data to reflect cases that are most comparable to the Company?

A: Yes, I analyzed the recently authorized returns for vertically integrated electric utilities. In order to narrow the sample of recently authorized returns, I applied the following screening criteria to establish returns for companies that are of a similar risk profile as the Company:

- I included only vertically-integrated electric utilities because the ownership and operation of generation facilities mean that vertically-integrated electric utilities carry a relatively higher level of business risk and thus have a relatively higher cost of equity as compared to electric distribution utilities.
- I excluded limited-issue rider cases because these cases address only a specific issue or issues, such as the construction of generation assets and the associated incremental risk, and not a utility's entire operations. Thus, the returns authorized in such limited-issue rider cases would not be comparable to the rates being established for the Company in this proceeding.

[5] Moody's Investors Service, Regulated Electric and Gas Utilities – US, 2023 outlook negative due to higher natural gas prices, inflation and rising interest rates, November 10, 2022, at 4.

- I excluded jurisdictions that set ROEs using a formula because these ROEs are not being determined using methodologies that have been relied upon by this Commission in prior cases.
- Lastly, I excluded authorized returns that reflect a utility-specific penalty because an authorized ROE that includes a penalty is not indicative of a market-derived cost of equity.[6]

Q: What do you conclude from this analysis?

A: The average authorized ROE for vertically-integrated electric utilities in 2022 was 9.77 percent, while the most recent authorized ROEs were in the range of 9.80 to 10.00 percent. Both Dr. Won's and Mr. Murray's ROE recommendations are below the range of recently authorized ROEs in 2022, and in fact, Mr. Murray's ROE recommendation is well below the average authorized ROEs in prior years when interest rates were 200 basis points lower than current interest rates. Thus, Mr. Murray's proposal would be a low-end outlier even in a lower interest rate environment, and therefore cannot be determined to be reasonable in the current market conditions, which, as noted, Dr. Won acknowledges demonstrates a higher overall cost of equity.

Further, proposing a return below the mean would indicate that Dr. Won and Mr. Murray both believe that the Company has less risk than other comparable vertically-integrated electric utilities across the U.S.; however, neither witness provides any

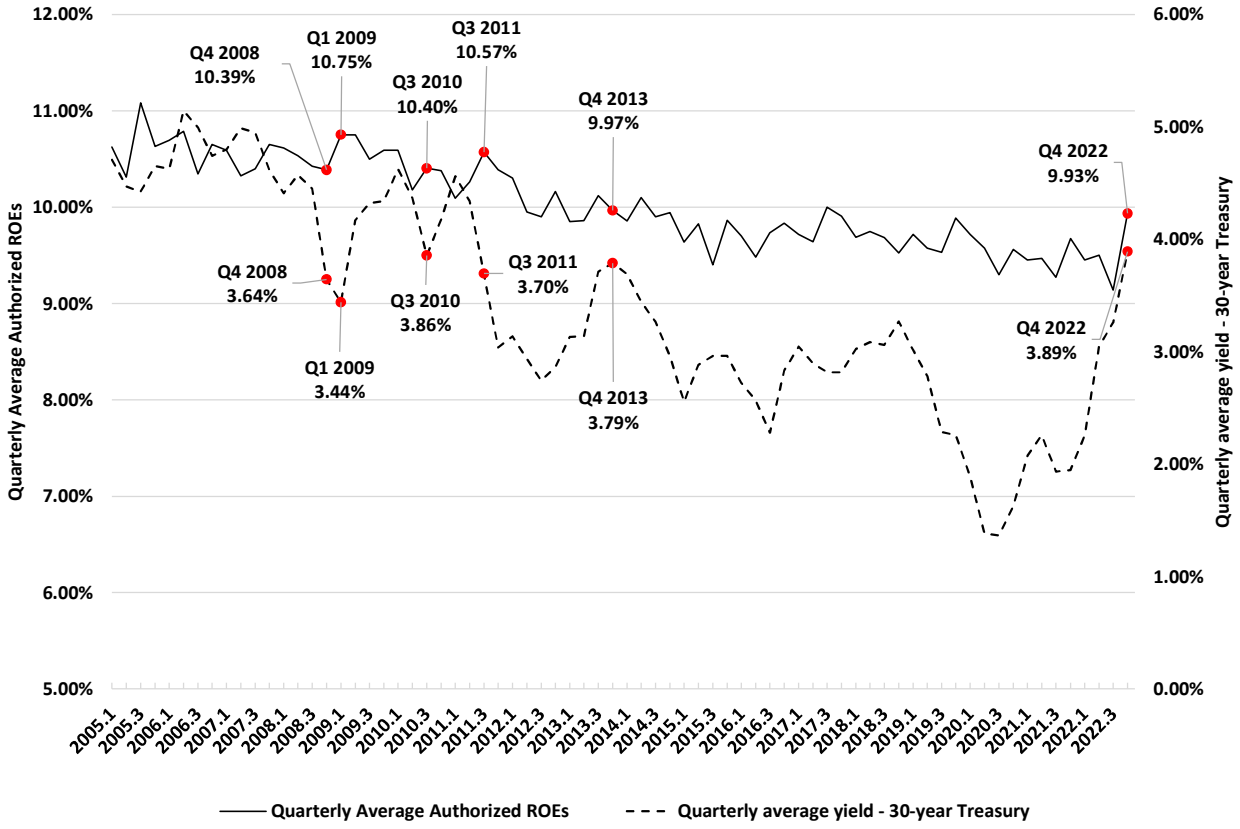
[6] For example, Central Maine Power Company was authorized an ROE in 2020 of 8.25 percent that reflected a 100-basis point penalty for management inefficiency, which is not representative of a market-derived cost of equity and should be excluded from the recently authorized return data.

evidence to support such a conclusion because they do not consider the relative risk of the Company to their proxy groups.

Q: Recognizing the limitations of recently authorized ROEs that you just discussed, is there additional relevant information that the Commission should consider in establishing the Company's ROE in this proceeding?

A: Yes. Because of the significant changes that have occurred in the market in terms of inflation and interest rates in the past nine months, it is important to consider what the authorized ROEs for vertically-integrated electric utilities have been when interest rates have previously approximated the levels at which they are currently. Figure 1 compares quarterly 30-year Treasury bond yields and quarterly authorized ROEs for vertically-integrated electric utilities since 2005. As shown, when interest rates have been at levels approximating the current interest rates, the authorized ROEs for vertically-integrated electric utilities have ranged from approximately 9.90 percent to 10.75 percent, which is consistent with the Company's proposed ROE in this proceeding. For example, as shown, in 4Q/2022, the 30-year Treasury yield was 3.89 percent, and the average authorized ROE for vertically-integrated electric utilities at that same quarter was 9.93 percent. In comparison, in 3Q/2011, the 30-year Treasury yield was 3.70 percent, which is similar to current yields, and the average authorized ROE for vertically-integrated electric utilities at that same quarter was 10.57 percent.

FIGURE 1: 30-YEAR TREASURY BOND YIELDS AND U.S. AUTHORIZED ROES OF VERTICALLY-INTEGRATED ELECTRIC UTILITIES[7]



Q: Based on your review, what is your conclusion regarding the ROE recommendations of Dr. Won and Mr. Murray?

A: As outlined in *Hope* and *Bluefield*, the return authorized for the Company must be comparable to the returns on assets with comparable risk. As noted previously, the recommendations of Dr. Won and Mr. Murray are below the recent authorized ROEs for vertically-integrated electric utilities, and in particular, Mr. Murray's ROE recommendation is even a low end outlier that is not supported based on the

[7] S&P Capital IQ Pro.

authorized ROEs in 2020 to 2021 when interest rates, and the overall cost of equity, were lower than in the current market environment. Therefore, both Dr. Won's and Mr. Murray's ROE recommendations are understating the cost of equity for utilities.

IV. Updated Cost of Equity Analyses

Q: Have you updated your cost of equity analyses from your direct testimony?

A: Yes, I have updated the results of the cost of equity analyses using the same methodologies as in my direct testimony, but now reflecting market data through December 31, 2022. Figure 2 summarizes the range of results of my cost of equity analyses for the Company.

FIGURE 2: SUMMARY OF COST OF EQUITY ANALYTICAL RESULTS

	Constant Growth DCF		
	Minimum Growth Rate (Median)	Average Growth Rate (Median)	Maximum Growth Rate (Median)
30-Day Average	7.92%	9.42%	10.47%
90-Day Average	7.98%	9.42%	10.55%
180-Day Average	7.90%	9.35%	10.42%
Constant Growth Average	7.93%	9.40%	10.48%
	CAPM		
	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
Value Line Beta	11.52%	11.54%	11.54%
Bloomberg Beta	10.99%	11.02%	11.02%
Long-term Avg. Beta	10.47%	10.52%	10.52%
	ECAPM		
Value Line Beta	11.80%	11.81%	11.81%
Bloomberg Beta	11.40%	11.42%	11.42%
Long-term Avg. Beta	11.01%	11.05%	11.05%
	Bond Yield Plus Risk Premium		
	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
Risk Premium Results	10.23%	10.31%	10.32%

Q: Do the updated results support the Company's requested ROE of 10.20 percent in this proceeding?

A: Yes. The updated results reflecting market data through December 31, 2022 continue to support the Company's requested ROE of 10.20 percent. The results of DCF and CAPM models are generally on balance with the results filed in my direct testimony, with certain scenarios slightly higher and other scenarios slightly lower than the results presented in my direct testimony.

V. Updated Capital Markets

Q: What is Dr. Won's position on capital market conditions and the implications for the cost of equity?

A: In his direct testimony, Dr. Won discusses various economic and capital market conditions currently impacting the cost of equity for utilities. On the one hand, Dr. Won notes inflation and interest rates have increased throughout 2022 and that the Federal Reserve anticipates ongoing increases in the federal funds rate. In addition, Dr. Won states that the dividend yields and expected growth rates for his proxy group companies have also increased since the Commission issued its decision in the 2019 Empire Case, which justifies a higher cost of equity than the 2019 Empire Case.[8]

On the other hand, however, Dr. Won states that, "there is no financial theory or regulatory rule that the Commission must authorize an unusually high ROE because of the current unusually high levels of inflation rates and interest rates."[9] Dr. Won states high inflation rates or high interest rates do not necessarily mean a higher cost of capital than what is presently reflected on the basis that the price investors are willing to pay for a share of stock already reflects these economic and financial market conditions. While Dr. Won does not describe it as such, his position is consistent with what has been termed the "efficient market hypothesis."

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[8] Won Direct Testimony, at 16-17.

[9] Won Direct Testimony, at 10.

Ultimately, Dr. Won concludes that, "[t]he combined net result of the increase in interest rates and the changes in overall market conditions" has resulted in an increase in the cost of equity of 34 basis points since the 2019 Empire Case.[10]

Q: Do you agree with Dr. Won's conclusion regarding the effect of capital market conditions on the utility cost of equity?

A: I agree with Dr. Won's overall conclusion that the effect of current and projected capital market conditions has resulted in an increase in the utility cost of equity. However, I do not agree with the extent to which Dr. Won concludes that the cost of equity has increased.

Q: Is Dr. Won's recommended ROE for the Company in this proceeding consistent with the Staff's recommended ROE for Missouri-American Water in its currently ongoing rate proceeding?

A: No. Dr. Won's recommended ROE for the Company in this proceeding is significantly understated relative to Staff's ROE recommendation in the Missouri-American Water proceeding for two primary reasons. First, in the Missouri-American Water rate proceeding, Staff witness Mr. Jennings conducts comparative cost of equity analyses, with his current period being based on data as of 2Q/2022. Mr. Jennings recommends an ROE of 9.73 percent,[11] and concludes that water

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[10] Won Direct Testimony, at 16.

[11] Missouri Public Service Commission, Case No. WR-2022-0303, Direct Testimony of Randall T. Jennings, November 22, 2022, at 4-5.

utilities are less risky than electric and natural gas utilities.[12] However, while Dr. Won and Mr. Jennings both use a comparative cost of equity approach, Dr. Won's ROE recommendation in the current proceeding of 9.59 percent for a vertically-integrated electric company is 14 basis points *lower* than Mr. Jennings's ROE recommendation for a water utility – which Mr. Jennings deems less risky than an electric or natural gas utility. All else equal, based on Staff's conclusion of the risk of water utilities relative to electric and natural gas utilities, Dr. Won's recommended ROE should be greater than Mr. Jennings's recommendation of 9.73 percent.

Second, Mr. Jennings's cost of equity analyses are based on data through 2Q/2022 while Dr. Won's cost of equity analyses are based on data through 3Q/2022. However, Dr. Won has stated that (1) interest rates have typically been the main driver of cost of equity changes; (2) currently he sees higher costs of equity based on higher interest rates; and (3) interest rates are expected to continue rising.[13] In fact, the 3-month average yield on the 30-year Treasury bond increased from 3.04 percent to 3.26 percent from the end of 2Q/2022 (*i.e.*, Mr. Jennings's analysis) to the end of 3Q/2022 (*i.e.*, Dr. Won's analysis). In other words, based on Dr. Won's conclusions, it would be reasonable to expect that Mr. Jennings's ROE recommendation would be even higher than 9.73 percent had his analysis been done using even more current data through 3Q/2022 such as done by Dr. Won in

[12] Missouri Public Service Commission, Case No. WR-2022-0303, Rebuttal Testimony of Randall T. Jennings, January 18, 2023, at 2.

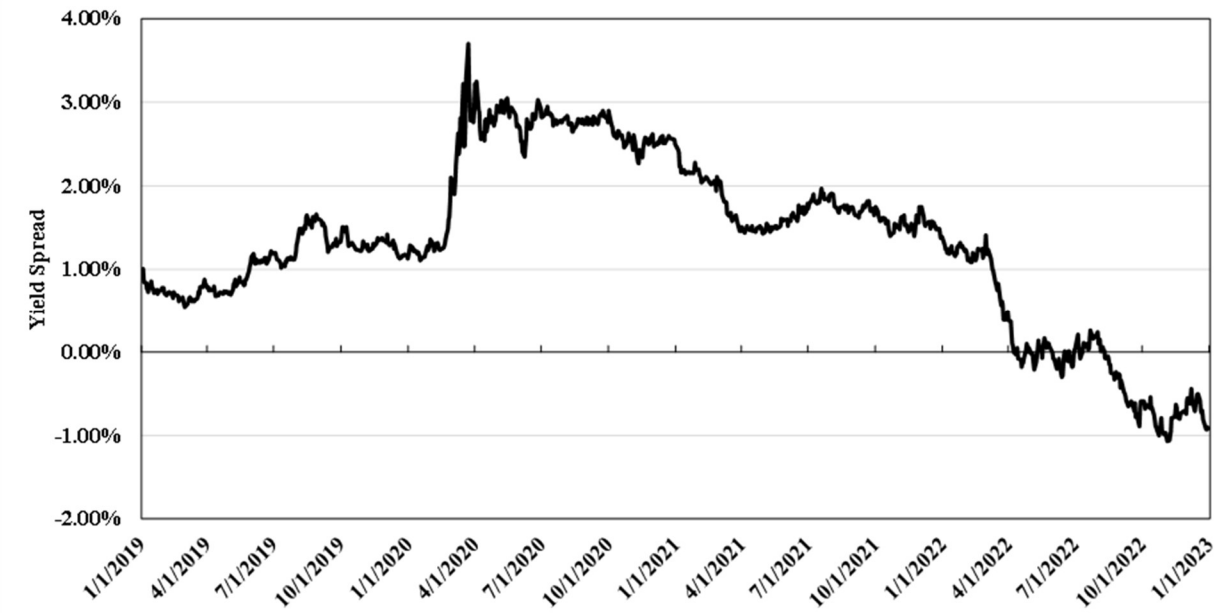
[13] Won Direct Testimony, at 13 and 18.

the current proceeding, thus indicating that Dr. Won's ROE recommendation for the Company is even more understated.

Q: Do you agree with Dr. Won that the market fully reflects the effect of inflation and future increases in interest rates on the share prices of utilities?

A: No. Since the filing of my direct testimony, the spread between the dividend yield of utility stocks versus the yield on long-term government bonds has changed such that the yield on government bonds now significantly exceeds the dividend yield on utility stocks, which further supports an underperformance of utility stocks going forward. As shown in Figure 3, the yields on long-term government bonds currently exceed the dividend yields on utility stocks, which is counter to the historical relationship between the dividend yields of utilities and the yields on long-term government bonds. Therefore, investors in utility stocks are currently earning yields that are lower than the return they can get on a lower risk investment. Given that interest rates will remain relatively high over the near term, it is reasonable to conclude that utility sector will most likely underperform over the near term. This is because investors in utility stocks will expect a higher yield as interest rates remain elevated on the alternative investment of government bonds.

FIGURE 3: SPREAD BETWEEN THE S&P UTILITIES INDEX DIVIDEND YIELD AND THE 10-YEAR TREASURY BOND YIELD, JANUARY 2019 TO DECEMBER 2022[14]



Q: Does Dr. Won acknowledge that when utility stocks underperform the broader market that the cost of equity for utilities is higher?

A: Yes. Dr. Won acknowledges that during the economic recovery from the COVID-19 pandemic that utilities tended to underperform the broader market, which pushed the cost of equity for utilities higher.[15]

[14] S&P Capital IQ Pro and Bloomberg Professional.

[15] Won Direct Testimony, at 19 and Schedule SJW-d14.

Q: Since the filing of your direct testimony, what have been equity analysts' expectation of the performance of the utilities sector as a result of the increasing interest rate environment?

A: Equity analysts continue to project that utilities will underperform the broader market given the substantial increases in interest rates. Fidelity recently classified the utility sector as underweight,[16] and *Morningstar* has noted that if inflation persists the utility sector will underperform, stating:

> [a]s long as inflation remains the market's top concern, we expect utilities to underperform. Utilities are the most sensitive to inflation because of their mostly fixed revenue, large capital investment budgets, and borrowing needs. We think long-term investors who want utilities in their portfolios should focus on those in constructive regulatory environments with the most protection from inflation.[17]

In discussing the utility sector's strong performance relative to the broader market in 2022, *Morningstar* noted that, unsurprisingly, utilities have benefited from recession concerns. However, *Morningstar* stated:

> We think utilities will struggle to match those returns going forward. U.S. utilities are 3% overvalued based on our fair value estimates, making it the most overvalued sector. Dividend yields have lost their appeal. In June, 10-year U.S. Treasury rates topped the Morningstar U.S. Utilities Index dividend yield for the first time in 14 years.[18]

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[16] Fidelity, "Top sectors to watch in Q2," August 3, 2022.

[17] Miller, Travis, "As Long as Inflation Worries Persist, We Expect Utilities to Underperform: Renewable energy continues to be a long-term boon for the sector," July 6, 2022.

[18] Miller, Travis, "Utilities Brighten Under Cloud of Recession, but Future Dim at Lofty Valuations," October 12, 2022.

Additionally, *The Wall Street Journal* recently noted that the S&P Utilities Index was down 14 percent over the past month, attributing the decline to the recent increase in long-term treasury yields:

> A big draw of utility stocks has become less attractive as interest rates have climbed. Utility stocks are known for their sizable dividends, offering investors a regular stream of income. Companies in the S&P 500 utilities sector offer a dividend yield of 3.3%, among the highest payout percentages in the index, according to FactSet.
>
> But the outsize dividends of utility stocks are no match for climbing bond yields. The yield on the benchmark 10-year Treasury note finished above 4% on Monday for a second consecutive session. Friday marked the 10-year yield's first close above the 4% level since 2008 and 11 straight weeks of gains. Treasurys are viewed as essentially risk-free if held to maturity.
>
> "The 10-year is repricing everything. I've got something that's even safer and yields even more," said Kevin Barry, chief investment officer at Summit Financial, comparing Treasurys and utility stocks.[19]

Similarly, Barron's recently noted that the decline in share prices can be attributed to the relatively high valuations and low dividend yields of utilities as compared to other asset classes such as Treasuries.[20] According to Barron's, even after the recent decline in share prices, the Utilities Select ETF was yielding 2.85 percent, which is a yield that will not "lure in buyers when the ultrasafe 10-year Treasury note

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[19] Miao, Hannah. "Utility Stock stumble as treasury yields climb." *The Wall Street Journal*. October 18, 2022.

[20] Sonenshine, Jacob. "Utilities Stocks Have Fallen off a Cliff. They Just Got Downgraded, Too." Barron's, October 17, 2022.

yields close to 4%."[21] Therefore, Barron's currently recommends not buying utility stocks

Q: Have credit rating agencies highlighted challenges that place pressure on the outlook for utilities in 2023?

A: Yes. For example, Moody's recently revised its 2023 outlook for the regulated electric and gas utilities sector to "negative" based on ongoing challenges of inflation, increasing interest rates and higher natural gas prices. Moody's noted that these challenges increase the pressure on customer affordability, and thus face heightened public scrutiny and the ability of utilities to promptly recover their costs. Moody's concluded that regulated utilities' financial metrics are already under pressure with little cushion, and that sustained capital spending is likely as utilities continue progress towards emissions reductions and net-zero goals. Moody's noted that the outlook could return to stable if regulatory support remains intact, natural gas prices are at a level where utilities are able to recover their fuel and purchased power costs without delay beyond 12 months, overall inflation moderates, interest rates stabilize and/or utilities' aggregate funds from operations-to-debt ratio remains between 14% to 15%.[22]

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[21] *Id.*

[22] Moody's Investors Service, Outlook, "2023 outlook negative due to higher natural gas prices, inflation and rising interest rates," November 10, 2022; Moody's Investors Service, Outlook, Sector In-Depth, "Inflation, high natural gas prices complicate prospects for supportive rate increases," November 11, 2022.

Fitch Ratings ("Fitch") also highlights similar factors as Moody's as challenging utilities' outlook for 2023, stating that the sector faces mounting cost pressures due to "elevated commodity prices, inflationary headwinds and rising interest costs," and that some offset in managing these headwinds include "higher authorized ROEs and the use of tools such as securitization of under-recovered fuel balances."[23]

Likewise, S&P also continues to maintain a negative outlook for the utility industry,[24] noting that since downgrades outpaced upgrades for a second consecutive year in 2021, the median investor-owned utility credit rating fell to the "BBB" category for the first time ever.[25] Further, S&P expects continued pressure on cash flows over the near term as utilities continue to increase leverage to fund capital expenditure plans necessary to reduce greenhouse gas emission and improve safety and reliability. Finally, S&P also highlights inflation, higher interest rates and rising commodity prices as additional risks that could further constrain the credit metrics for utilities over the near term. Specifically regarding inflation, S&P notes:

> Inflation recently spiked to its highest level in decades after rising for several consecutive months in 2021. Given the sustained increase to the U.S. consumer price index in 2021, inflation no longer appears to be just transitory and may have financial implications for the investor-owned North American regulated utility industry. Because of the regulatory lag within the industry, inflation, which causes prices to rise, typically leads to a

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[23] Fitch Ratings, "North American Utilities, Power & Gas Outlook 2023," December 7, 2022, at 1-2.

[24] S&P Global Ratings, "Regulated Utilities: Credit quality has weakened and credit risks are rising," July 14, 2022.

[25] S&P Global Ratings, "For the First Time Ever, the Median Investor-Owned Utility Ratings Falls to the 'BBB' Category," January 20, 2022.

> weakening of financial performance. The regulatory lag is the timing difference between when costs are incurred and when regulators allow those costs to be fully recovered from ratepayers.[26]

The credit ratings agencies' continued concerns over the negative effects of inflation and increased capital expenditures underscore the importance of maintaining adequate cash flow metrics for utilities.

Q: What are Mr. Murray's views on capital market conditions?

A: Mr. Murray recognizes that market conditions have changed significantly since the end of 2021, noting that the yield on long-term bonds have "increased dramatically," almost double the yield since that time-period.[27] However, Mr. Murray suggests that, despite the substantial increase in bond yields, the cost of equity for electric utilities has not increased because valuations of electric utility stocks remain elevated at price-to-equity ratios of approximately 20.[28] As a result, Mr. Murray concludes that this is an indication that the risk premium for utilities over bonds has decreased as bond yields have increased but the overall cost of equity for utilities has remained unchanged (*i.e.,* investors have placed a higher premium on utility stocks in the current market environment).[29]

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[26] *Id.*

[27] Murray Direct Testimony, at 8-9.

[28] Murray Direct Testimony, at 18.

[29] Murray Direct Testimony, at 18

Q: Has Mr. Murray recognized how the current, high valuations of the utilities sector affect the results of the models used to estimate the cost of equity?

A: No, he does not acknowledge that high valuations depress the dividend yield in the DCF model. In order to determine whether the results of the DCF model are reasonable, it is important to consider whether the current market conditions will persist during the rate period. While Mr. Murray correctly observes that valuations for electric utilities are currently well above historical averages, analysts do not expect the current price levels to be sustainable. As I noted previously, equity analysts such as Fidelity, Morningstar and Barron's project that utilities are likely to underperform the broader market over the near term. In fact, as I discuss in my response to Mr. Murray's cost of equity estimation models, Zacks's recommendation is either "hold" or "sell" for 85 percent of the electric utilities included in Mr. Murray's proxy group. To the extent that analysts and investors expect the electric utility sector to underperform, the current dividend yields reflected in the DCF model, which reflect relatively high stock price valuations, will understate the forward-looking cost of equity.

Q: Why do equity analysts expect the electric utility sector to underperform over the near term?

A: Mr. Murray is correct that while interest rates have increased over the past year, the valuations of the electric utility sector have remained elevated. However, it is precisely this reason that equity analysts believe that the electric utility sector is overvalued and thus will underperform over the near term. For example, as shown

previously in Figure 3, the recent significant increase in long-term government bond yields has resulted in the yield on long-term government bonds exceeding the dividend yields of utilities. As shown, the 30-day average yield spread (*i.e.*, utility dividend yields minus long-term government bond yields) as of December 31, 2022 is -0.69 percent. However, the long-term average yield spread from 2010 to 2022 is 1.37 percent. Therefore, the current yield spread is well below the long-term average.

For further context as to how unlikely it is to have a yield spread of -0.69 percent, I have calculated the z-score for the current yield spread, which measures the number of standard deviations from the mean. The current yield spread of -0.69 percent has a z-score of 2.85, indicating that a yield spread of -0.69 percent is nearly 3 standard deviations from the mean of 1.37 percent. Thus, 95 percent of the daily yield spread observations from 2010 to 2022 fall between -0.08 percent and 2.81 percent and the current yield spread of -0.69 percent is outside of that range. In other words, the current yield spread is an outlier, which is why equity analysts do not expect this current level to hold. Since long-term bond yields are expected to remain elevated at current levels over the near term, equity analysts expect utilities to underperform, and thus the dividend yields for utilities will increase. Mr. Murray is assuming that the current valuations of electric utilities will be maintained over the near term, which is not reasonable given the recent increase in interest rates.

VI. Rebuttal of Dr. Won

VI.A. Overview

Q: Please summarize Dr. Won's cost of equity analyses.

A: Dr. Won conducts a "comparative" cost of equity analysis to derive his recommended ROE for the Company.[30] Specifically, Dr. Won estimates the cost of equity for the Company as of 4Q/2019 (*i.e.*, the time of the 2019 Empire District Electric Company rate case) and 3Q/2022 using a two-step DCF analysis. Dr. Won states that he determined that the DCF analysis was the most proper analysis to use in this case to recommend a just and reasonable ROE for the Company.[31] Dr. Won also calculates a CAPM analysis as of 3Q/2022, as well as a "rule of thumb" risk premium analysis; however, he does not rely on these analyses for purposes of establishing his recommended ROE, but rather uses them as a test for reasonableness.[32]

Q: In general, do you agree with the "comparative approach" that Dr. Won utilizes to establish his ROE recommendation?

A: No. The comparative approach implemented by Dr. Won requires adjustments that are unnecessary if the cost of equity analyses are conducted on the subject company and are reasonably specified based on current and expected market conditions. Deriving an estimated cost of equity from several analytical approaches

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[30] Won Direct Testimony, at 3.

[31] Won Direct Testimony, at 29.

[32] Won Direct Testimony, at 29.

based on current and expected market data is a widely-used and defensible approach to recommending a reasonable ROE for ratemaking purposes. In fact, when testing his DCF result for reasonableness, Dr. Won only conducts his CAPM analysis as of 3Q/2022 and does not perform a comparative analysis such as he does with his DCF analysis. There is no basis for such an inconsistency in the analyses.

While I disagree with Dr. Won's comparative approach, even if one were to conduct such an approach, all necessary adjustments would need to be made to account for the differences between the subject and the benchmark company; however, Dr. Won has not done that comparison and assumes that Empire District Electric in 2019 and the Company in 2022 are the same in terms of risk and that no further adjustment is warranted.

Q: Do the results of either of Dr. Won's DCF analyses (*i.e.*, his Q4/2019 analysis or his Q3/2022 analysis) support his recommended ROE in this proceeding?

A: No. As a practical matter, Dr. Won does not actually rely on the results of either of his DCF analyses to support his recommendation for the Company. Specifically, the cost of equity results of these comparative DCF analyses are 7.71 percent for Q4/2019 and 8.04 percent for Q3/2022,[33] meaning both are substantially below his recommended ROE 9.59 percent.

[33] Won Direct Testimony Schedule SJW-d13.

VI.B. Proxy Group

Q: Please summarize Dr. Won's proxy group.

A: Dr. Won starts with the group of 38 U.S. utilities classified that the Edison Electric Institute ("EEI") classifies as electric utilities, and then applies various screening criteria.[34] After applying his screening criteria, Dr. Won utilizes a proxy group of 13 electric utilities.

Q: Do you agree with Dr. Won's proxy group?

A: While Dr. Won's proxy group differs from my proxy group as a result of the differences in the screening criteria applied, there is significant overlap in the proxy group companies. However, it is not reasonable to include Pinnacle West Capital Corporation ("PNW") in the proxy group as Dr. Won has done.

Q: Why it is unreasonable to include PNW in the proxy group?

A: PNW should be excluded from the proxy group based on the adverse market reaction and credit rating actions as a result of a negative rate case determination for Arizona Public Service ("APS"), PNW's electric utility operating subsidiary. Specifically, in APS's most recently completed rate case, the Arizona Corporation Commission ("AZCC") reduced the authorized ROE for APS from 10.00 percent to 8.70 percent, even though the Administrative Law Judge had recommended an ROE of 9.16 percent.[35] As a result of this rate case decision, credit ratings agencies

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[34] Won Direct Testimony, at 28.

[35] Arizona Corporation Commission, ALJ Recommended Opinion and Order, August 2, 2021, at 322.

instituted negative ratings actions, PNW's stock price fell significantly, and the company's projected earnings growth rate estimates were reduced to nearly zero.

Specifically, Fitch downgraded the issuer default credit rating of APS and PNW citing heightened business risk.[36] Moody's also downgraded APS and PNW, noting that the downgrade was a function of "the recent decline in Arizona regulatory environment" and "the organization's weakened credit metrics." [37] Guggenheim Securities LLC, an equity analyst that follows PNW, informed its clients that the "Arizona Corporation Commission is now confirmed to be the single most value destructive regulatory environment in the country as far as investor-owned utilities are concerned."[38] Similarly, S&P Global Market Intelligence's Regulatory Research Associates ("RRA") noted that this decision was "among the lowest ROEs RRA had encountered in its coverage of vertically integrated electric utilities in the past 30 years."

After the decision, APS's projected EPS growth rates reported by IBES were reduced to nearly zero. In addition, the *Value Line* five-year projected EPS growth rates for APS fell from 5.0 percent in July 2021 prior to the deliberations in the rate

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[36] FitchRatings, "Fitch Downgrades Pinnacle West Capital & Arizona Public Service to 'BBB+'; Outlooks Remain Negative," October 12, 2021.

[37] Moody's Investors Service, Inc., "Rating Actions: Moody's downgrades Pinnacle West to Baa1 and Arizona Public Service to A3," November 17, 2021.

[38] S&P Global Market Intelligence, "Pinnacle West shares tumble after regulators slash returns in rate case," October 7, 2021.

proceeding to "Nil" in October 2021, and most recently 0.5 percent as of January 2023. In July 2022, *Value Line* noted the following:

> Pinnacle West stock is still reeling from the regulatory thrashing the company suffered late last year. The issue has lost over 30% of its value from mid-2021, when it started to become apparent that things would not go the company's way in its general rate case. When the decision arrived in November, Pinnacle West saw its allowed return on equity (ROE) reduced from 10% to 8.7% (the lowest level in the U.S.), and its annual earning power cut by $0.90 per share. There were some strong relief rallies based on the hope for restitution, but that sentiment has faded, as its utility subsidiary (APS) has been unsuccessful in its bid for a judiciary appeal. In December, it filed a petition for special action with the Arizona Supreme Court, but was turned down. APS also put in a request to argue its case before the state Court of Appeals, but has received no response.[39]

Most recently in January 2023, *Value Line* reiterated PNW's difficulties in 2022, and stated that 2023 "probably won't be significantly better," noting that APS's ROE issues has been quite volatile over the past 18 months and that investors have been trying to gauge if the setback would be permanent or not.[40]

In addition, as shown in Figure 4, PNW's stock price declined approximately 24 percent from August 2, 2021 to November 4, 2021 following the issuance of the ALJ's recommended opinion that included an ROE of 9.16 percent, and then the subsequent amendment to that opinion in early November 2021 recommending the 8.70 percent ROE that was adopted by the AZCC. At its 3Q/2021 earnings

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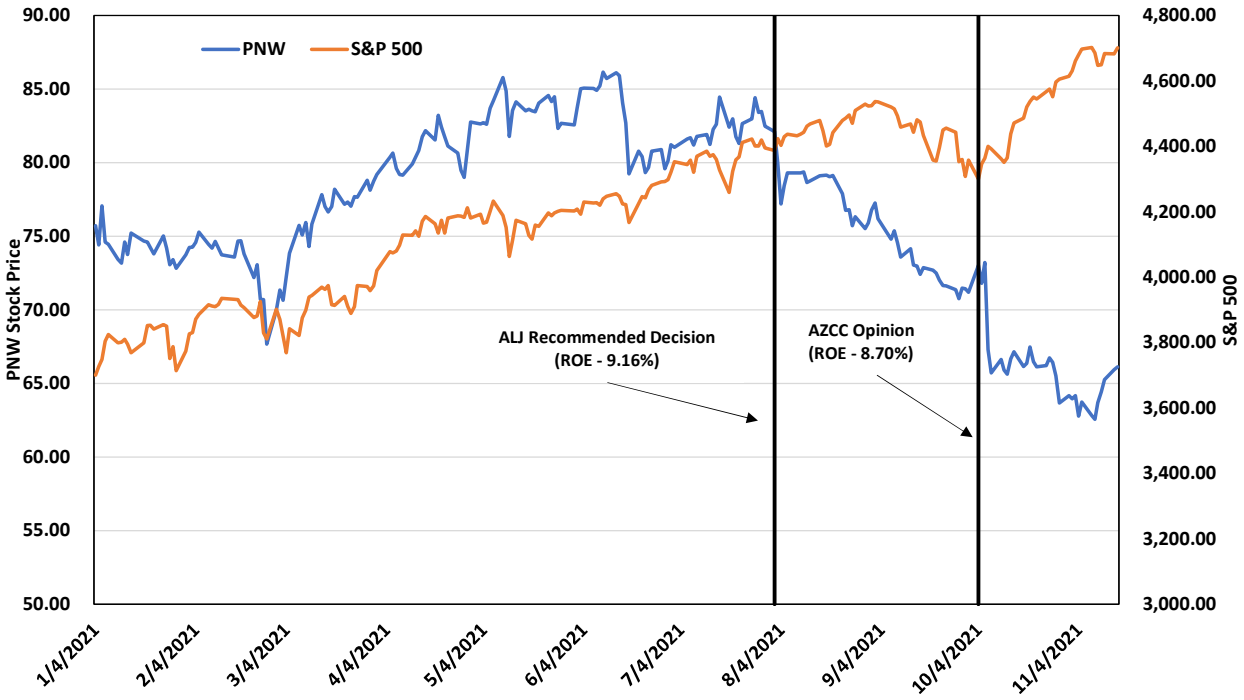
[39] *Value Line*, Pinnacle West, October 21, 2022.

[40] *Value Line*, Pinnacle West, January 20, 2023.

call, PNW announced changes to its capital plan saying that it would defer equity issuances until the conclusion of its next rate case to limit shareholder dilution.[41]

FIGURE 4: PNW STOCK PRICE VS. S&P 500 UTILITIES



Based on the fact that the assumptions used in the DCF model have been and continue to be affected significantly by PNW's last rate decision, PNW should be excluded from the proxy group.

Q: Can the effect of the adverse regulatory outcome for APS be shown in the projected growth rates in Dr. Won's analysis?

A: Yes. As summarized in Figure 5, the projected growth rates shown in Schedule SJW-d11 of Dr. Won's testimony clearly show that the projected growth rates were

[41] S&P Global Market Intelligence, "Pinnacle West Capital Corporation NYSE: PNW FQ3 2021 Earnings Call Transcripts," November 5, 2021, p. 7.

significantly higher prior to the ACC's November 2021 decision and are much lower subsequently.

FIGURE 5: COMPARISON OF PNW PROJECTED EPS GROWTH RATES 4Q/2019 VERSUS 3Q/2022

	Projected		
	EPS	DPS	BVPS
4Q/2019	5.00%	6.00%	3.50%
3Q/2022	0.50%	2.50%	2.50%

Q: Does the fact that Dr. Won relies on a "comparative analysis" also exacerbate the effect of including PNW in the proxy group?

A: Yes, because Dr. Won is comparing the cost of equity as of 4Q/2019, which is a period prior to the effect of the AZCC's decision on PNW's growth rates, to a current period subsequent to the AZCC's decision. Since Dr. Won is not simply estimating the cost of equity for the Company as of the current period and instead is applying a "comparative analysis," this has the effect of understating the magnitude of Dr. Won's comparative period cost of equity adjustment and thus is understating the Company's cost of equity.

VI.C. DCF Model

Q: Please summarize the DCF analysis conducted by Dr. Won.

A: Dr. Won conducts a two-step constant growth DCF model for two different time periods. Specifically, Dr. Won calculates a projected dividend yield using the average of the high and low stock prices for the three month period ending

December 31, 2019 (*i.e.*, the time period of the 2019 Empire Case) and for the three month period ending September 30, 2022.[42] For the growth rate in his DCF analysis, Dr. Won relies on a weighted average of two different growth rates: (1) an average of analysts' projected earnings per share ("EPS"), dividends per share ("DPS") and book value per share ("BVPS") growth rates ("Step 1 Growth Rate"); and (2) a projected nominal GDP growth rate ("Step 2 Growth Rate").[43] Dr. Won weights the Step 1 Growth Rate by 80% and the Step 2 Growth Rate by 20%. Dr. Won refers to the Federal Energy Regulatory Commission's method of estimating the cost of equity using the DCF analysis as support for this approach.[44] The cost of equity results of these comparative DCF analyses are 7.71 percent for Q4/2019 and 8.04 percent for Q3/2022.[45]

Q: What are your primary areas of disagreement with Dr. Won's DCF analyses?

A: Aside from the comparative analysis that Dr. Won conducts, my primary areas of disagreement with Dr. Won's DCF analysis are (1) his reliance on projected DPS and BVPS growth rates as part of the Step 1 Growth Rate; (2) his reliance on the weighted average of his Step 1 and Step 2 growth rates for his constant growth DCF analysis; and (3) the fact that he did not rely on the most updated data for purposes of estimating the cost of equity.

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42 Won Direct Testimony, Schedule SJW-d12.

43 Won Direct Testimony, at 30 and Schedule SJW-d11.

44 Won Direct Testimony, at 31.

45 Won Direct Testimony Schedule SJW-d13.

Q: Is it appropriate to rely on projected DPS or BVPS growth rates in the DCF?

A: No. There are numerous reasons that projected EPS growth rates should be relied upon in the DCF analysis and that it is not appropriate to rely on projected DPS or BVPS growth rates:

- Earnings are the fundamental determinant of a company's ability to pay dividends, and over the long-term dividend growth can only be sustained by earnings growth.[46] Management decisions to conserve cash for capital investments, to manage the dividend payout for the purpose of minimizing future dividend reductions, or to signal future earnings prospects can influence dividend growth rates in near-term periods. For example, forty S&P 500 companies suspended dividend payments in 2020 as a result of the increased uncertainty due to COVID-19.[47] These dividend suspensions occurred because companies believed earnings over the short term would decline and, therefore, elected to conserve cash to offset the financial effects of COVID-19.[48]
- These decisions affect the dividends and the payout ratio in the short term but are not necessarily indicative of a firm's long-term earnings growth.
- Estimates of BVPS growth are also highly influenced by dividend policy. Investing earnings in assets or paying down debt will both increase BVPS (all else equal), but paying dividends will decrease BVPS. Therefore, projections of earnings growth provide a more robust estimate of total company growth since it is EPS growth that will influence both DPS and BVPS growth.
- There is significant academic research demonstrating that EPS growth rates are most relevant in stock price valuation.[49] For example, Liu, ***et. al.***

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[46] As noted by Brigham and Houston: "Growth in dividends occurs primarily as a result of growth in earnings per share (EPS). Earnings growth, in turn, results from a number of factors, including (1) inflation, (2) the amount of earnings the company retains and invests, and (3) the rate of return the company earns on its equity (ROE).

[47] Langley, Karen. "U.S. Companies Slashed Dividends at Fastest Pace in More Than a Decade." *Wall Street Journal*, July 8, 2020.

[48] Brigham, Eugene F. and Joel F. Houston, *Fundamentals of Financial Management*. Concise 4th ed., Thomson South-Western, 2004, p. 317.

[49] *See, e.g.*, Harris, Robert S. "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return." *Financial Management*, Spring 1986, at 66; Vander Weide, James H. and Willard T. Carleton. "Investor growth expectations: Analysts vs. history." *The Journal of Portfolio Management*, Spring, 1988; Harris, Robert S. and Felicia C.Marston. "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts." *Financial Management*, Summer, 1992; Advanced Research Center.

(2002) examined "the valuation performance of a comprehensive list of value drivers" and found that "forward earnings explain stock prices remarkably well" and were generally superior to other value drivers analyzed. Gleason, *et. al*. (2012) found that the sell-side analysts with the most accurate stock price targets were those whom the researchers found to have more accurate earnings forecasts. The use of DPS and BVPS growth rates ignore the academic research demonstrating that EPS growth rates are most relevant in stock price valuation.

- Investment analysts report predominant reliance on EPS growth projections. In a survey completed by 297 members of the Association for Investment Management and Research, the majority of respondents ranked earnings as the most important variable in valuing a security (more important than cash flow, dividends, or book value).[50]

- Projected DPS and BVPS growth rates are only provided by *Value Line*. In contrast, projected EPS growth rates are based on consensus estimates available from multiple sources. In other words, projected EPS growth rates include the contributions of more than one analyst rather than the views of an individual analyst such as at *Value Line*, and thus the results are less likely to be biased in one direction or another. Moreover, the fact that projected EPS growth estimates are available on a consensus basis attests to the importance of projected EPS growth rates to investors when developing long-term growth expectations.

"Investor Growth Expectations." Summer 2004; Brigham, Eugene F. and Dilip K. Shome and Steve R. Vinson. "The Risk Premium Approach to Measuring a Utility's Cost of Equity." *Financial Management*, Vol. 14, No. 1, Spring, 1985; Morin, Dr. Roger A. New Regulatory Finance. Public Utilities Reports, Inc., 2006, pp. 299-303; Liu, Jing, *et al*. "Equity Valuation Using Multiples." *Journal of Accounting Research*, Vol. 40 No. 1, March 2002; Gleason, C.A., *et al*. "Valuation Model Use and the Price Target Performance of Sell-Side Equity Analysts." *Contemporary Accounting Research*, September 2011; Jung, Boochun, *et. al*. "Do financial analysts' long-term growth forecasts matter? Evidence from stock recommendations and career outcomes." *Journal of Accounting and Economics*, Vol. 53 Issues 1-2, February-April 2012.

[50] Block, Stanley B. "A Study of Financial Analysts: Practice and Theory." *Financial Analysts Journal*, July/August 1999.

Q: As you previously noted, Dr. Won references the FERC's approach to the DCF analysis as support for his approach to estimating the growth rates that he relies on in his analysis. Does the FERC rely on projected DPS or BVPS growth rates in its DCF analysis?

A: No. Dr. Won's approach for estimating the growth rates is not consistent with FERC's DCF methodology. Specifically, the FERC relies solely on projected EPS growth rates for the Step 1 growth rate in its DCF analysis and does not rely on either projected DPS or projected BVPS growth rates.

Q: Does the Step 2 growth rate in Dr. Won's DCF analysis reasonably reflect the utility growth that is expected to occur over the longer-term?

A: No. Dr. Won states that it is important that the perpetual growth rate used in his DCF analysis reflects the long-term investment horizon assumption implied in the constant growth DCF. As a result, Dr. Won's uses a projected nominal GDP growth rate as his Step 2 growth rate that is given a 20 percent weighting. However, Dr. Won's GDP growth rate for the overall economy does not reasonably represent the growth that is expected to occur in the electric utility industry over the next 30 years due to significant capital spending to (i) transition to cleaner generation sources, which will include substantial generation and transmission investment; (ii) effectuate grid modernization investments for improved reliability and energy efficiency; and (iii) facilitate the electrification of the economy to switch away from fossil fuels.

For example, Ameren Missouri has a net-zero carbon emissions goal for Scope 1 and 2 emissions by 2045, and expects to add 4,700 MW of renewable generation

and 800 MW of battery storage by 2040.[51] The Edison Electric Institute estimates that in both 2022 and 2023 alone utilities will spend approximately $140 billion to replace aging infrastructure, which is substantially more than in any year since 2000 when such statistics began.[52] It is estimated that the installed capacity required to achieve decarbonization may be 4 times higher than the amount of installed capacity currently used to provide service,[53] and these investments are in addition to other significant changes to the electric transmission and distribution systems required to advance toward decarbonization goals.

Q: To conduct his comparative DCF analysis, did Dr. Won rely on the most updated data available at the time he filed his testimony?

A: No. Dr. Won's cost of equity analyses rely on data for the quarter ending September 2022 even though he filed his testimony in January 2023.

Q: Have you updated Dr. Won's analyses to reflect the most current data?

A: Yes. As noted, Dr. Won conducted a cost of equity estimate in his DCF analysis by comparing the results of the proxy group as of Q4/2019 and Q3/2022. I have replicated Dr. Won's DCF analysis as of Q3/2022 but have updated it to reflect data through 4Q/2022. In order to isolate the impact of failing to reflect current data, I have only updated the data used in Dr. Won's DCF through December 2022 and

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[51] Ameren Missouri, 2022 Integrated Resource Plan Update, at 1.

[52] Blunt, Katherine, "Utilities Ready Upgrades Amid Green-Energy Shift," Wall Street Journal, April 18, 2022.

[53] "The Path to Net Zero, A Decarbonization Roadmap for California," San Diego Gas & Electric, Black & Veatch, Boston Consulting Group, David G. Victor, April 2022, p. 5.

have retained all of his methodologies and assumptions. Dr. Won's DCF analysis, as updated to reflect current data, is shown on Schedule AEB-R1, Attachments 7 through 9.

Q: What is the result of Dr. Won's DCF analysis when updated with data through December 2022?

A: As shown on Schedule AEB-R1, Attachment 11, page 1, when Dr. Won's comparative DCF analysis is updated to reflect data through December 2022, and everything else remains the same, his analysis results in a "cost of equity change adjustment" for his comparative analysis of 60 basis points, not the 34 basis points he suggests on Schedule SJW-d15. As shown on Schedule AEB-R1, Attachment 11A, page 1, when the *only* change that is made to Dr. Won's comparative cost of equity analysis is to update those analyses to reflect the most current data, his ROE recommendation would be 9.85 percent.[54]

Q: What is the result of Dr. Won's DCF analysis when it is not only updated with the most current data at the time he filed his testimony, but also appropriately excludes APS from the proxy group and appropriately reflects only projected EPS growth rates for the Step 1 growth rate?

A: As shown on Schedule AEB-R1, Attachment 11, page 1, when Dr. Won's comparative DCF analysis is updated to reflect data through December 2022, and

[54] The 9.85 percent equals Dr. Won's DCF estimate if Q4/2022 data is used of 8.31 percent minus his DCF estimate of 7.71 percent when Q4/2019 data is used, plus the authorized return in the 2019 Empire Case of 9.25 percent.

appropriately excludes APS from the proxy group and relies only on projected EPS growth rates (not DPS and BVPS growth rates as well), his analysis results in a "cost of equity change adjustment" for his comparative analysis of 109 basis points, not the 34 basis points he suggests on Schedule SJW-d15. In other words, when these reasonable changes are made to Dr. Won's comparative cost of equity analysis, his ROE recommendation would be 10.34 percent, or higher than the Company's requested ROE of 10.20 percent in this proceeding.

Q: Is there a way to address the differences between Empire District Electric and Ameren in Dr. Won's comparative DCF analysis?

A: Yes. As noted, Dr. Won has calculated his DCF analysis by comparing the change in the cost of equity between the period ending for 3Q/2022 to the quarter in which the Commission authorized the ROE in the 2019 Empire Case. However, as discussed, that presumes that there are no differences between Empire District Electric Company in 2019 relative to Ameren Missouri currently. While, I do not agree with Dr. Won's comparative DCF analyses generally, in order to address the potential differences between Empire District Electric Company in 2019 and Ameren Missouri, Dr. Won could have compared the results of his current DCF analysis to an analysis prepared using data as of the date of Ameren Missouri's last litigated rate case in Case No. ER-2014-0258 ("2014/2015 Ameren Missouri Rate Case").

Q: Have you conducted that analysis?

A: Yes. As shown on Schedule AEB-R1, Attachment 9B, page 2, I relied on Dr. Won's comparative DCF analysis, updated to reflect data through December 2022 as the

current analysis. I then compared that result to the DCF results for the same proxy group that Dr. Won relies on in the current proceeding but using data as of the period relied on by Staff in the 2014/2015 Ameren Missouri Rate Case (*i.e.*, August 2014 through October 2014). In addition, I have appropriately excluded APS from the proxy group and relied only on projected EPS growth rates (not DPS and BVPS growth rates as well). As shown in this analysis, comparing the DCF results over these two time periods results in a "cost of equity change adjustment" of 73 basis points. In other words, using the reasonable adjustments that I have made to Dr. Won's current DCF analysis, replicating that methodology using data as of the time period of the 2014/2015 Ameren Missouri Rate Cas, results in an 73 basis point increase in the cost of equity. As shown on Schedule AEB-R1, Attachment 11B, applying that increase in the cost of equity to the ROE that was authorized in the 2014/2015 Ameren Missouri Rate Case of 9.53 percent results in an ROE recommendation of 10.26 percent, which is also higher than the Company's requested ROE of 10.20 percent in this proceeding.

VI.D. CAPM Analysis

Q: Please summarize Dr. Won's CAPM analysis.

A: While Dr. Won conducts two DCF analyses for purposes of his comparative approach, for his CAPM analysis, Dr. Won conducts only a single CAPM analysis based on data as of 3Q/2022. As noted, Dr. Won states that he develops the CAPM as a test of the reasonableness of his DCF result.

Specifically, Dr. Won's CAPM analysis uses a risk-free rate based on the average yield on the 30-year Treasury bond for the three months ending September 30, 2022, *Value Line* betas for the proxy group as of this same time period, and four measures of the market risk premium also as of this time period. Specifically, for Dr. Won's market risk premium estimates, the market returns reflect: (1) the long-term geometric mean of the historical return difference between large company stocks and long-term government bonds from 1926-2021; (2) the long-term arithmetic mean of the historical return difference between large company stocks and long-term government bonds from 1926-2021; (3) the long-term geometric mean of the historical return difference between the S&P 500 and long-term government bonds from 1928-2021; and (4) the long-term arithmetic mean of the historical return difference between the S&P 500 and long-term government bonds from 1928-2021.

The results of Dr. Won's CAPM analysis as of 3Q/2022 range from 7.23 percent to 9.04 percent, with an average of 8.11 percent. Dr. Won concludes that because the results of his CAPM analysis overlap the results from his DCF analysis for the period ending 3Q/2022, he concludes that the results of his CAPM supports the cost of equity estimate resulting from his DCF analysis.

Q: Do you agree with Dr. Won's CAPM analysis?

A: No, I do not agree with Dr. Won's CAPM analysis. First, I do not agree with the historical market risk premiums relied on by Dr. Won. Second, since Dr. Won advocates for a comparative approach for estimating the cost of equity, it is unclear

why he did not conduct a comparative CAPM analysis such as he did with his DCF analysis.

Q: Why are the market risk premiums relied upon by Dr. Won not reasonable?

A: There are multiple reasons why the historical market risk premia relied on by Dr. Won are unreasonable. First, in addition to the historical arithmetic mean return to estimate the market risk premium, Dr. Won has incorrectly relied on the historical geometric mean return to calculate the risk premium. Second, Dr. Won has incorrectly used the total return on long-term government bonds to calculate his historical market risk premium instead of the income-only return on long-term government bonds. Third, Dr. Won's historical market risk premia fail to consider the inverse relationship between interest rates and the market risk premium under current market conditions (*i.e.*, as interest rates decrease, the market risk premium increases).

Q: Has Dr. Won previously relied on a forward-looking estimate of the market risk premium in his CAPM analysis such as you have done in your direct testimony?

A: Yes. In Missouri-American Water's 2020 rate proceeding, Dr. Won relied on two estimates of an historical market risk premium, as well as an estimate of the forward-looking market risk premium based on the market return of the S&P 500 less the current risk-free rate.[55] It is unclear why Dr. Won's market risk premium is not

[55] Missouri Public Service Commission, Case No. WR-2020-0344, Staff Report Cost of Service, at 26 and Schedule SJW-14, columns [8] through [10].

consistent in this proceeding or why he has relied solely on historical market risk premia. All else equal, if Dr. Won had calculated the market risk premium in this proceeding in the same way that he had calculated it in the Missouri-American Water 2020 rate proceeding, his CAPM result in this proceeding would have been higher. Specifically, as shown

Q: Why is it inappropriate to consider a geometric mean to estimate a historical market return for the CAPM?

A: Geometric and arithmetic means are used for different purposes. The geometric mean is used to determine the exact rate of compounded return between a specific starting and ending point. The geometric mean is most appropriately used for series that exhibit serial correlation. The arithmetic mean, which is the appropriate calculation to be used for this purpose, is the simple average of single period rates of return and best approximates the uncertainty associated with returns from year to year. The important distinction between the two methods is that the arithmetic mean assumes that each periodic return is an independent observation and, therefore, incorporates uncertainty into the calculation of the long-term average. In contrast, the geometric mean does not incorporate the same degree of uncertainty because it assumes that returns remain constant from year to year. Cooper (2006) reviewed the literature on the topic and noted the following rationale for using the arithmetic mean:

> Note that the arithmetic mean, not the geometric mean is the relevant value for this purpose. The quantity desired is the rate of return that investors expect over the next year for the random annual rate of return on the market. The arithmetic mean, or simple average, is the

> unbiased measure of the expected value of repeated observations of a random variable, not the geometric mean.…[The] geometric mean underestimates the expected annual rate of return.[56]

Furthermore, Pratt and Grabowski note the following in their review of the literature:

> The choice between which average to use is a matter of disagreement among practitioners. The arithmetic average receives the most support in the literature, though other authors recommend a geometric average. The use of the arithmetic average relies on the assumption that (1) market returns are serially independent (not correlated) and (2) the distribution of market returns is stable (not time-varying). Under these assumptions, an arithmetic average gives an unbiased estimate of expected future returns assuming expected conditions in the future are similar to conditions during the observation period. Moreover, the more observations available, the more accurate will be the estimate.[57]

Q: As you noted, Dr. Won has also deducted the total historical return on long-term government bonds from his estimates of the historical market return in order to estimate his market risk premium. Why is this incorrect?

A: Dr. Won has calculated his market risk premia in one instance as the difference between the long-term average return on large company stocks and the long-term average *total* return on long-term government bonds. In the other instance, Dr. Won has calculated the market risk premia as the difference between the long-term average total return on the S&P 500 and the long-term average *total* return on Treasury bonds. However, in calculating a historical market risk premium, the long-

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[56] Cooper, Ian. "Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting." *European Financial Management 2.2*. 1996, at 158.

[57] Pratt, Shannon P. and Roger J. Grabowski. Cost of Capital: Applications and Examples. Wiley, 2008, at 96.

term average *income-only* return should be deducted from the long-term average return on large company stocks or the S&P 500, not the *total* return (*i.e*., income return and inflation) on long-term government bonds.

Q: Is there support for your assertion that it is appropriate to use the income-only return on long-term government bonds to calculate the historical market risk premium?

A: Yes. As stated by *Morningstar*, which is the prior publisher of the Duff & Phelps historical dataset relied on by Dr. Won and that is now published by *Kroll*, the historical market risk premium is appropriately calculated by subtracting the *income-only* portion of the government bond return from the total return on large company stocks.

> Another point to keep in mind when calculating the equity risk premium is that the income return on the appropriate-horizon Treasury security, rather than the total return, is used in the calculation. The total return is comprised of three return components: the income return, the capital appreciation return, and the reinvestment return…The income return is thus used in the estimation of the equity risk premium because it represents the truly riskless portion of the return.[58]

[58] *Morningstar*, Ibbotson SBBI 2012 Valuation Yearbook, Market Results for Stocks, Bonds, Bills, and Inflation 1926-2011, at 55.

Q: Why does the historical market risk premium relied upon by Dr. Won fail to account for the inverse relationship between interest rates and the market risk premia?

A: Dr. Won simply takes an average of historical market risk premia and then utilizes a current risk-free rate in the CAPM equation; however, the current risk-free rate bears no relationship to the average historical interest rate underlying the average historical market risk premia on which Dr. Won relies. As shown in the Bond Yield Plus Risk Premium analysis in my Direct Testimony, as interest rates decrease, the market risk premium increases, and vice versa. As *Morningstar* has observed, the market risk premium is a forward-looking concept, not a historical analysis:

> It is important to note that the expected equity risk premium, as it is used in discount rates and the cost of capital analysis, is a forward-looking concept. That is, the equity risk premium that is used in the discount rate should be reflective of what investors think the risk premium will be going forward.[59]

To illustrate this point, in one of his estimates of the historical market risk premium, as noted, Dr. Won takes the arithmetic historical market return of 12.33 percent and deducts the arithmetic total return on long-term government bonds of 6.30 percent, to derive a market risk premium of 6.03 percent.[60] However, when correctly calculated as the difference between the total return on Large Company Stocks from for 1926-2021 and the *income-only* return on long-term government bonds over this same period of 4.87 percent, the historical market risk premium is 7.46 percent. In

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[59] *Morningstar Inc.*, 2010 Ibbotson Stocks, Bonds, Bills, and Inflation, Valuation Yearbook, at 55.

[60] Schedule SJW-d14. Both the market return and total return on long-term government bonds are as reported by *Kroll*, formerly *Duff & Phelps*.

comparison, Dr. Won relies on a 3-month average risk-free rate on long-term government bonds as of September 30, 2022 of 3.26 percent Therefore, because the current interest rate on long-term government bonds relied on by Dr. Won for his risk-free rate is below the long-term historical average rate of 4.87 percent, the inverse relationship between interest rates and the market risk premium implies that the current market risk premium should be above the long-term historical average of 7.46 percent, which is clearly substantially higher than the market risk premium of 6.03 percent that Dr. Won relies on for this scenario. Consequently, Dr. Won's calculation of the historical market risk premia is understated, which in turn results in his CAPM results being understated.

Q: Even if Dr. Won's CAPM analysis did not suffer from the various issues that you have identified, is there a basis to conclude, as Dr. Won has done, that since the range of results of his CAPM analysis overlap the range of results of his DCF analysis for the same time period that the results of his DCF are reasonable?

A: No. While the range of results for Dr. Won's CAPM analysis and DCF analysis as of 3Q/2022 may overlap one another, that does not indicate that the results are reasonable. Rather, the high end of the range of results for both Dr. Won's DCF analysis and his CAPM as of 3Q/2022 are below his recommended ROE for the Company in this proceeding, thus implicitly the results of these analyses cannot be considered reasonable – regardless of whether they overlap one another. In addition, as discussed, given the multiple problems with Dr. Won's market risk

premia estimates, his CAPM results cannot be considered to be supportive of the results of his DCF analysis.

Q: Did Dr. Won explain why he did not conduct a comparative CAPM analysis such as he did for his DCF analysis?

A: No. Dr. Won does not explain why he does not conduct a comparative CAPM analysis consistent with his DCF analysis.

Q: Has Staff also recently relied on a comparative CAPM analysis for determining a utility's ROE in another contemporaneous rate proceeding?

A: Yes. In the ongoing Missouri-American Water rate proceeding, Staff witness Mr. Jennings utilizes a comparative cost of equity analysis approach just as Dr. Won has done in this proceeding; however, Staff witness Jennings conducts both a comparative DCF analysis as well as a comparative CAPM analysis.[61]

Q: If Dr. Won had conducted a comparative CAPM analysis consistent with his approach for the DCF analysis, would the results of that analysis support his DCF result?

A: No.

[61] Missouri Public Service Commission, Case No. WR-2022-0303, Direct Testimony of Randall T. Jennings, November 22, 2022, Schedule RTJ-d14 and Schedule RTJ-d15.

Q: How would Dr. Won's ROE recommendation change if he had conducted a comparative CAPM analysis consistent with his approach for the DCF analysis?

A: On Schedule AEB-R, Attachment 10, page 1, I have replicated Dr. Won's CAPM analysis as he has presented it on his Schedule SJW-d14; however, I have also added the same CAPM analysis for the period ended 4Q/2019, which is consistent with how Dr. Won conducted his comparative DCF analysis. In addition, on Schedule AEB-R, Attachment 10, page 2, I have done the same analysis, but have updated Dr. Won's CAPM analysis with the data through 4Q/2022 that was available as of the filing of his testimony.

As shown on Schedule AEB-R, Attachment 10, page 1, the cost of equity adjustment based on the comparative CAPM analysis would be 2.91 percent when the "current' comparative period relies on data through 3Q/2022 such as Dr. Won did in his testimony. As shown on Schedule AEB-R, Attachment 10, page 2, the cost of equity adjustment based on the comparative CAPM analysis would be 3.33 percent when the comparative period relies on the most current data through 4Q/2022.

Schedule AEB-R, Attachment 11, page 2, demonstrates that if Dr. Won had applied the same methodology as Staff relied upon in the currently ongoing Missouri-American Water proceeding and averaged the comparative cost of equity changes from both the DCF analysis and the CAPM analysis, his estimated ROE for the Company would be 10.87 percent (using data through 3Q/2022) or 11.21 percent

(using data through 4Q/2022), either of which is *well above* the ROE request of the Company.

Q: Why is it important that the Staff rely on similar approaches to the calculation of the cost of equity in different, and even ongoing, rate proceedings?

A: The ROE that is ultimately selected by the Commission for each utility should be based on the facts and circumstances that are in each rate proceeding, and the overall risk factors of the utility that is before the Commission in each case. However, the differences in the ROEs should not be the result of methodological changes in the models developed by the Staff from case to case without any basis for such changes. Relying on different methodologies without a basis to do so can bias the cost of equity results that are used in one proceeding as compared with another. For example, in the currently ongoing Missouri-American Water proceeding, the Staff considered comparative analyses using both the DCF and the CAPM, whereas in this proceeding Dr. Won has relied only on a comparative analysis of the DCF model. As shown in my analysis, failure to consider the CAPM analysis has resulted in Dr. Won's analysis understating the cost of equity for the Company.

VI.E. "Rule of Thumb" Risk Premium

Q: Please summarize Dr. Won's "rule of thumb" risk premium analysis.

A: The "rule of thumb" methodology presented by Dr. Won is a form of the risk premium methodology that simply adds an estimated equity risk premium to an average utility bond yield to estimate the cost of equity. Dr. Won uses what he terms a "rule of

thumb" risk premium as a reasonableness check on his DCF results. Specifically, Dr. Won evaluated the three-month average yield on long-term A-rated and Baa-rated utility bonds as of September 30, 2022, which were 4.94 percent and 5.28 percent, respectively. Dr. Won then adds a "rule of thumb" risk premium of 3.00 percent to 4.00 percent to the utility bond yields, which produced a range of results from 7.94 percent to 9.28 percent. From this analysis, Dr. Won concludes that, since his DCF results overlap with this range, it supports cost of equity estimate of 8.04 percent from the DCF for the three months ended September 30, 2022.[62]

Q: Do you agree with this methodology?

A: No. While I agree that it is generally appropriate to rely on properly-specified risk premium methodologies, I do not agree with the simplistic approach that Dr. Won utilizes as a check on the reasonableness of his DCF analysis.

First, similar to his CAPM analysis, Dr. Won's specification of this risk premium approach relies on an unsupported estimate of the market risk premium and does not take into consideration the inverse relationship between interest rates and the market risk premium as previously discussed. There are a number of studies which have shown that the market risk premium is inversely related to the level of interest rates.[63] As such, Dr. Won's "rule of thumb" methodology is not reflective of the

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[62] Won Direct Testimony, at 34.

[63] *See, e.g.,* Berry, S. Keith. Interest Rate Risk and Utility Risk Premia during 1982-93. Managerial and Decision Economics, Vol. 19, No. 2, March, 1998, at 7; Harris, Robert S. Using Analysts' Growth Forecasts to Estimate Shareholders Required Rates of Return. Financial Management, Spring 1986, at 66.

investor required return for the Company over the period during which rates will be in effect.

Second, Staff has utilized different ranges of the "rule of thumb" over time. For example, in the Company's 2021 rate case, Staff witness Chari also applied a generic market risk premium as a "rule of thumb" to estimate the cost of equity, but indicated the range was 3.0 to 5.0 percent.[64] Thus, the range of Staff's "rule of thumb" market risk premium was higher than the range both Dr. Won and Mr. Murray rely on in this proceeding. Clearly, there is no consensus as to the "rule of thumb," highlighting its arbitrary nature and illustrating that it is overly simplistic and unreliable.

Lastly, Dr. Won's "rule of thumb" risk premium analysis is outdated and does not reflect the increases in interest rates that occurred after September 30, 2022. For example, as shown in Figure 6, the 3-month average yield on A-rated utility bonds through December 31, 2022 was 70 basis points higher than the average relied on by Dr. Won. Likewise, the 3-month average yield on Baa-rated utility bonds through December 31, 2022 was 65 basis points higher than the average relied on by Dr. Won. In other words, when correctly reflecting the most recent data available as of the time of the filing of Dr. Won's testimony, his "rule of thumb" risk premium approach would instead indicate a cost of equity range of 8.64 percent to 9.93 percent, or well above either his as-filed DCF result of 8.04 percent or, as shown on

[64] File No. ER-2021-0240, September 3, 2021, Staff Report Cost of Service, at 27.

Schedule AEB-R1, Attachment 9, page 2, his DCF result of 8.30 percent if the only change made to his DCF analysis is to reflect data through December 31, 2022. Regardless, the results are well below the low-end of Dr. Won's "rule of thumb" cost of equity range. Therefore, Dr. Won's "rule of thumb" analysis, when properly updated to reflect data available as of the filing of his testimony, does not support nor serve as a reasonableness check of the result of his DCF analysis, but rather suggests that his DCF result is significantly understated.

FIGURE 6: DR. WON'S "RULE OF THUMB" RISK PREMIUM UPDATED TO REFLECT THE MOST CURRENT DATA AS OF THE FILING OF DR. WON'S TESTIMONY

	As of 9/30/2022	As of 12/31/2022
A-rated Utility Bond Yield	4.94%	5.64%
Dr. Won "Rule of Thumb" Equity Risk Premium (Low End)	3.00%	3.00%
Estimated Cost of Equity	7.94%	8.64%
Baa-rated Utility Bond Yield	5.28%	5.93%
Dr. Won "Rule of Thumb" Equity Risk Premium (High End)	4.00%	4.00%
Estimated Cost of Equity	9.28%	9.93%
Dr. Won DCF Result	8.04%	8.30%
"Rule of Thumb" Results Overlap with DCF Result?	YES	**NO**

VII. Rebuttal Mr. Murray

Q: Please summarize Mr. Murray's ROE analyses.

A: Mr. Murray develops several cost of equity analyses, including a multi-stage DCF and a CAPM. In these analyses, Mr. Murray relies on a proxy group of comparable electric companies, as well as separately calculates an ROE for Ameren. In

addition, Mr. Murray also develops a "rule of thumb" bond yield risk premium approach similar to Dr. Won. As shown in Figure 7, the results of Mr. Murray's cost of equity estimation methodologies range from 7.32 percent to 9.05 percent. Instead of averaging or otherwise aggregating these estimates in a systematic fashion, Mr. Murray states that the fair and reasonable range for an ROE for the Company in this proceeding is 8.40 percent to 9.25 percent. Mr. Murray arrives at the low end of his range is based on a starting point of 9.40 percent, which he claims is an "average authorized ROE," less 100 basis points, which he states is "approximately the lowest ROE that the Commission would consider under its "zone of reasonableness standard.""[65] Mr. Murray arrives at the high end of his ROE range by stating simply that 9.25 percent would "appropriately reduce" the Company's current authorized ROE for its electric utility operations that the Commission established 8 years ago.[66] Within his range, Mr. Murray recommends an ROE for the Company of 9.25 percent, stating that it is fair and reasonable if applied to his recommended equity ratio of 43 percent.[67]

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[65] Murray Direct Testimony, at 6.

[66] *Id*.

[67] *Id*.

FIGURE 7: RESULTS OF MR. MURRAY'S ROE ESTIMATION METHODOLOGIES

Methodology	Range
Multi-Stage DCF (AEE, 3.5% long-term growth rate) [68]	7.61% - 7.62%
Multi-Stage DCF (AEE, 3.0% long-term growth rate) [69]	7.46% - 7.47%
Multi-Stage DCF (AEE, 2.5% long-term growth rate) [70]	7.32% - 7.33%
Multi-Stage DCF (Elec. Utility Group, 3.0% long-term growth rate)[71]	All: 7.89% Less than 10% Non-Reg: 7.75% Common Since 2012/14: 7.65%
CAPM[72]	8.52% - 9.05%
Rule of Thumb[73]	8% - 8.25%

Q: Is Mr. Murray's ROE recommendation based on the results of his cost of equity models?

A: No. While Mr. Murray establishes an ROE range of 8.40 percent to 9.25 percent that he suggests the Commission consider in this case, he provides no basis for that range in his testimony or workpapers. While Mr. Murray suggests that he considers the results of his cost of equity models, he concludes that his models support a cost of equity range of 7.00 percent to 7.50 percent, which does not support his recommended ROE range of 8.40 percent to 9.25 percent. Rather, Mr. Murray's ROE recommendation is 175 to 225 basis points above the cost of equity range that he determines based on his models. Mr. Murray states that his ROE

[68] Murray Direct Testimony, at DM-D-2-1 and DM-D-2-2.

[69] Murray Direct Testimony, at DM-D-2-1 and DM-D-2-2.

[70] Murray Direct Testimony, at DM-D-2-1 and DM-D-2-2.

[71] Murray Direct Testimony, at 32.

[72] Murray Direct Testimony, DM-D-4-1, DM-D-4-2, DM-D-4-3.

[73] Murray Direct Testimony, at 37.

recommendation is also based on consideration of the Commission's authorized ROE in the 2019 Empire Case, the authorized ROE for Ameren Illinois' electric utility operations, capital market conditions, and an approximation of the "zone of reasonableness" that the Commission would consider.[74]

Q: What are your primary conclusions regarding Mr. Murray's analyses and conclusions?

A: While there are many assumptions and methodologies developed by Mr. Murray with which I disagree and will discuss in more detail, it is important to recognize that, as was the case with Dr. Won, because Mr. Murray's cost of equity models produce results that are 20 to 193 basis points below his recommended ROE of 9.25 percent, it is unreasonable to suggest that he has relied on any of his analyses. In other words, Mr. Murray's ROE recommendation lacks any analytical foundation and is essentially just his own unsupported opinion as to the appropriate ROE for Ameren Missouri.

Q: Has Mr. Murray changed his approach for determining the cost of equity range supported by his model results from prior proceedings?

A: Yes, he has. Figure 8 compares the results of Mr. Murray's multi-stage DCF, CAPM and "rule of thumb" risk premium analyses in this proceeding to his model results in both the Company's 2021 and 2019 electric rate proceedings. As shown in Figure 8, Mr. Murray's model results for the Company's 2021 electric rate proceeding

[74] Murray Direct Testimony, at 6.

ranged from 5.75 percent to 7.33 percent, and Mr. Murray indicated that his model results supported a cost of equity range of 6.50 percent to 7.00 percent. Similarly, Mr. Murray's model results for the Company's 2019 electric rate proceeding ranged from 5.38 percent to 6.83 percent, and Mr. Murray indicated that his model results supported a cost of equity range of 5.50 percent to 6.50 percent. In each case, Mr. Murray's cost of equity range fell within the range of his model results. However, in the current proceeding, Mr. Murray's model results range from 7.33 percent to 9.05 percent, and he indicates that his model results only support a cost of equity range of 7.00 percent to 7.50 percent. Thus, the low-end of his range is below his model results, while the high-end of his range is very close to the low-end of his model results. It is clear that if Mr. Murray had applied an approach similar to the one he applied in the Company's 2019 and 2021 rate proceedings, which required the cost of equity range to fall within the range of his model results, his cost of equity range would be much higher than 7.00 percent to 7.50 percent.

FIGURE 8: COMPARISON OF MR. MURRAY'S ROE ESTIMATION METHODOLOGIES 2023 VS 2021 VS. 2019 AMEREN MISSOURI TESTIMONIES

Methodology	Case No. ER-2022-0337	Case No. ER-2021-0240	Case No. ER-2019-0335	Increase/Decrease	
				2021 to 2023	2019 to 2023
Multi-Stage DCF (AEE, 3.5% long-term growth rate) [75]	7.62%	7.12%	6.83%	+0.50%	+0.79%
Multi-Stage DCF (AEE, 3.0% long-term growth rate) [76]	7.47%	6.95%	6.65%	+0.52%	+0.82%
Multi-Stage DCF (AEE, 2.5% long-term growth rate) [77]	7.33%	6.78%	6.48%	+0.55%	+0.85%
Multi-Stage DCF (Electric Utility Group, 3.0% long-term [78] growth rate)	7.65% - 7.89%	7.08%-7.33%	6.50%-6.75%	+0.57%	+1.15%
CAPM[79]	8.52%-9.05%	6.40%-7.04%	5.38%-6.06%	+2.12%/+2.01%	+3.14%/+2.99%
Rule of Thumb[80]	8.00%-8.25%	5.75%	6.25%	+2.25%/+2.50%	+1.75%/+2.00%
Cost of Equity Range[81]	7.00%-7.50%	6.50%-7.00%	5.50%-6.50%	+0.50%	+1.50%/+1.00%
ROE Recommendation[82]	9.25%	9.0%	9.25%	+0.25%	0.00%
Equity Ratio[83]	43%	45%	48%	(2.00%)	(5.00%)
WROE (ROE x Equity Ratio)	3.98%	4.05%	4.44%	(0.07%)	(0.46%)

[75] Direct Testimony of David Murray, at DM-D-2-2; File No. ER-2021-0240, September 3, 2021, Direct Testimony of David Murray, DM-D-2-2; File No. ER-2019-0335, December 4, 2019, Murray Direct Testimony, DM-D-2.

[76] Direct Testimony of David Murray, at DM-D-2-2; File No. ER-2021-0240, September 3, 2021, Direct Testimony of David Murray, DM-D-2-2; File No. ER-2019-0335, December 4, 2019, Murray Direct Testimony, DM-D-2.

[77] Direct Testimony of David Murray, at DM-D-2-2; File No. ER-2021-0240, September 3, 2021, Direct Testimony of David Murray, DM-D-2-2; File No. ER-2019-0335, December 4, 2019, Murray Direct Testimony, DM-D-2.

[78] Direct Testimony of David Murray, at DM-D-3-1; File No. ER-2021-0240, September 3, 2021, Direct Testimony of David Murray, DM-D-3-1; File No. ER-2019-0335, December 4, 2019, Murray Direct Testimony, at 22.

[79] Direct Testimony of David Murray, DM-D-4-1, DM-D-4-2, DM-D-4-3; File No. ER-2021-0240, September 3, 2021, Direct Testimony of David Murray, DM-D-5-1, DM-D-5-2, DM-D-5-3; File No. ER-2019-0335, December 4, 2019, Murray Direct Testimony, Schedule DM-D-4 through DM-D-6.

[80] Direct Testimony of David Murray, at 37; File No. ER-2021-0240, September 3, 2021, Direct Testimony of David Murray, at 22; File No. ER-2019-0335, December 4, 2019, Murray Direct Testimony, at 26.

[81] Direct Testimony of David Murray, at 5; File No. ER-2021-0240, September 3, 2021, Direct Testimony of David Murray, at 5; File No. ER-2019-0335, December 4, 2019, Murray Direct Testimony, at 4.

Q: Do Mr. Murray's model results indicate a higher cost of equity in the current proceeding than in the Company's 2021 and 2019 electric rate proceedings?

A: Yes, they indicate a significant increase in the cost of equity. As shown in Figure 8, the results of his models in this proceeding indicate an increase of between 79 and 314 basis points in the cost of equity from the time of the Company's 2019 electric rate proceeding, and an increase of between 50 and 250 basis points from the time of the Company's 2021 electric rate proceeding.

Q: Does Mr. Murray's ROE recommendation reflect the significant increase in the cost of equity indicated by his models since the Company's 2021 and 2019 electric rate proceedings?

A: No. While Mr. Murray's model results indicate a significant increase in the cost of equity, Mr. Murray continues to recommend an ROE of 9.25 percent, which is same as his recommendation in the Company's 2019 electric rate proceeding and only 25 basis points greater than his recommendation in the Company's 2021 electric rate proceeding. Furthermore, as shown in Figure 8, Mr. Murray's proposed equity return in the current proceeding of 3.98 percent, which is calculated as the product of his recommended ROE and equity ratio (*i.e.*, the weighted ROE or WROR), is lower than his proposed equity return in both the Company's 2019 and 2021 electric rate proceedings. Therefore, while I disagree with many aspects of Mr. Murray's analyses, simply evaluating the differences in his model results in the current

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[82] Direct Testimony of David Murray, at 6; File No. ER-2021-0240, September 3, 2021, Direct Testimony of David Murray, at 5; File No. ER-2019-0335, December 4, 2019, Murray Direct Testimony, at 3.

[83] *Id*.

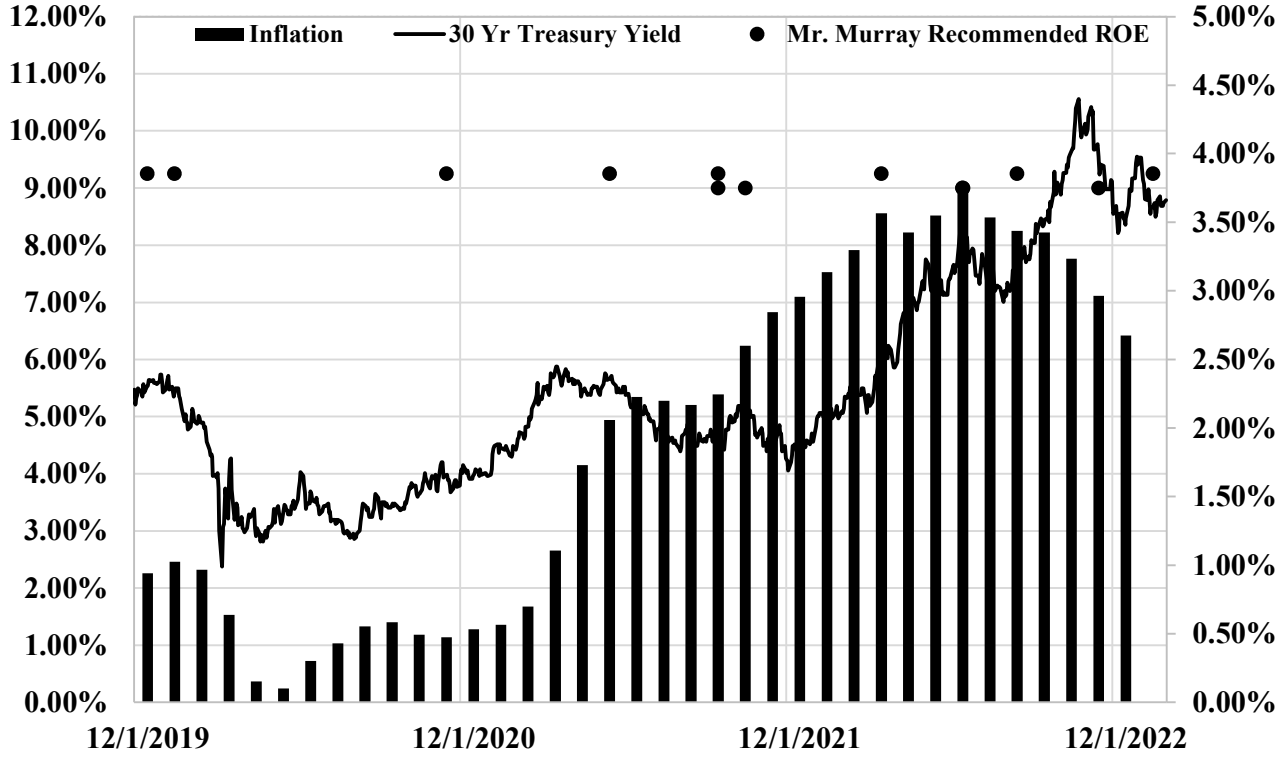
proceeding relative to his results in the Company's 2019 and 2021 electric rate proceedings demonstrates that his recommendation in this case is inconsistent with the facts that result from a comparison of his own work. It appears Mr. Murray has decided that he is going to recommend an ROE of either 9.00 percent or 9.25 percent irrespective of the effect on the cost of equity of changing capital market conditions.

Q: Have you compared Mr. Murray's ROE recommendations and capital market conditions since 2019?

A: Yes, I have. As recently highlighted in Spire Missouri Inc.'s just-completed rate case,[84] and as shown in Figure 9, Mr. Murray has consistently recommended an ROE of 9.00 percent to 9.25 percent, regardless of market conditions, since 2019. In addition, Mr. Murray has recommended an equity ratio no higher than 48.00 percent in any of these cases. Given Mr. Murray's cost of equity estimates for Ameren Missouri are unreasonably low based on a comparison to recently authorized ROEs for vertically-integrated electric utilities, and his apparent disregard for changing capital market conditions in his recommended ROE, this demonstrates that Mr. Murray's ROE recommendations are highly arbitrary.

[84] Missouri Public Service Commission, Docket No. GR-2022-0719, Rebuttal Testimony of Adam Woodard, October 7, 2022, Schedule AWW-R1.

FIGURE 9: MR. MURRAY RECOMMENDED ROES RELATIVE TO 30-YEAR TREASURY BOND YIELDS AND INFLATION



VII.A. Proxy Group

Q: Please summarize the composition of Mr. Murray's proxy group.

A: Mr. Murray relies on a broad proxy group of utilities classified as "regulated and "mostly regulated" as compiled by Edison Electric Institute ("EEI").[85] In addition, he develops model scenarios that consider the subsets of this broad proxy group that have less than 10 percent of their operations exposed to competitive markets and also the companies that he has consistently followed in electric rate cases since

[85] Murray Direct Testimony, at 32.

2012/2014. The specific companies that compose these two smaller proxy groups is not disclosed in his testimony.

Q: What is your conclusion regarding Mr. Murray's proxy group?

A: My primary conclusion is that the composition of the proxy group is not a significant driver in the current proceeding in the development of Mr. Murray's cost of equity estimation models. While the proxy group relied upon is broad and includes companies that may be less comparable to Ameren Missouri, particularly those that are only electric distribution companies, I do not believe that the proxy group is the primary driver of the differences in our results. Therefore, I have limited my response on this issue to narrow the issues to those that are causing the unreasonably low cost of equity results of Mr. Murray's multi-stage DCF and CAPM analyses.

VII.B. Multi-Stage DCF Analysis

Q: Please explain how Mr. Murray conducts his multi-stage DCF analysis.

A: Mr. Murray's multi-stage DCF analysis includes three stages, the first two of which have defined time horizons, while the third assumes cash flows in perpetuity. In the first stage, Mr. Murray relies on analyst estimates of annual DPS and EPS that were available for the next three to four years. In the final year of the first stage (*i.e.*, 2026), Mr. Murray calculates the estimated dividend payout ratio based on the analysts' estimated annual DPS and EPS. His second stage then models an equal percentage change in the dividend payout ratio from the end of the first stage until the terminal year (*i.e.*, 2037), where Mr. Murray assumes a payout ratio that retains sufficient earnings to ensure each company in his group maintains a perpetual

growth rate of 3.0 percent.[86] Mr. Murray conducts scenarios on the long-term growth rate in his multi-stage DCF analysis for Ameren ranging from 2.5 percent to 3.5 percent.

For the proxy group, Mr. Murray's multi-stage DCF produces a cost of equity estimate ranging from 7.65 percent to 7.89 percent, depending on the proxy group considered.[87] For Ameren, his multi-stage DCF analysis produces a cost of equity estimate of 7.32 percent to 7.62 percent.[88]

Q: Does Mr. Murray's multi-stage DCF analysis indicate the cost of equity has increased for utilities?

A: Yes, it does. While I disagree with the specification of Mr. Murray's multi-stage DCF model, as previously discussed and as shown in Figure 8, Mr. Murray's multi-Stage DCF results in the current proceeding are 50 to 57 basis points greater than his multi-stage DCF results in the Company's 2021 electric rate proceeding, and 79 to 115 basis points greater than his multi-stage DCF results in the Company's 2019 electric rate proceeding. Additionally, while Mr. Murray contends that he considered the 9.25 percent authorized ROE in the 2019 Empire Case when developing his recommended ROE for Ameren Missouri,[89] had he compared the results of his multi-stage DCF analysis in the current proceeding to the results of his multi-stage DCF

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[86] Murray Direct Testimony, at 32.

[87] Murray Direct Testimony, DM-D-3-1.

[88] Murray Direct Testimony, at DM-D-2-1 and DM-D-2-2.

[89] Murray Direct Testimony, at 2.

analysis in the 2019 Empire Case, he would have concluded that the cost of equity has increased significantly. Specifically, as shown in Figure 10, comparing the results of his multi-stage DCF analyses in these two cases suggests an increase in the cost of equity of approximately 100 basis points. Despite the change in his model results, and his recognition that changes in capital market conditions indicate the cost of equity has increased since the 2019 Empire Case,[90] Mr. Murray recommends the same ROE for Ameren Missouri in this proceeding as his ROE recommendation in the 2019 Empire Case.

FIGURE 10: COMPARISON OF MR. MURRAY'S MULTI-STAGE DCF RESULTS – CURRENT PROCEEDING AND 2019 EMPIRE CASE

Methodology	2019 Empire Case	Current Rate Case
Multi-Stage DCF	6.5% - 6.75%[91]	7.33% - 7.89%

Q: Why is Mr. Murray not recommending an ROE for Ameren Missouri that is greater than his recommendation in the 2019 Empire Case if he concludes that the cost of capital has increased?

A: Mr. Murray contends that, while the cost of equity may have increased since the 2019 Empire Case, the cost of equity has not increased since the Commission awarded Ameren Missouri an ROE of 9.53 percent in Case No. ER-2014-0258 in 2015.[92] According to Mr. Murray, the dividend yield for the electric utility industry ranged from 3.0 to 3.5 percent from Spring 2021 to Fall 2022, while electric utility

[90] Murray Direct Testimony, at 2.

[91] Docket No. ER-2019-0374, Direct Testimony of David Murray, January 15, 2020, at 35.

[92] Murray Direct Testimony, at 2.

dividend yields were "consistently" higher than 3.5 percent in 2015. Thus, Mr. Murray concludes if growth and the dividend payout ratio were assumed to remain relatively stable, the lower dividend yield would support a reduction in the 9.53 percent ROE previously awarded to Ameren Missouri in 2015 by 25 basis points.[93]

Q: What is your concern with Mr. Murray's comparison of electric utility dividend yields between 2015 and 2022?

A: I have several concerns with Mr. Murray's comparison. First, while Mr. Murray claims that the cost of equity has decreased between 2015 and 2022, he recommended an ROE of 9.25 percent in both Case No. ER-2014-0258 (*i.e.*, the 2014/2015 Ameren Missouri Rate Case) and in the current proceeding.[94] The fact that his recommendation did not change further supports the conclusion that Mr. Murray does not actually consider the effect of capital market conditions and instead regularly and arbitrarily recommends an ROE in the range of 9.00 percent to 9.25 percent.

Second, Mr. Murray indicates that the calculated average dividend yields are for the electric utility industry. However, Mr. Murray does not rely on his EEI electric utility proxy group of 39 companies to develop the dividend yield chart shown on page 21

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[93] Murray Direct Testimony, at 21.

[94] Case No. ER-2014-0258, Staff Revenue Requirement Cost of Service Report, December 5, 2014, at 10-11.

of his testimony, but instead he relies on a subgroup of 12 electric utilities.[95] Mr. Murray provides no indication as to how he arrived at his selected electric utility subgroup nor does he indicate why this subgroup would be representative of the electric industry.

Lastly, and most importantly, Mr. Murray's comparison is biased. Specifically, Mr. Murray compares the range of electric utility dividend yields for 2015 to the range of electric utility dividends yield for 2021 to 2022. However, the more appropriate comparison is to compare the average electric utility dividend yield for the analytical period that Mr. Murray relied on in his testimony in the 2014/2015 Ameren Missouri Rate Case (*i.e.*, August 2014 through October 2014) and the average electric utility divided yield for the analytical period that he relies on in the current proceeding (*i.e.*, October 2022 to December 2022). As shown in Figure 11, using the data that Mr. Murray relied on to develop his chart of electric utility dividend yields on page 21 of his testimony, the average electric utility dividend yield for October 2022 to December 2022 is the exact same as with the average electric utility dividend yield for August 2014 through October 2014. Therefore, based on Mr. Murray's own analysis, the cost of equity has not declined since the 2014/2015 Ameren Missouri Rate Case.

[95] The subgroup consists of Alliant Energy Corporation, American Electric Power Company, CMS Energy Corporation, DTE Energy Company, IDACORP, Inc., OGE Energy Corp., Pinnacle West Capital Corporation, PNM Resources, Inc., Portland General Electric Company, The Southern Company, WEC Energy Group, Inc., and Xcel Energy Inc.

FIGURE 11: COMPARISON OF MR. MURRAY'S ELECTRIC UTILITY DIVIDEND YIELDS – AMEREN MISSOURI'S 2015 AND CURRENT RATE CASES[96]

Methodology	2014/2015 Ameren Missouri Rate Case	Current Rate Case
Electric Utility Dividend Yield	3.55%	3.55%

Q: Are there capital market indicators that suggest the cost of equity has increased since the 2014/2015 Ameren Missouri Rate Case?

A: Yes, there are. As I previously discussed in Section V, utility dividends yields are likely currently too low and do not fully reflect the recent increase in interest rates that has occurred during 2022. This can be seen in Figure 3 previously, which shows that, counter to historical averages, the yields on long-term government bonds currently exceed the dividend yields of utilities. Therefore, it is important to also compare additional market indicators such as inflation and interest rates that have an effect on the cost of equity of electric utilities. As shown in Figure 12, the yield on the 30-year Treasury bond increased 61 basis points and year-over-year ("YOY") inflation has increased 481 basis points since the analytical period relied on by Mr. Murray in the 2014/2015 Ameren Missouri Rate Case. Based on these changes in market conditions, it is unreasonable for Mr. Murray to suggest that Ameren Missouri's ROE should decrease from the 9.53 percent return that was authorized in the 2014/2015 Ameren Missouri Rate Case.

[96] Mr. Murray's workpaper titled: Murray Charts in Test Electric and Ameren Valuations and Bond Yield Info.xlsx.

FIGURE 12: COMPARISON OF MARKET CONDITIONS BETWEEN THE COMPANY'S 2015 AND CURRENT RATE CASES

	Oct-14	Dec-22	Basis Point Increase
10-year Treasury Bond Yield	2.37%	3.65%	129
30-year Treasury Bond Yield	3.09%	3.71%	61
Y-o-Y Inflation	1.61%	6.42%	481

Q: Does Staff witness Dr. Won also conclude that the cost of equity has increased since the 2019 Empire's Case?

A: Yes. As discussed, Dr. Won compares the DCF result at the time of the 2019 Empire Case to his DCF result currently for purposes of his ROE recommendation for the Company in the current proceeding. Since the DCF result increased 34 basis points, Dr. Won concludes that the authorized ROE for Ameren Missouri should increase from the 9.25 percent ROE that was authorized in the 2019 Empire Case.[97]

Q: In addition to the issues you have just discussed, are the results of Mr. Murray's multi-stage DCF model reasonable?

A: No. The results of Mr. Murray's multi-stage DCF analysis are so low as to be unreasonable and are not reflective of the cost of equity. The results of Mr. Murray's multi-stage DCF model are well below any ROE authorized for a vertically-integrated electric utility in the last 40 years, which provides reasonable context that he has either failed to consider or rejected such prior authorizations. The *Hope* and *Bluefield* decisions, which Mr. Murray acknowledges are standards to be upheld,

[97] Won Direct Testimony, at 4.

require the authorized return to be just and reasonable, as well as comparable to other returns available to investors in companies with similar risk. [98] Mr. Murray's multi-stage DCF results clearly violate this standard.

Q: Please summarize Mr. Murray's opinion as to the difference between authorized ROEs and the cost of equity.

A: Mr. Murray attempts to reconcile the difference between the results of his ROE estimation models and his recommendation by suggesting that average allowed ROEs have been greater than the cost of equity. Therefore, according to Mr. Murray, the results of the modern financial models must be reconciled with the principles of *Hope* and *Bluefield* that require the return to be just and reasonable and commensurate to the return available to investors in assets of similar risk.[99] Thus, Mr. Murray develops a zone of reasonableness based on recent authorized returns and prior Commission guidance.

Q: Do you agree with Mr. Murray that authorized ROEs are overstating the cost of equity?

A: No, I do not. Mr. Murray's conclusion is solely reliant on the assumption that he has appropriately specified the multi-stage DCF model, even though it produces a result that he does not rely on in setting his recommended ROE. Mr. Murray's specification

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[98] Murray Direct Testimony, at 4-5.

[99] *Id*.

of and reliance on the multi-stage DCF model to estimate the cost of equity is, however, incorrect for several reasons.

First, while Mr. Murray uses current electric utility stock prices in his multi-stage DCF model, he has failed to account for the fact that, as discussed previously, equity analysts expect electric utilities over the near term to underperform due to the recent increase in interest rates and the expectation that interest rates will remain elevated. As shown in Schedule AEB-R1, Attachment 12, Zacks' recommendation for investors is either "hold" or "sell" for 84.62 percent of the electric utilities included in Mr. Murray's proxy group with an average combined Value, Growth, and Momentum ("VGM") rating from Zacks of "C" (which is based on a rating from "A" to "F" such as grading in school). While Zacks has noted that stocks ranked as "Hold" have historically only slightly underperformed the S&P 500, the combination of the "Hold" rating with a "C" VGM rating indicates Zacks expects Mr. Murray's proxy group to underperform over the near term.[100] In the case of Mr. Murray's multi-stage DCF, if electric utility stock prices decline going forward, the amount needed to be paid by an investor to capture the benefit of future dividends declines, thereby increasing the cost of equity. In other words, by failing to account for expected lower electric utility stock prices going forward, Mr. Murray's multi-stage DCF model understates the cost of equity.

[100] Zacks Investment Research, "The Zacks Rank Guide," 2022.

Second, Mr. Murray relies on a long-term EPS growth rate of 2.50 percent to 3.50 percent in his multi-stage DCF model, which he notes is based on his review of historical growth rate data from the Moody's electric utility index, a sample of electric utility companies whose data is available from Value Line and reports from equity analysts.[101] However, Mr. Murray's long-term growth rate assumption is not consistent with the stock prices that he relies on to calculate his multi-stage DCF model. In fact, the basis for the current valuation of utilities is the expectation that utilities will sustain current earnings growth rates for the foreseeable future. Therefore, equity analysts' current views on the valuation of utilities are strongly based on the projections of earnings growth, which are in turn based in part on the ROEs that are authorized for those utilities' operating subsidiaries. Therefore, Mr. Murray's long-term EPS growth rate in his multi-stage DCF also understates the cost of equity.

[101] Murray Direct Testimony, at 29.

Q: Have you reviewed recent equity analyst reports for electric utilities?

A: Yes, I have. **

A:

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[102]

[102]

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[redacted][103]

[redacted]** As noted above, a decline in the valuation of the company would result in an increase in the DCF results.

As a result, given that growth rates in earnings are expected to be much greater than Mr. Murray's long-term growth rate assumption of 3.00 percent, it is reasonable to conclude that investors would not pay for the current valuations of electric utilities for a growth rate that is well below the growth rate they expect, meaning the utility stock prices would have to be lower and thus their dividend yields higher.

103 [redacted]

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Further, if regulatory commissions were to lower the ROE for utilities to the results produced by Mr. Murray's multi-stage DCF analysis, which are significantly lower than currently or previously authorized ROEs, this would likely significantly lower equity analysts' earnings growth projections and thus the valuations of electric utilities.

Q: Has Mr. Murray acknowledged that the long-term growth rate assumption could have a significant effect on the result of the multi-stage DCF model?

A: Yes, Mr. Murray acknowledged in his testimony on behalf of Staff in the 2014/2015 Ameren Missouri Rate Case that the, "[c]ost of equity estimates using multi-stage DCF methodologies are **extremely sensitive** to the assumed perpetual growth rate."[104] As I have demonstrated, investors expect the long-term growth rate for utilities to exceed the long-term growth rate range of 2.50 percent to 3.50 percent that he has relied on for his multi-stage DCF model. Therefore, Mr. Murray's reliance on a low long-term growth rate with the current stock prices of Ameren and the companies in his proxy group results in a significantly understated cost of equity estimate. If Mr. Murray were to assume a long-term growth rate more consistent with current earnings growth projections, he would have obtained a much higher ROE estimate for Ameren and the proxy group.

[104] Missouri Public Service Commission, Case No. ER-2014-0258, Staff Cost of Service Report, December 5, 2014, at 34.

Q: **

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[redacted]**

Q: What specification of the DCF model do you believe is most appropriate for estimating the cost of equity for Ameren Missouri?

A: A constant growth DCF model is appropriate for the utility industry because utilities are considered a mature industry as a result of their regulated status and relatively stable demand. Thus, financial projections such as earnings growth rates are also likely to be relatively stable over the long-term. This is consistent with the views of equity analysts that project electric utilities will be able to sustain earnings growth projections over the long-term. Thus, Mr. Murray should have considered the constant growth form of the DCF model, which would have reflected long-term growth rates that more closely support the share prices he relies on to calculate his multi-stage DCF analysis. However, the constant growth DCF model, which relies on current stock price valuations, still understates the forward-looking cost of equity during the period that Ameren Missouri's rates will be in effect because utility valuations are expected to decline over the near term, albeit to a much lesser degree than the multi-stage DCF model as specified by Mr. Murray.

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VII.C. CAPM Analysis

Q: Please summarize Mr. Murray's application of the CAPM.

A: Mr. Murray develops three separate specifications of the CAPM analysis. The first CAPM analysis uses a risk-free rate that is based on the average yield on the 20-year Treasury bond for the two months ending November 30, 2022,[107] recalculated betas for Ameren and the electric utility proxy group, and a market risk premium of 6.00 percent, which Mr. Murray contends is "similar to historical spreads and estimates provided by sources, such as *Kroll*".[108] The second CAPM analysis uses a risk-free rate based on the average yield on the 30-year Treasury bond for the two months ending November 30, 2022,[109] and the same recalculated betas and market risk premium as in his first CAPM analysis.[110] Finally, the third CAPM analysis uses *Kroll*'s risk-free rate, which is currently the spot yield on the 20-year Treasury bond since the spot yield currently exceeds *Kroll*'s normalized risk-free rate, recalculated betas for Ameren and the electric utility proxy group, and a market risk premium of 6.00 percent as reported by *Kroll*.[111] The results of Mr. Murray's CAPM analyses

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[107] DM-D-4-1 and Murray workpaper titled: Direct Schedules - Case No. ER-2022-0337.

[108] DM-D-4-1 note for Column 3.

[109] DM-D-4-2 and Murray workpaper titled: Direct Schedules - Case No. ER-2022-0337.

[110] DM-D-4-2 note for Column 3.

[111] DM-D-4-3 note for Column 1 cites to the *Kroll's* Most Recent Guidance on Normalized Risk-free Rate as of October 18, 2022.

range from 8.52 percent to 9.05 percent.[112] Ultimately, Mr. Murray concludes that his CAPM analyses support a cost of equity range of 8.5 percent to 8.8 percent.[113]

Q: Do you agree with the CAPM analyses conducted by Mr. Murray?

A: No. Beyond the fact that the results of his CAPM analyses do not support his recommended ROE for the Company in this proceeding, as I discussed earlier with respect to his DCF analysis, a significant and overarching problem with Mr. Murray's CAPM analyses is that the market risk premia he relies on are not reasonable.

Q: Does Mr. Murray's market risk premium suffer from similar issues that you have identified in your response to Dr. Won?

A: Yes. Mr. Murray relies on the historical geometric mean and historical arithmetic mean equity risk premia from 1926 to 2021 published by *Kroll* just as Dr. Won has done.[114] As discussed in my response to Dr. Won, these historical market risk premia are not appropriate for the same following reasons:

- Mr. Murray's historical estimates of the market risk premium are based on the average of long-term historical data, and in developing these market risk premium estimates, he fails to reflect the inverse relationship between interest rates and the market risk premium (*i.e.*, as interest rates decrease, the market risk premium increases and vice versa), which significantly understate his CAPM results.
- For his historical market risk premium estimates, Mr. Murray has calculated his historical market risk premium as the difference between the market return and the total return on long-term government bonds when he should have instead adjusted the market return by the *income-only* return on long-term government bonds. While I disagree with the use of a historical market

[112] DM-D-4-1, DM-D-4-2, DM-D-4-3.

[113] Murray Direct Testimony, at 36.

[114] Murray Direct Testimony, at 34.

risk premium for the forward-looking CAPM analysis, if a historical market risk premium is calculated correctly, the long-term average *income-only* return should be deducted from the long-term average return on large company stocks, not the *total* return (*i.e*., income return, capital appreciation return and reinvestment return) on long-term government bonds.

- Mr. Murray has incorrectly relied on the geometric mean return on the S&P 500 and total return on long-term government bonds to calculate one of his historical market risk premium estimates. The arithmetic mean return, which would be the appropriate calculation, assumes that each periodic return is an independent observation and, therefore, incorporates uncertainty into the calculation of the long-term average, which is appropriate in an analysis of annual market returns. The geometric mean return assumes a constant return over the period between the beginning and end points of the analysis, which is inconsistent with how actual returns occur in the market.

Q: Do you have any concerns with Mr. Murray's consideration of *Kroll*'s recommended market risk premium of 6.0 percent?

A: Yes, I do. In fact, Mr. Murray's consideration of *Kroll's* recommended market risk premium is inappropriate for one of the reasons discussed above in regards to the historical market risk premium. Given the current yields on Treasury bonds are lower than long-term average yields, *Kroll's* recommended market risk premium of 6.0 percent does not reflect the inverse relationship between interest rates and the market risk premium. Based on historical data published by *Kroll*, the market risk premium from 1926-2021 is 7.46 percent.[115] The historical income-only return on long-term government bonds used to calculate the historical market risk premium over the same period has been approximately 4.87 percent, while in comparison,

[115] The market risk premium from 1926-2021 is calculated as the average return on large company stocks from 1926-2021 minus the average income only return on long-term government bonds from 1926-2024 (i.e., 12.34 percent – 4.87 percent = 7.46 percent). Source: *Kroll*, Valuation Handbook: Guide to Cost of Capital, 2022.

the current yield on the 20-year Treasury bond relied on by Mr. Murray is 4.25 percent. Because current interest rates on long-term government bonds are below the historical average of 4.87 percent, the inverse relationship between interest rates and the market risk premium implies that the market risk premium should be above the long-term historical average of 7.46 percent. In contrast, *Kroll's* recommended market risk premium of 6.0 percent suggests that the expected market risk premium is currently 146 basis points lower than the historical average market risk premium of 7.46 percent.

Q: Do you have any other concerns with the market risk premium of 6.0 percent relied on by Mr. Murray?

A: Yes. As shown in Figure 13, the implied market returns for the market risk premia cited by Mr. Murray range from 10.02 percent to 10.25 percent which is well below the recent historical returns for large company stocks that Mr. Murray also considers in establishing his market risk premium.

FIGURE 13: MR. MURRAY'S IMPLIED MARKET RETURNS[116]

Description	Amount	Source
Murray CAPM 1		
MRP	6.00%	Historical/Equity Analyst
Risk-Free Rate	4.25%	20-Year Treasury bond yield
Implied Market Return	10.25%	
Murray CAPM 2		
MRP	6.00%	Historical/Equity Analyst
Risk-Free Rate	4.02%	30-Year Treasury bond yield
Implied Market Return	10.02%	
Murray CAPM 3		
MRP	6.00%	Kroll Recommended
Risk-Free Rate	4.25%	Kroll Recommended
Implied Market Return	10.25%	

As shown in Figure 14, the actual average market return for large company stocks from 2009 to 2021 (*i.e.*, the period after the Great Recession of 2008/09) was 16.55 percent as reported by *Kroll*. Moreover, the average return on large company stocks from 1926-2021 was 12.34 percent. The implied market returns considered by Mr. Murray are well below and cannot be reconciled with both long-term historical and more recent returns for the market.

[116] DM-D-4-1 through DM-D-4-3.

FIGURE 14: TOTAL RETURN FOR LARGE COMPANY STOCKS – 2009-2021[117]

Year	Large Company Stock Total Return
2009	26.46%
2010	15.06%
2011	2.11%
2012	16.00%
2013	32.39%
2014	13.69%
2015	1.38%
2016	11.96%
2017	21.83%
2018	-4.38%
2019	31.49%
2020	18.40%
2021	28.70%
Average	**16.55%**

Q: What is your conclusion regarding Mr. Murray's CAPM analysis?

A: My conclusion is that Mr. Murray's CAPM results of 8.52 percent to 9.05 percent are not reasonable estimates of the cost of equity for Ameren Missouri. Similar to his multi-stage DCF analysis, Mr. Murray's misspecification of the CAPM has resulted in the incorrect conclusion that the cost of equity is well below recently authorized ROEs for vertically-integrated electric utilities. In particular, Mr. Murray's CAPM analysis fails to consider the inverse relationship between interest rates and the market risk premium. This results in: (1) a market risk premium that is well below the historical market risk premium using large company stocks (7.46 percent); and (2) an implied market return that is well below the long-term average total return for

[117] *Kroll*, Cost of Capital Navigator.

large company stocks since 1926 and more recent market return for large company stocks, both as reported by *Kroll*. As such, the results of Mr. Murray's CAPM analysis are not representative of the forward-looking cost of equity for Ameren Missouri in this proceeding.

VII.D. "Rule of Thumb" Risk Premium

Q: Please summarize Mr. Murray's "rule of thumb" risk premium analysis.

A: The "rule of thumb" methodology that Mr. Murray relies on is similar to the approach also relied on by Dr. Won, which relies on an estimated market risk premium of 3.0 percent to 4.0 percent plus Ameren Missouri's long-term bond yield. However, Mr. Murray selects the low end of the "rule of thumb" risk premium range of 3.0 percent because he contends that investors view utilities as bond "surrogates/ substitutes."[118] Mr. Murray notes that the current yield on Ameren Missouri's long-term bonds has ranged from approximately 5.00 percent to 5.25 percent, which when combined with the 3.0 percent risk premium, results in a ROE range for Ameren Missouri of 8.00 percent to 8.25 percent.[119] While Mr. Murray reports the result of this analysis, he has recommended an ROE that is 100 to 125 basis points higher than his "rule of thumb" approach.

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[118] Murray Direct Testimony, at 37.

[119] *Id*.

Q: Do you agree with this methodology?

A: No. Mr. Murray's "rule of thumb" analysis suffers from the same deficiencies as Dr. Won's similar analysis. In addition, the overly simplistic nature of this approach is highlighted by comparing Mr. Murray's "rule of thumb" result in Ameren Missouri's 2021 rate proceeding to his result in this proceeding relative to his recommended ROEs in each case. Specifically, as shown in Figure 15, while the result of Mr. Murray's "rule of thumb" approach has increased significantly (*i.e.*, by 225 to 250 basis points) from the prior case to the current case, his recommended ROE for Ameren Missouri has only increased 25 basis points from 9.00 percent to 9.25 percent.

FIGURE 15: COMPARISON OF MR. MURRAY'S "RULE OF THUMB" RESULTS

	Mr. Murray "Rule of Thumb" Results	Mr. Murray ROE Recommendation
Ameren Missouri's 2021 Rate Case	5.75%	9.00%
Current Rate Case	8.00% to 8.25%	9.25%

Q: Does this conclude your rebuttal testimony?

A: Yes.

SUMMARY OF ROE ANALYSES RESULTS

	Constant Growth DCF		
	Minimum Growth Rate (Median)	Average Growth Rate (Median)	Maximum Growth Rate (Median)
30-Day Average	7.92%	9.42%	10.47%
90-Day Average	7.98%	9.42%	10.55%
180-Day Average	7.90%	9.35%	10.42%
Constant Growth Average	7.93%	9.40%	10.48%
	CAPM		
	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
Value Line Beta	11.52%	11.54%	11.54%
Bloomberg Beta	10.99%	11.02%	11.02%
Long-term Avg. Beta	10.47%	10.52%	10.52%
	ECAPM		
Value Line Beta	11.80%	11.81%	11.81%
Bloomberg Beta	11.40%	11.42%	11.42%
Long-term Avg. Beta	11.01%	11.05%	11.05%
	Bond Yield Plus Risk Premium		
	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
Risk Premium Results	10.23%	10.31%	10.32%

30-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 EPS Growth	Yahoo! Finance EPS Growth	Zacks EPS Growth	Average Growth Rate	ROE - Minimum Growth Rate	ROE - Average Growth Rate	ROE - Maximum Growth Rate
ALLETE, Inc.	ALE	$2.60	$65.18	3.99%	4.15%	6.00%	8.70%	9.30%	8.00%	10.11%	12.15%	13.47%
Alliant Energy Corporation	LNT	$1.71	$55.33	3.09%	3.18%	6.00%	5.53%	5.90%	5.81%	8.71%	8.99%	9.18%
American Electric Power Company, Inc.	AEP	$3.32	$95.32	3.48%	3.59%	6.50%	6.18%	6.10%	6.26%	9.69%	9.85%	10.10%
Duke Energy Corporation	DUK	$4.02	$100.46	4.00%	4.11%	5.00%	6.15%	5.50%	5.55%	9.10%	9.66%	10.27%
Entergy Corporation	ETR	$4.28	$114.57	3.74%	3.84%	4.00%	6.19%	6.80%	5.66%	7.81%	9.50%	10.66%
Evergy, Inc.	EVRG	$2.45	$60.86	4.03%	4.13%	7.50%	2.43%	5.30%	5.08%	6.50%	9.20%	11.68%
IDACORP, Inc.	IDA	$3.16	$107.53	2.94%	2.99%	4.00%	3.40%	3.40%	3.60%	6.39%	6.59%	7.00%
NextEra Energy, Inc.	NEE	$1.70	$84.45	2.01%	2.12%	10.50%	10.36%	9.70%	10.19%	11.81%	12.30%	12.62%
NorthWestern Corporation	NWE	$2.52	$57.22	4.40%	4.47%	2.50%	4.50%	1.70%	2.90%	6.14%	7.37%	9.00%
OGE Energy Corporation	OGE	$1.66	$39.74	4.17%	4.26%	6.50%	1.90%	5.00%	4.47%	6.11%	8.73%	10.80%
Otter Tail Corporation	OTTR	$1.65	$58.28	2.83%	2.93%	4.50%	9.00%	n/a	6.75%	7.39%	9.68%	11.96%
Portland General Electric Company	POR	$1.81	$48.11	3.76%	3.83%	4.50%	1.39%	5.30%	3.73%	5.18%	7.56%	9.16%
Southern Company	SO	$2.72	$68.76	3.96%	4.07%	6.50%	6.68%	4.00%	5.73%	8.03%	9.80%	10.77%
Xcel Energy Inc.	XEL	$1.95	$69.40	2.81%	2.90%	6.00%	6.80%	6.50%	6.43%	8.89%	9.33%	9.71%
Mean				3.51%	3.61%	5.71%	5.66%	5.73%	5.73%	7.99%	9.34%	10.46%
Median				3.75%	3.84%	6.00%	6.17%	5.50%	5.70%	7.92%	9.42%	10.47%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 30-day average as of December 31, 2022
[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 EPS Growth	Yahoo! Finance EPS Growth	Zacks EPS Growth	Average Growth Rate	ROE - Minimum Growth Rate	ROE - Average Growth Rate	ROE - Maximum Growth Rate
ALLETE, Inc.	ALE	$2.60	$58.55	4.44%	4.62%	6.00%	8.70%	9.30%	8.00%	10.57%	12.62%	13.95%
Alliant Energy Corporation	LNT	$1.71	$55.33	3.09%	3.18%	6.00%	5.53%	5.90%	5.81%	8.71%	8.99%	9.18%
American Electric Power Company, Inc.	AEP	$3.32	$93.15	3.56%	3.68%	6.50%	6.18%	6.10%	6.26%	9.77%	9.94%	10.18%
Duke Energy Corporation	DUK	$4.02	$98.28	4.09%	4.20%	5.00%	6.15%	5.50%	5.55%	9.19%	9.75%	10.37%
Entergy Corporation	ETR	$4.28	$110.52	3.87%	3.98%	4.00%	6.19%	6.80%	5.66%	7.95%	9.65%	10.80%
Evergy, Inc.	EVRG	$2.45	$61.82	3.96%	4.06%	7.50%	2.43%	5.30%	5.08%	6.44%	9.14%	11.61%
IDACORP, Inc.	IDA	$3.16	$104.70	3.02%	3.07%	4.00%	3.40%	3.40%	3.60%	6.47%	6.67%	7.08%
NextEra Energy, Inc.	NEE	$1.70	$82.00	2.07%	2.18%	10.50%	10.36%	9.70%	10.19%	11.87%	12.37%	12.68%
NorthWestern Corporation	NWE	$2.52	$53.61	4.70%	4.77%	2.50%	4.50%	1.70%	2.90%	6.44%	7.67%	9.31%
OGE Energy Corporation	OGE	$1.66	$38.56	4.30%	4.39%	6.50%	1.90%	5.00%	4.47%	6.24%	8.86%	10.94%
Otter Tail Corporation	OTTR	$1.65	$63.11	2.61%	2.70%	4.50%	9.00%	n/a	6.75%	7.17%	9.45%	11.73%
Portland General Electric Company	POR	$1.81	$47.08	3.84%	3.92%	4.50%	1.39%	5.30%	3.73%	5.26%	7.65%	9.25%
Southern Company	SO	$2.72	$69.33	3.92%	4.04%	6.50%	6.68%	4.00%	5.73%	8.00%	9.76%	10.73%
Xcel Energy Inc.	XEL	$1.95	$68.07	2.86%	2.96%	6.00%	6.80%	6.50%	6.43%	8.95%	9.39%	9.76%
Mean				3.60%	3.70%	5.71%	5.66%	5.73%	5.73%	8.07%	9.42%	10.54%
Median				3.86%	3.95%	6.00%	6.17%	5.50%	5.70%	7.98%	9.42%	10.55%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 90-day average as of December 31, 2022
[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 EPS Growth	Yahoo! Finance EPS Growth	Zacks EPS Growth	Average Growth Rate	ROE - Minimum Growth Rate	ROE - Average Growth Rate	ROE - Maximum Growth Rate
ALLETE, Inc.	ALE	$2.60	$58.88	4.42%	4.59%	6.00%	8.70%	9.30%	8.00%	10.55%	12.59%	13.92%
Alliant Energy Corporation	LNT	$1.71	$57.17	2.99%	3.08%	6.00%	5.53%	5.90%	5.81%	8.60%	8.89%	9.08%
American Electric Power Company, Inc.	AEP	$3.32	$94.92	3.50%	3.61%	6.50%	6.18%	6.10%	6.26%	9.70%	9.87%	10.11%
Duke Energy Corporation	DUK	$4.02	$102.51	3.92%	4.03%	5.00%	6.15%	5.50%	5.55%	9.02%	9.58%	10.19%
Entergy Corporation	ETR	$4.28	$112.16	3.82%	3.92%	4.00%	6.19%	6.80%	5.66%	7.89%	9.59%	10.75%
Evergy, Inc.	EVRG	$2.45	$63.90	3.83%	3.93%	7.50%	2.43%	5.30%	5.08%	6.31%	9.01%	11.48%
IDACORP, Inc.	IDA	$3.16	$105.46	3.00%	3.05%	4.00%	3.40%	3.40%	3.60%	6.45%	6.65%	7.06%
NextEra Energy, Inc.	NEE	$1.70	$79.78	2.13%	2.24%	10.50%	10.36%	9.70%	10.19%	11.93%	12.43%	12.74%
NorthWestern Corporation	NWE	$2.52	$54.99	4.58%	4.65%	2.50%	4.50%	1.70%	2.90%	6.32%	7.55%	9.19%
OGE Energy Corporation	OGE	$1.66	$38.79	4.27%	4.37%	6.50%	1.90%	5.00%	4.47%	6.21%	8.83%	10.91%
Otter Tail Corporation	OTTR	$1.65	$64.73	2.55%	2.63%	4.50%	9.00%	n/a	6.75%	7.11%	9.38%	11.66%
Portland General Electric Company	POR	$1.81	$47.92	3.78%	3.85%	4.50%	1.39%	5.30%	3.73%	5.19%	7.58%	9.18%
Southern Company	SO	$2.72	$70.87	3.84%	3.95%	6.50%	6.68%	4.00%	5.73%	7.91%	9.67%	10.65%
Xcel Energy Inc.	XEL	$1.95	$69.67	2.80%	2.89%	6.00%	6.80%	6.50%	6.43%	8.88%	9.32%	9.69%
Mean				3.53%	3.63%	5.71%	5.66%	5.73%	5.73%	8.01%	9.35%	10.47%
Median				3.80%	3.89%	6.00%	6.17%	5.50%	5.70%	7.90%	9.35%	10.42%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 180-day average as of December 31, 2022
[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 (K)
ALLETE, Inc.	ALE	3.71%	0.90	12.63%	8.93%	11.74%	11.96%
Alliant Energy Corporation	LNT	3.71%	0.85	12.63%	8.93%	11.29%	11.63%
American Electric Power Company, Inc.	AEP	3.71%	0.75	12.63%	8.93%	10.40%	10.96%
Duke Energy Corporation	DUK	3.71%	0.85	12.63%	8.93%	11.29%	11.63%
Entergy Corporation	ETR	3.71%	0.95	12.63%	8.93%	12.19%	12.30%
Evergy, Inc.	EVRG	3.71%	0.90	12.63%	8.93%	11.74%	11.96%
IDACORP, Inc.	IDA	3.71%	0.80	12.63%	8.93%	10.85%	11.29%
NextEra Energy, Inc.	NEE	3.71%	0.90	12.63%	8.93%	11.74%	11.96%
NorthWestern Corporation	NWE	3.71%	0.90	12.63%	8.93%	11.74%	11.96%
OGE Energy Corporation	OGE	3.71%	1.00	12.63%	8.93%	12.63%	12.63%
Otter Tail Corporation	OTTR	3.71%	0.85	12.63%	8.93%	11.29%	11.63%
Portland General Electric Company	POR	3.71%	0.85	12.63%	8.93%	11.29%	11.63%
Southern Company	SO	3.71%	0.95	12.63%	8.93%	12.19%	12.30%
Xcel Energy Inc.	XEL	3.71%	0.80	12.63%	8.93%	10.85%	11.29%
Mean						11.52%	11.80%
Median						11.52%	11.80%

Notes:
[1] Source: Bloomberg Professional, as of December 31, 2022
[2] Source: Value Line
[3] Source: Schedule AEB-D2, Attachment 6
[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

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

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE (K)
ALLETE, Inc.	ALE	3.88%	0.90	12.63%	8.75%	11.76%	11.98%
Alliant Energy Corporation	LNT	3.88%	0.85	12.63%	8.75%	11.32%	11.65%
American Electric Power Company, Inc.	AEP	3.88%	0.75	12.63%	8.75%	10.44%	10.99%
Duke Energy Corporation	DUK	3.88%	0.85	12.63%	8.75%	11.32%	11.65%
Entergy Corporation	ETR	3.88%	0.95	12.63%	8.75%	12.20%	12.30%
Evergy, Inc.	EVRG	3.88%	0.90	12.63%	8.75%	11.76%	11.98%
IDACORP, Inc.	IDA	3.88%	0.80	12.63%	8.75%	10.88%	11.32%
NextEra Energy, Inc.	NEE	3.88%	0.90	12.63%	8.75%	11.76%	11.98%
NorthWestern Corporation	NWE	3.88%	0.90	12.63%	8.75%	11.76%	11.98%
OGE Energy Corporation	OGE	3.88%	1.00	12.63%	8.75%	12.63%	12.63%
Otter Tail Corporation	OTTR	3.88%	0.85	12.63%	8.75%	11.32%	11.65%
Portland General Electric Company	POR	3.88%	0.85	12.63%	8.75%	11.32%	11.65%
Southern Company	SO	3.88%	0.95	12.63%	8.75%	12.20%	12.30%
Xcel Energy Inc.	XEL	3.88%	0.80	12.63%	8.75%	10.88%	11.32%
Mean						11.54%	11.81%
Median						11.54%	11.81%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 42, No. 1, January 1, 2023, at 2
[2] Source: Value Line
[3] Source: Schedule AEB-D2, Attachment 6
[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

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2023 - 2027)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.90%	0.90	12.63%	8.73%	11.76%	11.98%
Alliant Energy Corporation	LNT	3.90%	0.85	12.63%	8.73%	11.32%	11.65%
American Electric Power Company, Inc.	AEP	3.90%	0.75	12.63%	8.73%	10.45%	11.00%
Duke Energy Corporation	DUK	3.90%	0.85	12.63%	8.73%	11.32%	11.65%
Entergy Corporation	ETR	3.90%	0.95	12.63%	8.73%	12.20%	12.31%
Evergy, Inc.	EVRG	3.90%	0.90	12.63%	8.73%	11.76%	11.98%
IDACORP, Inc.	IDA	3.90%	0.80	12.63%	8.73%	10.89%	11.32%
NextEra Energy, Inc.	NEE	3.90%	0.90	12.63%	8.73%	11.76%	11.98%
NorthWestern Corporation	NWE	3.90%	0.90	12.63%	8.73%	11.76%	11.98%
OGE Energy Corporation	OGE	3.90%	1.00	12.63%	8.73%	12.63%	12.63%
Otter Tail Corporation	OTTR	3.90%	0.85	12.63%	8.73%	11.32%	11.65%
Portland General Electric Company	POR	3.90%	0.85	12.63%	8.73%	11.32%	11.65%
Southern Company	SO	3.90%	0.95	12.63%	8.73%	12.20%	12.31%
Xcel Energy Inc.	XEL	3.90%	0.80	12.63%	8.73%	10.89%	11.32%
Mean						11.54%	11.81%
Median						11.54%	11.81%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14
[2] Source: Value Line
[3] Source: Schedule AEB-D2, Attachment 6
[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

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

		[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 (K)
ALLETE, Inc.	ALE	3.71%	0.84	12.63%	8.93%	11.18%	11.54%
Alliant Energy Corporation	LNT	3.71%	0.80	12.63%	8.93%	10.83%	11.28%
American Electric Power Company, Inc.	AEP	3.71%	0.77	12.63%	8.93%	10.60%	11.11%
Duke Energy Corporation	DUK	3.71%	0.73	12.63%	8.93%	10.19%	10.80%
Entergy Corporation	ETR	3.71%	0.86	12.63%	8.93%	11.40%	11.71%
Evergy, Inc.	EVRG	3.71%	0.79	12.63%	8.93%	10.74%	11.22%
IDACORP, Inc.	IDA	3.71%	0.81	12.63%	8.93%	10.93%	11.36%
NextEra Energy, Inc.	NEE	3.71%	0.83	12.63%	8.93%	11.10%	11.48%
NorthWestern Corporation	NWE	3.71%	0.87	12.63%	8.93%	11.43%	11.73%
OGE Energy Corporation	OGE	3.71%	0.93	12.63%	8.93%	12.00%	12.16%
Otter Tail Corporation	OTTR	3.71%	0.88	12.63%	8.93%	11.57%	11.83%
Portland General Electric Company	POR	3.71%	0.79	12.63%	8.93%	10.74%	11.22%
Southern Company	SO	3.71%	0.78	12.63%	8.93%	10.68%	11.17%
Xcel Energy Inc.	XEL	3.71%	0.75	12.63%	8.93%	10.40%	10.96%
Mean						10.99%	11.40%
Median						10.88%	11.32%

Notes:
[1] Source: Bloomberg Professional, as of December 31, 2022
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of December 31, 2022
[3] Source: Schedule AEB-D2, Attachment 6
[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

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

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE (K)
ALLETE, Inc.	ALE	3.88%	0.84	12.63%	8.75%	11.20%	11.56%
Alliant Energy Corporation	LNT	3.88%	0.80	12.63%	8.75%	10.87%	11.31%
American Electric Power Company, Inc.	AEP	3.88%	0.77	12.63%	8.75%	10.64%	11.14%
Duke Energy Corporation	DUK	3.88%	0.73	12.63%	8.75%	10.24%	10.84%
Entergy Corporation	ETR	3.88%	0.86	12.63%	8.75%	11.43%	11.73%
Evergy, Inc.	EVRG	3.88%	0.79	12.63%	8.75%	10.78%	11.24%
IDACORP, Inc.	IDA	3.88%	0.81	12.63%	8.75%	10.96%	11.38%
NextEra Energy, Inc.	NEE	3.88%	0.83	12.63%	8.75%	11.13%	11.50%
NorthWestern Corporation	NWE	3.88%	0.87	12.63%	8.75%	11.45%	11.75%
OGE Energy Corporation	OGE	3.88%	0.93	12.63%	8.75%	12.01%	12.17%
Otter Tail Corporation	OTTR	3.88%	0.88	12.63%	8.75%	11.59%	11.85%
Portland General Electric Company	POR	3.88%	0.79	12.63%	8.75%	10.78%	11.24%
Southern Company	SO	3.88%	0.78	12.63%	8.75%	10.72%	11.20%
Xcel Energy Inc.	XEL	3.88%	0.75	12.63%	8.75%	10.44%	10.99%
Mean						11.02%	11.42%
Median						10.92%	11.34%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 42, No. 1, January 1, 2023, at 2
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of December 31, 2022
[3] Source: Schedule AEB-D2, Attachment 6
[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

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2023 - 2027)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.90%	0.84	12.63%	8.73%	11.21%	11.56%
Alliant Energy Corporation	LNT	3.90%	0.80	12.63%	8.73%	10.87%	11.31%
American Electric Power Company, Inc.	AEP	3.90%	0.77	12.63%	8.73%	10.65%	11.14%
Duke Energy Corporation	DUK	3.90%	0.73	12.63%	8.73%	10.25%	10.84%
Entergy Corporation	ETR	3.90%	0.86	12.63%	8.73%	11.43%	11.73%
Evergy, Inc.	EVRG	3.90%	0.79	12.63%	8.73%	10.78%	11.25%
IDACORP, Inc.	IDA	3.90%	0.81	12.63%	8.73%	10.97%	11.38%
NextEra Energy, Inc.	NEE	3.90%	0.83	12.63%	8.73%	11.13%	11.51%
NorthWestern Corporation	NWE	3.90%	0.87	12.63%	8.73%	11.46%	11.75%
OGE Energy Corporation	OGE	3.90%	0.93	12.63%	8.73%	12.01%	12.17%
Otter Tail Corporation	OTTR	3.90%	0.88	12.63%	8.73%	11.59%	11.85%
Portland General Electric Company	POR	3.90%	0.79	12.63%	8.73%	10.79%	11.25%
Southern Company	SO	3.90%	0.78	12.63%	8.73%	10.72%	11.20%
Xcel Energy Inc.	XEL	3.90%	0.75	12.63%	8.73%	10.45%	10.99%
Mean						11.02%	11.42%
Median						10.92%	11.35%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of December 31, 2022
[3] Source: Schedule AEB-D2, Attachment 6
[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 (K)
ALLETE, Inc.	ALE	3.71%	0.79	12.63%	8.93%	10.71%	11.19%
Alliant Energy Corporation	LNT	3.71%	0.75	12.63%	8.93%	10.40%	10.96%
American Electric Power Company, Inc.	AEP	3.71%	0.68	12.63%	8.93%	9.73%	10.46%
Duke Energy Corporation	DUK	3.71%	0.67	12.63%	8.93%	9.64%	10.39%
Entergy Corporation	ETR	3.71%	0.75	12.63%	8.93%	10.36%	10.93%
Evergy, Inc.	EVRG	3.71%	0.95	12.63%	8.93%	12.19%	12.30%
IDACORP, Inc.	IDA	3.71%	0.73	12.63%	8.93%	10.22%	10.83%
NextEra Energy, Inc.	NEE	3.71%	0.73	12.63%	8.93%	10.22%	10.83%
NorthWestern Corporation	NWE	3.71%	0.75	12.63%	8.93%	10.36%	10.93%
OGE Energy Corporation	OGE	3.71%	0.93	12.63%	8.93%	12.01%	12.16%
Otter Tail Corporation	OTTR	3.71%	0.85	12.63%	8.93%	11.29%	11.63%
Portland General Electric Company	POR	3.71%	0.75	12.63%	8.93%	10.40%	10.96%
Southern Company	SO	3.71%	0.66	12.63%	8.93%	9.55%	10.32%
Xcel Energy Inc.	XEL	3.71%	0.66	12.63%	8.93%	9.55%	10.32%
Mean						10.47%	11.01%
Median						10.36%	10.93%

Notes:
[1] Source: Bloomberg Professional, as of December 31, 2022
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-D2, Attachment 6
[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 & VALUE LINE LT AVERAGE BETA

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

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE (K)
ALLETE, Inc.	ALE	3.88%	0.79	12.63%	8.75%	10.75%	11.22%
Alliant Energy Corporation	LNT	3.88%	0.75	12.63%	8.75%	10.44%	10.99%
American Electric Power Company, Inc.	AEP	3.88%	0.68	12.63%	8.75%	9.79%	10.50%
Duke Energy Corporation	DUK	3.88%	0.67	12.63%	8.75%	9.70%	10.43%
Entergy Corporation	ETR	3.88%	0.75	12.63%	8.75%	10.40%	10.96%
Evergy, Inc.	EVRG	3.88%	0.95	12.63%	8.75%	12.20%	12.30%
IDACORP, Inc.	IDA	3.88%	0.73	12.63%	8.75%	10.27%	10.86%
NextEra Energy, Inc.	NEE	3.88%	0.73	12.63%	8.75%	10.27%	10.86%
NorthWestern Corporation	NWE	3.88%	0.75	12.63%	8.75%	10.40%	10.96%
OGE Energy Corporation	OGE	3.88%	0.93	12.63%	8.75%	12.02%	12.17%
Otter Tail Corporation	OTTR	3.88%	0.85	12.63%	8.75%	11.32%	11.65%
Portland General Electric Company	POR	3.88%	0.75	12.63%	8.75%	10.44%	10.99%
Southern Company	SO	3.88%	0.66	12.63%	8.75%	9.61%	10.37%
Xcel Energy Inc.	XEL	3.88%	0.66	12.63%	8.75%	9.61%	10.37%
Mean						10.52%	11.05%
Median						10.40%	10.96%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 42, No. 1, January 1, 2023, at 2
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-D2, Attachment 6
[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 & VALUE LINE LT 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 (2023 - 2027)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.90%	0.79	12.63%	8.73%	10.76%	11.22%
Alliant Energy Corporation	LNT	3.90%	0.75	12.63%	8.73%	10.45%	11.00%
American Electric Power Company, Inc.	AEP	3.90%	0.68	12.63%	8.73%	9.79%	10.50%
Duke Energy Corporation	DUK	3.90%	0.67	12.63%	8.73%	9.71%	10.44%
Entergy Corporation	ETR	3.90%	0.75	12.63%	8.73%	10.41%	10.96%
Evergy, Inc.	EVRG	3.90%	0.95	12.63%	8.73%	12.20%	12.31%
IDACORP, Inc.	IDA	3.90%	0.73	12.63%	8.73%	10.28%	10.86%
NextEra Energy, Inc.	NEE	3.90%	0.73	12.63%	8.73%	10.28%	10.86%
NorthWestern Corporation	NWE	3.90%	0.75	12.63%	8.73%	10.41%	10.96%
OGE Energy Corporation	OGE	3.90%	0.93	12.63%	8.73%	12.02%	12.17%
Otter Tail Corporation	OTTR	3.90%	0.85	12.63%	8.73%	11.32%	11.65%
Portland General Electric Company	POR	3.90%	0.75	12.63%	8.73%	10.45%	11.00%
Southern Company	SO	3.90%	0.66	12.63%	8.73%	9.62%	10.37%
Xcel Energy Inc.	XEL	3.90%	0.66	12.63%	8.73%	9.62%	10.37%
Mean						10.52%	11.05%
Median						10.41%	10.96%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-D2, Attachment 6
[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 - 2022

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Company	Ticker	12/31/2013	12/31/2014	12/31/2015	12/31/2016	12/31/2017	12/31/2018	12/31/2019	12/31/2020	12/31/2021	12/31/2022	Average
ALLETE, Inc.	ALE	0.75	0.80	0.80	0.75	0.80	0.65	0.65	0.85	0.90	0.90	0.79
Alliant Energy Corporation	LNT	0.75	0.80	0.80	0.70	0.70	0.60	0.60	0.85	0.85	0.85	0.75
American Electric Power Company, Inc.	AEP	0.70	0.70	0.70	0.65	0.65	0.55	0.55	0.75	0.75	0.75	0.68
Duke Energy Corporation	DUK	0.65	0.60	0.65	0.60	0.60	0.50	0.50	0.85	0.85	0.85	0.67
Entergy Corporation	ETR	0.70	0.70	0.70	0.65	0.65	0.60	0.60	0.95	0.95	0.95	0.75
Evergy, Inc.	EVRG						NMF	NMF	1.00	0.95	0.90	0.95
IDACORP, Inc.	IDA	0.75	0.80	0.80	0.75	0.70	0.55	0.55	0.80	0.80	0.80	0.73
NextEra Energy, Inc.	NEE	0.70	0.70	0.75	0.65	0.65	0.55	0.55	0.90	0.90	0.95	0.73
NorthWestern Corporation	NWE	0.70	0.70	0.70	0.70	0.70	0.60	0.60	0.90	0.95	0.90	0.75
OGE Energy Corporation	OGE	0.85	0.90	0.95	0.90	0.95	0.85	0.75	1.10	1.05	1.00	0.93
Otter Tail Corporation	OTTR	0.95	0.90	0.85	0.85	0.90	0.75	0.70	0.85	0.90	0.85	0.85
Portland General Electric Company	POR	0.75	0.80	0.80	0.70	0.70	0.60	0.55	0.85	0.90	0.85	0.75
Southern Company	SO	0.55	0.55	0.60	0.55	0.55	0.50	0.50	0.90	0.95	0.90	0.66
Xcel Energy Inc.	XEL	0.65	0.65	0.65	0.60	0.60	0.50	0.50	0.80	0.80	0.80	0.66
Mean		0.73	0.74	0.75	0.70	0.70	0.60	0.58	0.88	0.89	0.88	0.75

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] Average ([1] - [10])

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

[1] Estimated Weighted Average Dividend Yield	1.81%
[2] Estimated Weighted Average Long-Term Growth Rate	10.72%
[3] S&P 500 Estimated Required Market Return	12.63%

STANDARD AND POOR'S 500 INDEX

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
LyondellBasell Industries NV	LYB	325.62	83.03	27,037	0.10%	5.73%	0.01%	3.50%	0.00%
Signature Bank/New York NY	SBNY	62.93	115.22	7,250	0.03%	1.94%	0.00%	16.50%	0.00%
American Express Co	AXP	747.23	147.75	110,404	0.41%	1.41%	0.01%	10.00%	0.04%
Verizon Communications Inc	VZ	4,199.82	39.40	165,473	0.61%	6.62%	0.04%	2.50%	0.02%
Broadcom Inc	AVGO	417.89	559.13	233,653		3.29%		30.00%	
Boeing Co/The	BA	595.98	190.49	113,529					
Caterpillar Inc	CAT	520.41	239.56	124,669	0.46%	2.00%	0.01%	11.00%	0.05%
JPMorgan Chase & Co	JPM	2,933.21	134.10	393,343	1.45%	2.98%	0.04%	5.00%	0.07%
Chevron Corp	CVX	1,933.64	179.49	347,069		3.16%		44.00%	
Coca-Cola Co/The	KO	4,324.51	63.61	275,082	1.01%	2.77%	0.03%	7.50%	0.08%
AbbVie Inc	ABBV	1,768.48	161.61	285,804	1.05%	3.66%	0.04%	4.50%	0.05%
Walt Disney Co/The	DIS	1,823.59	86.88	158,434				30.50%	
FleetCor Technologies Inc	FLT	73.75	183.68	13,547	0.05%			10.50%	0.01%
Extra Space Storage Inc	EXR	133.92	147.18	19,711	0.07%	4.08%	0.00%	4.00%	0.00%
Exxon Mobil Corp	XOM	4,118.29	110.30	454,248		3.30%			
Phillips 66	PSX	472.63	104.08	49,192		3.73%		85.00%	
General Electric Co	GE	1,092.67	65.38	71,444		0.49%		21.00%	
HP Inc	HPQ	982.15	26.87	26,390	0.10%	3.91%	0.00%	12.50%	0.01%
Home Depot Inc/The	HD	1,019.19	315.86	321,920	1.18%	2.41%	0.03%	9.00%	0.11%
Monolithic Power Systems Inc	MPWR	46.94	353.61	16,599		0.85%		23.50%	
International Business Machines Corp	IBM	904.13	140.89	127,382	0.47%	4.68%	0.02%	3.00%	0.01%
Johnson & Johnson	JNJ	2,614.48	176.65	461,849	1.70%	2.56%	0.04%	8.00%	0.14%
McDonald's Corp	MCD	732.42	263.53	193,016	0.71%	2.31%	0.02%	10.50%	0.07%
Merck & Co Inc	MRK	2,535.40	110.95	281,302	1.03%	2.63%	0.03%	8.00%	0.08%
3M Co	MMM	552.74	119.92	66,285	0.24%	4.97%	0.01%	7.50%	0.02%
American Water Works Co Inc	AWK	181.83	152.42	27,714	0.10%	1.72%	0.00%	3.00%	0.00%
Bank of America Corp	BAC	8,022.43	33.12	265,703	0.98%	2.66%	0.03%	8.50%	0.08%
Pfizer Inc	PFE	5,613.32	51.24	287,626	1.06%	3.20%	0.03%	6.50%	0.07%
Procter & Gamble Co/The	PG	2,369.70	151.56	359,151	1.32%	2.41%	0.03%	6.50%	0.09%
AT&T Inc	T	7,127.00	18.41	131,208	0.48%	6.03%	0.03%	1.00%	0.00%
Travelers Cos Inc/The	TRV	234.35	187.49	43,938	0.16%	1.98%	0.00%	6.50%	0.01%
Raytheon Technologies Corp	RTX	1,470.06	100.92	148,359	0.55%	2.18%	0.01%	7.00%	0.04%
Analog Devices Inc	ADI	509.30	164.03	83,540	0.31%	1.85%	0.01%	14.00%	0.04%
Walmart Inc	WMT	2,696.80	141.79	382,379	1.41%	1.58%	0.02%	7.50%	0.11%
Cisco Systems Inc	CSCO	4,108.10	47.26	194,159	0.71%	3.22%	0.02%	9.00%	0.06%
Intel Corp	INTC	4,127.00	26.43	109,077		5.52%			
General Motors Co	GM	1,420.70	33.64	47,792	0.18%	1.07%	0.00%	10.00%	0.02%
Microsoft Corp	MSFT	7,454.47	239.82	1,787,732	6.57%	1.13%	0.07%	16.50%	1.08%
Dollar General Corp	DG	223.58	246.25	55,055	0.20%	0.89%	0.00%	10.00%	0.02%
Cigna Corp	CI	305.74	331.34	101,304	0.37%	1.35%	0.01%	10.00%	0.04%
Kinder Morgan Inc	KMI	2,247.74	18.08	40,639	0.15%	6.14%	0.01%	19.00%	0.03%
Citigroup Inc	C	1,936.85	45.23	87,604	0.32%	4.51%	0.01%	3.50%	0.01%
American International Group Inc	AIG	742.98	63.24	46,986	0.17%	2.02%	0.00%	6.50%	0.01%
Altria Group Inc	MO	1,792.17	45.71	81,920	0.30%	8.23%	0.02%	5.50%	0.02%
HCA Healthcare Inc	HCA	282.72	239.96	67,841	0.25%	0.93%	0.00%	12.50%	0.03%
International Paper Co	IP	355.67	34.63	12,317	0.05%	5.34%	0.00%	13.50%	0.01%
Hewlett Packard Enterprise Co	HPE	1,281.82	15.96	20,458	0.08%	3.01%	0.00%	7.50%	0.01%
Abbott Laboratories	ABT	1,743.57	109.79	191,427	0.70%	1.86%	0.01%	7.00%	0.05%
Aflac Inc	AFL	621.79	71.94	44,732	0.16%	2.34%	0.00%	9.00%	0.01%
Air Products and Chemicals Inc	APD	221.99	308.26	68,430	0.25%	2.10%	0.01%	11.00%	0.03%
Royal Caribbean Cruises Ltd	RCL	255.18	49.43	12,614					
Hess Corp	HES	308.31	141.82	43,724		1.06%			
Archer-Daniels-Midland Co	ADM	549.33	92.85	51,006	0.19%	1.72%	0.00%	13.00%	0.02%
Automatic Data Processing Inc	ADP	414.83	238.86	99,086	0.36%	2.09%	0.01%	10.00%	0.04%
Verisk Analytics Inc	VRSK	156.39	176.42	27,590	0.10%	0.70%	0.00%	13.00%	0.01%
AutoZone Inc	AZO	18.77	2,466.18	46,280	0.17%			14.50%	0.02%
Avery Dennison Corp	AVY	80.97	181.00	14,655	0.05%	1.66%	0.00%	12.00%	0.01%
Enphase Energy Inc	ENPH	135.92	264.96	36,014				26.50%	
MSCI Inc	MSCI	79.96	465.17	37,194	0.14%	1.07%	0.00%	14.50%	0.02%
Ball Corp	BALL	313.92	51.14	16,054		1.56%		21.50%	
Ceridian HCM Holding Inc	CDAY	153.60	64.15	9,853					
Carrier Global Corp	CARR	836.26	41.25	34,496		1.79%			
Bank of New York Mellon Corp/The	BK	808.28	45.52	36,793	0.14%	3.25%	0.00%	6.00%	0.01%
Otis Worldwide Corp	OTIS	416.59	78.31	32,623		1.48%			
Baxter International Inc	BAX	504.12	50.97	25,695	0.09%	2.28%	0.00%	8.00%	0.01%
Becton Dickinson and Co	BDX	284.27	254.30	72,289	0.27%	1.43%	0.00%	4.50%	0.01%
Berkshire Hathaway Inc	BRK/B	1,301.98	308.90	402,182	1.48%			6.00%	0.09%
Best Buy Co Inc	BBY	221.26	80.21	17,748	0.07%	4.39%	0.00%	4.00%	0.00%
Boston Scientific Corp	BSX	1,432.31	46.27	66,273	0.24%			17.00%	0.04%
Bristol-Myers Squibb Co	BMY	2,126.16	71.95	152,977		3.17%			
Brown-Forman Corp	BF/B	309.95	65.68	20,358	0.07%	1.25%	0.00%	14.00%	0.01%
Coterra Energy Inc	CTRA	788.47	24.57	19,373		11.07%			
Campbell Soup Co	CPB	299.47	56.38	16,883	0.06%	2.63%	0.00%	5.00%	0.00%
Hilton Worldwide Holdings Inc	HLT	270.46	126.36	34,175		0.47%			
Carnival Corp	CCL	1,112.71	8.06	8,968					
Qorvo Inc	QRVO	101.39	90.64	9,190	0.03%			14.50%	0.00%
Lumen Technologies Inc	LUMN	1,034.58	5.22	5,401	0.02%			1.50%	0.00%
UDR Inc	UDR	325.54	38.73	12,608	0.05%	3.92%	0.00%	10.50%	0.00%
Clorox Co/The	CLX	123.39	140.33	17,315	0.06%	3.36%	0.00%	7.50%	0.00%
Paycom Software Inc	PAYC	60.02	310.31	18,625				21.00%	

STANDARD AND POOR'S 500 INDEX

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] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
CMS Energy Corp	CMS	290.25	63.33	18,382	0.07%	2.91%	0.00%	6.50%	0.00%
Newell Brands Inc	NWL	413.60	13.08	5,410		7.03%			
Colgate-Palmolive Co	CL	835.21	78.79	65,807	0.24%	2.39%	0.01%	6.50%	0.02%
EPAM Systems Inc	EPAM	57.51	327.74	18,849				20.50%	
Comerica Inc	CMA	130.95	66.85	8,754	0.03%	4.07%	0.00%	9.00%	0.00%
Conagra Brands Inc	CAG	479.26	38.70	18,547	0.07%	3.41%	0.00%	4.00%	0.00%
Consolidated Edison Inc	ED	354.86	95.31	33,822	0.12%	3.32%	0.00%	4.00%	0.00%
Corning Inc	GLW	845.81	31.94	27,015	0.10%	3.38%	0.00%	17.50%	0.02%
Cummins Inc	CMI	141.02	242.29	34,168	0.13%	2.59%	0.00%	8.50%	0.01%
Caesars Entertainment Inc	CZR	214.57	41.60	8,926					
Danaher Corp	DHR	727.96	265.42	193,216	0.71%	0.38%	0.00%	16.00%	0.11%
Target Corp	TGT	460.31	149.04	68,605	0.25%	2.90%	0.01%	12.00%	0.03%
Deere & Co	DE	298.24	428.76	127,872	0.47%	1.12%	0.01%	16.50%	0.08%
Dominion Energy Inc	D	833.28	61.32	51,096	0.19%	4.35%	0.01%	5.50%	0.01%
Dover Corp	DOV	140.35	135.41	19,005	0.07%	1.49%	0.00%	9.00%	0.01%
Alliant Energy Corp	LNT	251.02	55.21	13,859	0.05%	3.10%	0.00%	6.00%	0.00%
Steel Dynamics Inc	STLD	175.57	97.70	17,153	0.06%	1.39%	0.00%	2.00%	0.00%
Duke Energy Corp	DUK	770.00	102.99	79,302	0.29%	3.90%	0.01%	5.00%	0.01%
Regency Centers Corp	REG	171.12	62.50	10,695	0.04%	4.16%	0.00%	12.50%	0.00%
Eaton Corp PLC	ETN	397.70	156.95	62,419	0.23%	2.06%	0.00%	12.00%	0.03%
Ecolab Inc	ECL	284.83	145.56	41,460	0.15%	1.46%	0.00%	10.50%	0.02%
PerkinElmer Inc	PKI	126.32	140.22	17,712	0.07%	0.20%	0.00%	4.00%	0.00%
Emerson Electric Co	EMR	582.30	96.06	55,936	0.21%	2.17%	0.00%	9.50%	0.02%
EOG Resources Inc	EOG	587.39	129.52	76,079		2.55%		26.00%	
Aon PLC	AON	206.85	300.14	62,085	0.23%	0.75%	0.00%	7.50%	0.02%
Entergy Corp	ETR	203.48	112.50	22,892	0.08%	3.80%	0.00%	4.00%	0.00%
Equifax Inc	EFX	122.44	194.36	23,798	0.09%	0.80%	0.00%	7.00%	0.01%
EQT Corp	EQT	367.05	33.83	12,417		1.77%			
IQVIA Holdings Inc	IQV	185.74	204.89	38,056	0.14%			14.50%	0.02%
Gartner Inc	IT	79.02	336.14	26,563	0.10%			18.00%	0.02%
FedEx Corp	FDX	252.40	173.20	43,715	0.16%	2.66%	0.00%	13.00%	0.02%
FMC Corp	FMC	125.97	124.80	15,721	0.06%	1.86%	0.00%	11.00%	0.01%
Brown & Brown Inc	BRO	283.22	56.97	16,135	0.06%	0.81%	0.00%	8.00%	0.00%
Ford Motor Co	F	3,949.64	11.63	45,934		5.16%		33.50%	
NextEra Energy Inc	NEE	1,987.16	83.60	166,127	0.61%	2.03%	0.01%	10.50%	0.06%
Franklin Resources Inc	BEN	500.26	26.38	13,197	0.05%	4.55%	0.00%	4.00%	0.00%
Garmin Ltd	GRMN	191.66	92.29	17,689	0.07%	3.16%	0.00%	6.00%	0.00%
Freeport-McMoRan Inc	FCX	1,429.33	38.00	54,314		1.58%		27.50%	
Dexcom Inc	DXCM	386.26	113.24	43,740					
General Dynamics Corp	GD	274.55	248.11	68,118	0.25%	2.03%	0.01%	9.00%	0.02%
General Mills Inc	GIS	589.61	83.85	49,439	0.18%	2.58%	0.00%	3.50%	0.01%
Genuine Parts Co	GPC	141.16	173.51	24,493	0.09%	2.06%	0.00%	9.00%	0.01%
Atmos Energy Corp	ATO	141.02	112.07	15,804	0.06%	2.64%	0.00%	7.50%	0.00%
WW Grainger Inc	GWW	50.53	556.25	28,107	0.10%	1.24%	0.00%	11.00%	0.01%
Halliburton Co	HAL	908.05	39.35	35,732		1.22%		31.00%	
L3Harris Technologies Inc	LHX	190.40	208.21	39,644	0.15%	2.15%	0.00%	18.00%	0.03%
Healthpeak Properties Inc	PEAK	537.54	25.07	13,476	0.05%	4.79%	0.00%	17.00%	0.01%
Catalent Inc	CTLT	179.96	45.01	8,100				21.00%	
Fortive Corp	FTV	353.81	64.25	22,732	0.08%	0.44%	0.00%	12.00%	0.01%
Hershey Co/The	HSY	146.97	231.57	34,034	0.13%	1.79%	0.00%	9.00%	0.01%
Synchrony Financial	SYF	450.54	32.86	14,805	0.05%	2.80%	0.00%	9.50%	0.01%
Hormel Foods Corp	HRL	546.42	45.55	24,890	0.09%	2.41%	0.00%	6.50%	0.01%
Arthur J Gallagher & Co	AJG	210.84	188.54	39,752	0.15%	1.08%	0.00%	18.50%	0.03%
Mondelez International Inc	MDLZ	1,365.62	66.65	91,019	0.33%	2.31%	0.01%	9.50%	0.03%
CenterPoint Energy Inc	CNP	629.43	29.99	18,877	0.07%	2.53%	0.00%	6.50%	0.00%
Humana Inc	HUM	126.60	512.19	64,843	0.24%	0.62%	0.00%	11.00%	0.03%
Willis Towers Watson PLC	WTW	108.24	244.58	26,473	0.10%	1.34%	0.00%	8.50%	0.01%
Illinois Tool Works Inc	ITW	307.19	220.30	67,673	0.25%	2.38%	0.01%	11.00%	0.03%
CDW Corp/DE	CDW	135.39	178.58	24,178	0.09%	1.32%	0.00%	8.50%	0.01%
Trane Technologies PLC	TT	230.31	168.09	38,712		1.59%			
Interpublic Group of Cos Inc/The	IPG	388.53	33.31	12,942	0.05%	3.48%	0.00%	10.00%	0.00%
International Flavors & Fragrances Inc	IFF	254.96	104.84	26,730	0.10%	3.09%	0.00%	7.50%	0.01%
Generac Holdings Inc	GNRC	63.36	100.66	6,377				23.50%	
NXP Semiconductors NV	NXPI	259.14	158.03	40,951	0.15%	2.14%	0.00%	12.00%	0.02%
Kellogg Co	K	341.28	71.24	24,313	0.09%	3.31%	0.00%	3.50%	0.00%
Broadridge Financial Solutions Inc	BR	117.66	134.13	15,781	0.06%	2.16%	0.00%	9.50%	0.01%
Kimberly-Clark Corp	KMB	337.49	135.75	45,815	0.17%	3.42%	0.01%	5.50%	0.01%
Kimco Realty Corp	KIM	618.46	21.18	13,099	0.05%	4.34%	0.00%	8.50%	0.00%
Oracle Corp	ORCL	2,696.25	81.74	220,392	0.81%	1.57%	0.01%	10.00%	0.08%
Kroger Co/The	KR	715.82	44.58	31,911	0.12%	2.33%	0.00%	6.50%	0.01%
Lennar Corp	LEN	254.77	90.50	23,056	0.08%	1.66%	0.00%	8.50%	0.01%
Eli Lilly & Co	LLY	950.18	365.84	347,613	1.28%	1.24%	0.02%	11.50%	0.15%
Bath & Body Works Inc	BBWI	228.42	42.14	9,625		1.90%		26.50%	
Charter Communications Inc	CHTR	155.67	339.10	52,788				23.00%	
Lincoln National Corp	LNC	169.22	30.72	5,198	0.02%	5.86%	0.00%	11.50%	0.00%
Loews Corp	L	237.43	58.33	13,849	0.05%	0.43%	0.00%	18.50%	0.01%
Lowe's Cos Inc	LOW	604.70	199.24	120,481	0.44%	2.11%	0.01%	12.50%	0.06%
IDEX Corp	IEX	75.42	228.33	17,221	0.06%	1.05%	0.00%	11.00%	0.01%
Marsh & McLennan Cos Inc	MMC	496.01	165.48	82,080	0.30%	1.43%	0.00%	11.00%	0.03%
Masco Corp	MAS	225.53	46.67	10,525	0.04%	2.40%	0.00%	8.00%	0.00%
S&P Global Inc	SPGI	325.80	334.94	109,123	0.40%	1.02%	0.00%	9.50%	0.04%
Medtronic PLC	MDT	1,330.18	77.72	103,382	0.38%	3.50%	0.01%	7.50%	0.03%
Viatris Inc	VTRS	1,212.69	11.13	13,497		4.31%			
CVS Health Corp	CVS	1,313.97	93.19	122,449	0.45%	2.60%	0.01%	6.00%	0.03%
DuPont de Nemours Inc	DD	496.79	68.63	34,095	0.13%	1.92%	0.00%	9.50%	0.01%
Micron Technology Inc	MU	1,091.18	49.98	54,537	0.20%	0.92%	0.00%	13.00%	0.03%
Motorola Solutions Inc	MSI	167.20	257.71	43,090	0.16%	1.37%	0.00%	10.50%	0.02%
Cboe Global Markets Inc	CBOE	106.08	125.47	13,310	0.05%	1.59%	0.00%	10.00%	0.00%
Laboratory Corp of America Holdings	LH	88.60	235.48	20,864	0.08%	1.22%	0.00%	1.50%	0.00%
Newmont Corp	NEM	793.74	47.20	37,464	0.14%	4.66%	0.01%	9.50%	0.01%
NIKE Inc	NKE	1,259.69	117.01	147,396		1.16%		24.00%	

STANDARD AND POOR'S 500 INDEX

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] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
NiSource Inc	NI	406.13	27.42	11,136	0.04%	3.43%	0.00%	9.50%	0.00%
Norfolk Southern Corp	NSC	231.51	246.42	57,050	0.21%	2.01%	0.00%	10.00%	0.02%
Principal Financial Group Inc	PFG	244.68	83.92	20,534	0.08%	3.05%	0.00%	6.00%	0.00%
Eversource Energy	ES	348.31	83.84	29,202	0.11%	3.04%	0.00%	6.50%	0.01%
Northrop Grumman Corp	NOC	153.91	545.61	83,976	0.31%	1.27%	0.00%	6.50%	0.02%
Wells Fargo & Co	WFC	3,810.49	41.29	157,335	0.58%	2.91%	0.02%	12.00%	0.07%
Nucor Corp	NUE	256.54	131.81	33,815	0.12%	1.55%	0.00%	2.50%	0.00%
Occidental Petroleum Corp	OXY	908.91	62.99	57,252		0.83%			
Omnicom Group Inc	OMC	203.92	81.57	16,633	0.06%	3.43%	0.00%	6.50%	0.00%
ONEOK Inc	OKE	446.95	65.70	29,365	0.11%	5.69%	0.01%	11.50%	0.01%
Raymond James Financial Inc	RJF	215.06	106.85	22,980	0.08%	1.57%	0.00%	15.00%	0.01%
PG&E Corp	PCG	1,987.70	16.26	32,320	0.12%			7.50%	0.01%
Parker-Hannifin Corp	PH	128.41	291.00	37,366	0.14%	1.83%	0.00%	15.50%	0.02%
Rollins Inc	ROL	492.47	36.54	17,995	0.07%	1.42%	0.00%	10.50%	0.01%
PPL Corp	PPL	736.32	29.22	21,515	0.08%	3.08%	0.00%	3.00%	0.00%
ConocoPhillips	COP	1,246.07	118.00	147,036	0.54%	0.59%	0.00%	20.00%	0.11%
PulteGroup Inc	PHM	227.82	45.53	10,373	0.04%	1.41%	0.00%	7.00%	0.00%
Pinnacle West Capital Corp	PNW	113.14	76.04	8,603	0.03%	4.55%	0.00%	0.50%	0.00%
PNC Financial Services Group Inc/The	PNC	403.32	157.94	63,700	0.23%	3.80%	0.01%	12.00%	0.03%
PPG Industries Inc	PPG	235.03	125.74	29,552	0.11%	1.97%	0.00%	4.00%	0.00%
Progressive Corp/The	PGR	585.00	129.71	75,880	0.28%	0.31%	0.00%	6.50%	0.02%
Public Service Enterprise Group Inc	PEG	498.95	61.27	30,571	0.11%	3.53%	0.00%	4.50%	0.01%
Robert Half International Inc	RHI	108.50	73.83	8,010	0.03%	2.33%	0.00%	10.50%	0.00%
Edison International	EIX	381.88	63.62	24,295	0.09%	4.64%	0.00%	16.00%	0.01%
Schlumberger Ltd	SLB	1,417.99	53.46	75,806		1.31%		23.50%	
Charles Schwab Corp/The	SCHW	1,815.85	83.26	151,187	0.56%	1.06%	0.01%	9.00%	0.05%
Sherwin-Williams Co/The	SHW	259.14	237.33	61,502	0.23%	1.01%	0.00%	11.50%	0.03%
West Pharmaceutical Services Inc	WST	74.03	235.35	17,424	0.06%	0.32%	0.00%	17.00%	0.01%
J M Smucker Co/The	SJM	106.64	158.46	16,898	0.06%	2.57%	0.00%	4.00%	0.00%
Snap-on Inc	SNA	53.16	228.49	12,145	0.04%	2.84%	0.00%	4.50%	0.00%
AMETEK Inc	AME	229.65	139.72	32,087	0.12%	0.63%	0.00%	10.00%	0.01%
Southern Co/The	SO	1,088.67	71.41	77,742	0.29%	3.81%	0.01%	6.50%	0.02%
Truist Financial Corp	TFC	1,326.77	43.03	57,091	0.21%	4.83%	0.01%	5.50%	0.01%
Southwest Airlines Co	LUV	593.75	33.67	19,992		2.14%			
W R Berkley Corp	WRB	265.48	72.57	19,266	0.07%	0.55%	0.00%	15.50%	0.01%
Stanley Black & Decker Inc	SWK	147.94	75.12	11,113	0.04%	4.26%	0.00%	6.00%	0.00%
Public Storage	PSA	175.64	280.19	49,212	0.18%	2.86%	0.01%	8.00%	0.01%
Arista Networks Inc	ANET	305.57	121.35	37,081	0.14%			10.00%	0.01%
Sysco Corp	SYY	506.77	76.45	38,742	0.14%	2.56%	0.00%	16.50%	0.02%
Corteva Inc	CTVA	718.60	58.78	42,239	0.16%	1.02%	0.00%	16.50%	0.03%
Texas Instruments Inc	TXN	907.57	165.22	149,949	0.55%	3.00%	0.02%	7.50%	0.04%
Textron Inc	TXT	208.77	70.80	14,781	0.05%	0.11%	0.00%	10.50%	0.01%
Thermo Fisher Scientific Inc	TMO	392.20	550.69	215,978	0.79%	0.22%	0.00%	11.00%	0.09%
TJX Cos Inc/The	TJX	1,155.50	79.60	91,978	0.34%	1.48%	0.01%	17.00%	0.06%
Globe Life Inc	GL	97.27	120.55	11,726	0.04%	0.69%	0.00%	8.50%	0.00%
Johnson Controls International plc	JCI	686.70	64.00	43,949	0.16%	2.19%	0.00%	12.50%	0.02%
Ulta Beauty Inc	ULTA	50.88	469.07	23,867	0.09%			15.50%	0.01%
Union Pacific Corp	UNP	614.80	207.07	127,307	0.47%	2.51%	0.01%	9.50%	0.04%
Keysight Technologies Inc	KEYS	178.80	171.07	30,586	0.11%			13.00%	0.01%
UnitedHealth Group Inc	UNH	934.35	530.18	495,373	1.82%	1.24%	0.02%	12.00%	0.22%
Marathon Oil Corp	MRO	635.07	27.07	17,191		1.33%			
Bio-Rad Laboratories Inc	BIO	24.75	420.49	10,407	0.04%			11.50%	0.00%
Ventas Inc	VTR	399.72	45.05	18,007	0.07%	4.00%	0.00%	10.50%	0.01%
VF Corp	VFC	388.57	27.61	10,728	0.04%	7.39%	0.00%	9.00%	0.00%
Vornado Realty Trust	VNO	191.82	20.81	3,992		10.19%		-20.50%	
Vulcan Materials Co	VMC	132.91	175.11	23,273	0.09%	0.91%	0.00%	8.50%	0.01%
Weyerhaeuser Co	WY	735.92	31.00	22,813	0.08%	2.32%	0.00%	7.00%	0.01%
Whirlpool Corp	WHR	54.48	141.46	7,706	0.03%	4.95%	0.00%	6.00%	0.00%
Williams Cos Inc/The	WMB	1,218.34	32.90	40,083	0.15%	5.17%	0.01%	12.00%	0.02%
Constellation Energy Corp	CEG	326.66	86.21	28,162		0.65%			
WEC Energy Group Inc	WEC	315.44	93.76	29,575	0.11%	3.33%	0.00%	6.00%	0.01%
Adobe Inc	ADBE	464.90	336.53	156,453	0.58%			14.50%	0.08%
AES Corp/The	AES	667.95	28.76	19,210	0.07%	2.31%	0.00%	14.00%	0.01%
Amgen Inc	AMGN	533.58	262.64	140,139	0.52%	3.24%	0.02%	5.50%	0.03%
Apple Inc	AAPL	15,908.12	129.93	2,066,942	7.60%	0.71%	0.05%	13.50%	1.03%
Autodesk Inc	ADSK	215.77	186.87	40,320	0.15%			14.00%	0.02%
Cintas Corp	CTAS	101.60	451.62	45,885	0.17%	1.02%	0.00%	14.00%	0.02%
Comcast Corp	CMCSA	4,313.96	34.70	149,695	0.55%	3.11%	0.02%	9.00%	0.05%
Molson Coors Beverage Co	TAP	200.15	51.52	10,311		2.95%		49.50%	
KLA Corp	KLAC	141.72	377.03	53,432	0.20%	1.38%	0.00%	20.00%	0.04%
Marriott International Inc/MD	MAR	316.54	148.89	47,130	0.17%	1.07%	0.00%	17.50%	0.03%
McCormick & Co Inc/MD	MKC	250.60	82.89	20,772	0.08%	1.88%	0.00%	5.00%	0.00%
PACCAR Inc	PCAR	347.77	98.97	34,419	0.13%	1.01%	0.00%	5.00%	0.01%
Costco Wholesale Corp	COST	443.73	456.50	202,562	0.74%	0.79%	0.01%	10.50%	0.08%
First Republic Bank/CA	FRC	182.93	121.89	22,297	0.08%	0.89%	0.00%	11.50%	0.01%
Stryker Corp	SYK	378.43	244.49	92,522	0.34%	1.23%	0.00%	8.50%	0.03%
Tyson Foods Inc	TSN	287.82	62.25	17,917	0.07%	3.08%	0.00%	6.00%	0.00%
Lamb Weston Holdings Inc	LW	143.83	89.36	12,853	0.05%	1.25%	0.00%	11.50%	0.01%
Applied Materials Inc	AMAT	844.14	97.38	82,202	0.30%	1.07%	0.00%	13.50%	0.04%
American Airlines Group Inc	AAL	649.90	12.72	8,267					
Cardinal Health Inc	CAH	262.13	76.87	20,150	0.07%	2.58%	0.00%	5.00%	0.00%
Cincinnati Financial Corp	CINF	157.18	102.39	16,094	0.06%	2.70%	0.00%	9.00%	0.01%
Paramount Global	PARA	608.47	16.88	10,271	0.04%	5.69%	0.00%	4.50%	0.00%
DR Horton Inc	DHI	344.55	89.14	30,713	0.11%	1.12%	0.00%	0.50%	0.00%
Electronic Arts Inc	EA	276.08	122.18	33,731	0.12%	0.62%	0.00%	11.50%	0.01%
Expeditors International of Washington Inc	EXPD	159.14	103.92	16,537	0.06%	1.29%	0.00%	10.00%	0.01%
Fastenal Co	FAST	572.76	47.32	27,103	0.10%	2.62%	0.00%	8.50%	0.01%
M&T Bank Corp	MTB	172.61	145.06	25,039	0.09%	3.31%	0.00%	9.00%	0.01%
Xcel Energy Inc	XEL	547.25	70.11	38,368	0.14%	2.78%	0.00%	6.00%	0.01%
Fiserv Inc	FISV	635.03	101.07	64,182	0.24%			11.00%	0.03%
Fifth Third Bancorp	FITB	686.40	32.81	22,521	0.08%	4.02%	0.00%	9.50%	0.01%

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Gilead Sciences Inc	GILD	1,254.24	85.85	107,677	0.40%	3.40%	0.01%	12.00%	0.05%
Hasbro Inc	HAS	138.11	61.01	8,426	0.03%	4.59%	0.00%	9.00%	0.00%
Huntington Bancshares Inc/OH	HBAN	1,442.73	14.10	20,343	0.07%	4.40%	0.00%	12.50%	0.01%
Welltower Inc	WELL	472.52	65.55	30,974	0.11%	3.72%	0.00%	2.50%	0.00%
Biogen Inc	BIIB	144.00	276.92	39,877				-10.50%	
Northern Trust Corp	NTRS	208.42	88.49	18,443	0.07%	3.39%	0.00%	8.00%	0.01%
Packaging Corp of America	PKG	92.53	127.91	11,836	0.04%	3.91%	0.00%	11.00%	0.00%
Paychex Inc	PAYX	360.47	115.56	41,656	0.15%	2.73%	0.00%	10.00%	0.02%
QUALCOMM Inc	QCOM	1,121.00	109.94	123,243	0.45%	2.73%	0.01%	18.00%	0.08%
Roper Technologies Inc	ROP	106.05	432.09	45,824	0.17%	0.63%	0.00%	3.50%	0.01%
Ross Stores Inc	ROST	344.37	116.07	39,971	0.15%	1.07%	0.00%	14.00%	0.02%
IDEXX Laboratories Inc	IDXX	82.82	407.96	33,786	0.12%			12.00%	0.01%
Starbucks Corp	SBUX	1,147.80	99.20	113,862	0.42%	2.14%	0.01%	16.00%	0.07%
KeyCorp	KEY	932.97	17.42	16,252	0.06%	4.71%	0.00%	7.50%	0.00%
Fox Corp	FOXA	302.48	30.37	9,186	0.03%	1.65%	0.00%	11.00%	0.00%
Fox Corp	FOX	240.22	28.45	6,834		1.76%			
State Street Corp	STT	366.94	77.57	28,464	0.10%	3.25%	0.00%	8.50%	0.01%
Norwegian Cruise Line Holdings Ltd	NCLH	421.40	12.24	5,158					
US Bancorp	USB	1,530.24	43.61	66,734	0.25%	4.40%	0.01%	6.00%	0.01%
A O Smith Corp	AOS	126.87	57.24	7,262	0.03%	2.10%	0.00%	11.50%	0.00%
Gen Digital Inc	GEN	651.36	21.43	13,959	0.05%	2.33%	0.00%	11.50%	0.01%
T Rowe Price Group Inc	TROW	223.47	109.06	24,371	0.09%	4.40%	0.00%	8.00%	0.01%
Waste Management Inc	WM	410.48	156.88	64,396	0.24%	1.66%	0.00%	6.50%	0.02%
Constellation Brands Inc	STZ	184.47	231.75	42,750	0.16%	1.38%	0.00%	5.00%	0.01%
DENTSPLY SIRONA Inc	XRAY	214.91	31.84	6,843	0.03%	1.57%	0.00%	12.00%	0.00%
Zions Bancorp NA	ZION	149.62	49.16	7,355	0.03%	3.34%	0.00%	6.50%	0.00%
Alaska Air Group Inc	ALK	126.84	42.94	5,446					
Invesco Ltd	IVZ	454.79	17.99	8,182	0.03%	4.17%	0.00%	10.00%	0.00%
Linde PLC	LIN	492.58	326.18	160,670	0.59%	1.43%	0.01%	12.00%	0.07%
Intuit Inc	INTU	280.93	389.22	109,342	0.40%	0.80%	0.00%	17.50%	0.07%
Morgan Stanley	MS	1,690.11	85.02	143,693	0.53%	3.65%	0.02%	8.50%	0.04%
Microchip Technology Inc	MCHP	550.01	70.25	38,638	0.14%	1.87%	0.00%	10.00%	0.01%
Chubb Ltd	CB	415.05	220.60	91,560	0.34%	1.50%	0.01%	14.50%	0.05%
Hologic Inc	HOLX	245.83	74.81	18,391				25.00%	
Citizens Financial Group Inc	CFG	492.49	39.37	19,389	0.07%	4.27%	0.00%	8.00%	0.01%
O'Reilly Automotive Inc	ORLY	62.58	844.03	52,816	0.19%			13.00%	0.03%
Allstate Corp/The	ALL	265.21	135.60	35,962	0.13%	2.51%	0.00%	2.50%	0.00%
Equity Residential	EQR	377.92	59.00	22,297		4.24%		-6.00%	
BorgWarner Inc	BWA	234.15	40.25	9,425	0.03%	1.69%	0.00%	9.50%	0.00%
Keurig Dr Pepper Inc	KDP	1,416.25	35.66	50,504	0.19%	2.24%	0.00%	11.50%	0.02%
Organon & Co	OGN	254.36	27.93	7,104		4.01%			
Host Hotels & Resorts Inc	HST	715.03	16.05	11,476		2.99%		59.50%	
Incyte Corp	INCY	222.48	80.32	17,869				25.50%	
Simon Property Group Inc	SPG	326.95	117.48	38,410	0.14%	6.13%	0.01%	3.00%	0.00%
Eastman Chemical Co	EMN	119.99	81.44	9,772	0.04%	3.88%	0.00%	9.50%	0.00%
AvalonBay Communities Inc	AVB	139.90	161.52	22,596	0.08%	3.94%	0.00%	9.00%	0.01%
Prudential Financial Inc	PRU	368.00	99.46	36,601	0.13%	4.83%	0.01%	5.00%	0.01%
United Parcel Service Inc	UPS	729.82	173.84	126,872	0.47%	3.50%	0.02%	11.50%	0.05%
Walgreens Boots Alliance Inc	WBA	862.33	37.36	32,217	0.12%	5.14%	0.01%	5.00%	0.01%
STERIS PLC	STE	99.82	184.69	18,436	0.07%	1.02%	0.00%	10.00%	0.01%
McKesson Corp	MCK	141.79	375.12	53,189	0.20%	0.58%	0.00%	10.00%	0.02%
Lockheed Martin Corp	LMT	262.07	486.49	127,496	0.47%	2.47%	0.01%	8.00%	0.04%
AmerisourceBergen Corp	ABC	203.29	165.71	33,687	0.12%	1.17%	0.00%	8.50%	0.01%
Capital One Financial Corp	COF	381.70	92.96	35,483		2.58%			
Waters Corp	WAT	59.41	342.58	20,352	0.07%			6.00%	0.00%
Nordson Corp	NDSN	57.16	237.72	13,587	0.05%	1.09%	0.00%	12.00%	0.01%
Dollar Tree Inc	DLTR	221.18	141.44	31,284	0.12%			12.00%	0.01%
Darden Restaurants Inc	DRI	122.39	138.33	16,930		3.50%		21.50%	
Evergy Inc	EVRG	229.48	62.93	14,441		3.89%			
Match Group Inc	MTCH	279.31	41.49	11,588				21.00%	
Domino's Pizza Inc	DPZ	35.40	346.40	12,262	0.05%	1.27%	0.00%	14.00%	0.01%
NVR Inc	NVR	3.20	4,612.58	14,742	0.05%			5.50%	0.00%
NetApp Inc	NTAP	215.57	60.06	12,947	0.05%	3.33%	0.00%	8.50%	0.00%
DXC Technology Co	DXC	230.07	26.50	6,097	0.02%			12.00%	0.00%
Old Dominion Freight Line Inc	ODFL	110.48	283.78	31,353	0.12%	0.42%	0.00%	11.50%	0.01%
DaVita Inc	DVA	90.10	74.67	6,728	0.02%			8.50%	0.00%
Hartford Financial Services Group Inc/The	HIG	318.10	75.83	24,121	0.09%	2.24%	0.00%	6.50%	0.01%
Iron Mountain Inc	IRM	290.71	49.85	14,492	0.05%	4.96%	0.00%	11.00%	0.01%
Estee Lauder Cos Inc/The	EL	231.27	248.11	57,380	0.21%	1.06%	0.00%	14.00%	0.03%
Cadence Design Systems Inc	CDNS	274.32	160.64	44,066	0.16%			12.00%	0.02%
Tyler Technologies Inc	TYL	41.64	322.41	13,425	0.05%			12.00%	0.01%
Universal Health Services Inc	UHS	64.16	140.89	9,039	0.03%	0.57%	0.00%	7.00%	0.00%
Skyworks Solutions Inc	SWKS	160.16	91.13	14,595	0.05%	2.72%	0.00%	9.00%	0.00%
Quest Diagnostics Inc	DGX	113.89	156.44	17,816	0.07%	1.69%	0.00%	3.50%	0.00%
Activision Blizzard Inc	ATVI	782.63	76.55	59,910	0.22%	0.61%	0.00%	12.50%	0.03%
Rockwell Automation Inc	ROK	114.75	257.57	29,555	0.11%	1.83%	0.00%	9.50%	0.01%
Kraft Heinz Co/The	KHC	1,224.93	40.71	49,867	0.18%	3.93%	0.01%	6.50%	0.01%
American Tower Corp	AMT	465.61	211.86	98,643	0.36%	2.95%	0.01%	9.00%	0.03%
Regeneron Pharmaceuticals Inc	REGN	107.08	721.49	77,260	0.28%			3.00%	0.01%
Amazon.com Inc	AMZN	10,201.65	84.00	856,939				26.50%	
Jack Henry & Associates Inc	JKHY	72.95	175.56	12,807	0.05%	1.12%	0.00%	9.00%	0.00%
Ralph Lauren Corp	RL	41.09	105.67	4,342	0.02%	2.84%	0.00%	12.00%	0.00%
Boston Properties Inc	BXP	156.76	67.58	10,594		5.80%		-1.00%	
Amphenol Corp	APH	595.10	76.14	45,311	0.17%	1.10%	0.00%	13.00%	0.02%
Howmet Aerospace Inc	HWM	413.71	39.41	16,304	0.06%	0.41%	0.00%	12.00%	0.01%
Pioneer Natural Resources Co	PXD	237.60	228.39	54,265		10.00%		21.00%	
Valero Energy Corp	VLO	385.52	126.86	48,907	0.18%	3.09%	0.01%	11.00%	0.02%
Synopsys Inc	SNPS	152.42	319.29	48,665	0.18%			12.50%	0.02%
Etsy Inc	ETSY	125.69	119.78	15,055				24.50%	
CH Robinson Worldwide Inc	CHRW	117.71	91.56	10,777	0.04%	2.66%	0.00%	8.50%	0.00%
Accenture PLC	ACN	658.39	266.84	175,685	0.65%	1.68%	0.01%	12.50%	0.08%

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TransDigm Group Inc	TDG	54.38	629.65	34,237	0.13%			19.50%	0.02%
Yum! Brands Inc	YUM	281.69	128.08	36,079	0.13%	1.78%	0.00%	10.50%	0.01%
Prologis Inc	PLD	923.08	112.73	104,059	0.38%	2.80%	0.01%	6.00%	0.02%
FirstEnergy Corp	FE	571.75	41.94	23,979	0.09%	3.72%	0.00%	3.00%	0.00%
VeriSign Inc	VRSN	106.02	205.44	21,780	0.08%			11.00%	0.01%
Quanta Services Inc	PWR	142.90	142.50	20,363	0.07%	0.22%	0.00%	16.50%	0.01%
Henry Schein Inc	HSIC	135.55	79.87	10,826	0.04%			7.00%	0.00%
Ameren Corp	AEE	258.37	88.92	22,974	0.08%	2.65%	0.00%	6.50%	0.01%
ANSYS Inc	ANSS	87.11	241.59	21,045	0.08%			8.50%	0.01%
FactSet Research Systems Inc	FDS	38.10	401.21	15,285	0.06%	0.89%	0.00%	10.50%	0.01%
NVIDIA Corp	NVDA	2,460.00	146.14	359,504		0.11%		23.00%	
Sealed Air Corp	SEE	144.66	49.88	7,216	0.03%	1.60%	0.00%	10.00%	0.00%
Cognizant Technology Solutions Corp	CTSH	513.92	57.19	29,391	0.11%	1.89%	0.00%	8.00%	0.01%
SVB Financial Group	SIVB	59.10	230.14	13,602	0.05%			8.50%	0.00%
Intuitive Surgical Inc	ISRG	353.39	265.35	93,771	0.34%			12.50%	0.04%
Take-Two Interactive Software Inc	TTWO	167.82	104.13	17,475	0.06%			8.00%	0.01%
Republic Services Inc	RSG	316.00	128.99	40,761	0.15%	1.54%	0.00%	12.50%	0.02%
eBay Inc	EBAY	542.66	41.47	22,504	0.08%	2.12%	0.00%	15.50%	0.01%
Goldman Sachs Group Inc/The	GS	338.64	343.38	116,280	0.43%	2.91%	0.01%	5.00%	0.02%
SBA Communications Corp	SBAC	107.97	280.31	30,264		1.01%		35.50%	
Sempra Energy	SRE	314.33	154.54	48,577	0.18%	2.96%	0.01%	7.00%	0.01%
Moody's Corp	MCO	183.20	278.62	51,043	0.19%	1.00%	0.00%	4.00%	0.01%
ON Semiconductor Corp	ON	432.42	62.37	26,970				22.50%	
Booking Holdings Inc	BKNG	38.79	2,015.28	78,171				22.00%	
F5 Inc	FFIV	60.37	143.51	8,664	0.03%			10.00%	0.00%
Akamai Technologies Inc	AKAM	157.24	84.30	13,256	0.05%			5.50%	0.00%
Charles River Laboratories International Inc	CRL	50.88	217.90	11,087	0.04%			12.00%	0.00%
MarketAxess Holdings Inc	MKTX	37.64	278.89	10,497	0.04%	1.00%	0.00%	10.00%	0.00%
Devon Energy Corp	DVN	653.70	61.51	40,209		8.78%		33.50%	
Bio-Techne Corp	TECH	156.97	82.88	13,010	0.05%	0.39%	0.00%	14.50%	0.01%
Alphabet Inc	GOOGL	5,973.00	88.23	526,998					
Teleflex Inc	TFX	46.91	249.63	11,709	0.04%	0.54%	0.00%	10.00%	0.00%
Allegion plc	ALLE	87.85	105.26	9,247	0.03%	1.56%	0.00%	11.00%	0.00%
Netflix Inc	NFLX	445.02	294.88	131,227	0.48%			14.50%	0.07%
Warner Bros Discovery Inc	WBD	2,428.40	9.48	23,021					
Agilent Technologies Inc	A	296.07	149.65	44,307	0.16%	0.60%	0.00%	12.00%	0.02%
Trimble Inc	TRMB	246.63	50.56	12,469	0.05%			10.00%	0.00%
Elevance Health Inc	ELV	238.83	512.97	122,512	0.45%	1.00%	0.00%	12.50%	0.06%
CME Group Inc	CME	359.73	168.16	60,491	0.22%	2.38%	0.01%	8.50%	0.02%
Juniper Networks Inc	JNPR	324.56	31.96	10,373	0.04%	2.63%	0.00%	10.50%	0.00%
BlackRock Inc	BLK	150.20	708.63	106,433	0.39%	2.75%	0.01%	10.00%	0.04%
DTE Energy Co	DTE	193.74	117.53	22,770	0.08%	3.24%	0.00%	4.50%	0.00%
Celanese Corp	CE	108.43	102.24	11,086	0.04%	2.74%	0.00%	7.50%	0.00%
Nasdaq Inc	NDAQ	491.28	61.35	30,140	0.11%	1.30%	0.00%	8.50%	0.01%
Philip Morris International Inc	PM	1,550.20	101.21	156,896	0.58%	5.02%	0.03%	5.00%	0.03%
Ingersoll Rand Inc	IR	404.93	52.25	21,157		0.15%			
Salesforce Inc	CRM	1,000.00	132.59	132,590	0.49%			19.50%	0.10%
Huntington Ingalls Industries Inc	HII	39.90	230.68	9,205	0.03%	2.15%	0.00%	10.00%	0.00%
MetLife Inc	MET	784.61	72.37	56,782	0.21%	2.76%	0.01%	5.00%	0.01%
Tapestry Inc	TPR	240.96	38.08	9,176	0.03%	3.15%	0.00%	15.00%	0.01%
CSX Corp	CSX	2,102.41	30.98	65,133	0.24%	1.29%	0.00%	10.50%	0.03%
Edwards Lifesciences Corp	EW	618.26	74.61	46,128	0.17%			11.00%	0.02%
Ameriprise Financial Inc	AMP	106.42	311.37	33,135	0.12%	1.61%	0.00%	15.00%	0.02%
Zebra Technologies Corp	ZBRA	51.63	256.41	13,238	0.05%			11.50%	0.01%
Zimmer Biomet Holdings Inc	ZBH	209.85	127.50	26,756	0.10%	0.75%	0.00%	5.50%	0.01%
Camden Property Trust	CPT	106.53	111.88	11,918	0.04%	3.36%	0.00%	3.50%	0.00%
CBRE Group Inc	CBRE	315.95	76.96	24,315	0.09%			8.50%	0.01%
Mastercard Inc	MA	953.80	347.73	331,666	1.22%	0.66%	0.01%	18.50%	0.23%
CarMax Inc	KMX	158.02	60.89	9,622	0.04%			4.00%	0.00%
Intercontinental Exchange Inc	ICE	558.55	102.59	57,302	0.21%	1.48%	0.00%	7.00%	0.01%
Fidelity National Information Services Inc	FIS	593.38	67.85	40,261		2.77%		52.00%	
Chipotle Mexican Grill Inc	CMG	27.72	1,387.49	38,463				23.00%	
Wynn Resorts Ltd	WYNN	113.31	82.47	9,345				27.00%	
Live Nation Entertainment Inc	LYV	230.88	69.74	16,102					
Assurant Inc	AIZ	52.83	125.06	6,607	0.02%	2.24%	0.00%	15.50%	0.00%
NRG Energy Inc	NRG	213.39	31.82	6,790		4.40%		-10.50%	
Monster Beverage Corp	MNST	521.74	101.53	52,973	0.19%			10.50%	0.02%
Regions Financial Corp	RF	934.45	21.56	20,147	0.07%	3.71%	0.00%	11.50%	0.01%
Baker Hughes Co	BKR	1,001.47	29.53	29,573		2.57%			
Mosaic Co/The	MOS	340.48	43.87	14,937		1.82%		38.00%	
Expedia Group Inc	EXPE	150.57	87.60	13,190					
CF Industries Holdings Inc	CF	196.19	85.20	16,715		1.88%		32.00%	
APA Corp	APA	321.51	46.68	15,008		2.14%			
Leidos Holdings Inc	LDOS	136.69	105.19	14,378	0.05%	1.37%	0.00%	8.50%	0.00%
Alphabet Inc	GOOG	6,086.00	88.73	540,011	1.99%			18.50%	0.37%
First Solar Inc	FSLR	106.61	149.79	15,969				20.50%	
Cooper Cos Inc/The	COO	49.35	330.67	16,320	0.06%	0.02%	0.00%	14.00%	0.01%
TE Connectivity Ltd	TEL	317.23	114.80	36,418	0.13%	1.95%	0.00%	10.50%	0.01%
Discover Financial Services	DFS	273.23	97.83	26,730	0.10%	2.45%	0.00%	16.00%	0.02%
Visa Inc	V	1,627.85	207.76	338,203	1.24%	0.87%	0.01%	13.50%	0.17%
Mid-America Apartment Communities Inc	MAA	115.48	156.99	18,129		3.57%		-14.50%	
Xylem Inc/NY	XYL	180.22	110.57	19,927	0.07%	1.09%	0.00%	9.00%	0.01%
Marathon Petroleum Corp	MPC	468.66	116.39	54,547		2.58%			
Advanced Micro Devices Inc	AMD	1,612.36	64.77	104,432				25.50%	
Tractor Supply Co	TSCO	110.46	224.97	24,851	0.09%	1.64%	0.00%	13.00%	0.01%
ResMed Inc	RMD	146.48	208.13	30,488	0.11%	0.85%	0.00%	8.50%	0.01%
Mettler-Toledo International Inc	MTD	22.29	1,445.45	32,225	0.12%			13.50%	0.02%
Jacobs Solutions Inc	J	126.61	120.07	15,202	0.06%	0.77%	0.00%	12.00%	0.01%
Copart Inc	CPRT	476.30	60.89	29,002	0.11%			7.00%	0.01%
VICI Properties Inc	VICI	997.37	32.40	32,315	0.12%	4.81%	0.01%	8.50%	0.01%
Fortinet Inc	FTNT	781.24	48.89	38,195				21.50%	

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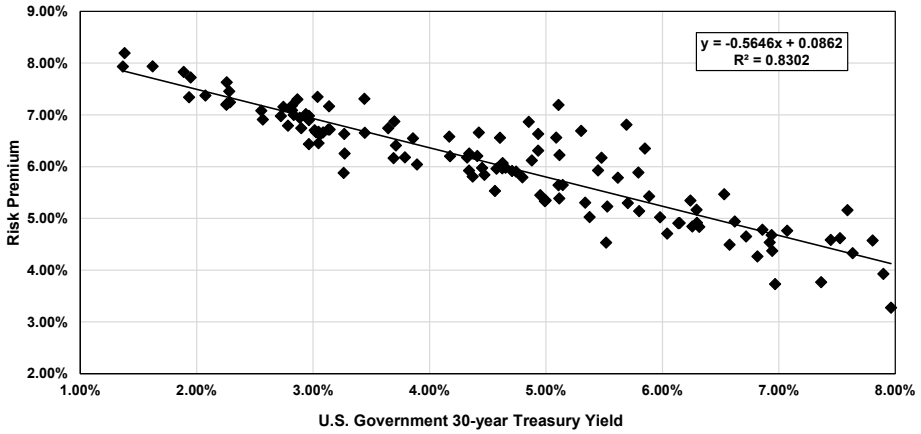
Albemarle Corp	ALB	117.15	216.86	25,406		0.73%		21.50%	
Moderna Inc	MRNA	384.18	179.62	69,006				-2.50%	
Essex Property Trust Inc	ESS	64.75	211.92	13,723		4.15%		-4.00%	
CoStar Group Inc	CSGP	406.69	77.28	31,429	0.12%			13.00%	0.02%
Realty Income Corp	O	627.15	63.43	39,780	0.15%	4.70%	0.01%	6.00%	0.01%
Westrock Co	WRK	254.52	35.16	8,949	0.03%	3.13%	0.00%	15.00%	0.00%
Westinghouse Air Brake Technologies Corp	WAB	181.87	99.81	18,152	0.07%	0.60%	0.00%	9.50%	0.01%
Pool Corp	POOL	39.05	302.33	11,806	0.04%	1.32%	0.00%	14.00%	0.01%
Western Digital Corp	WDC	317.65	31.55	10,022	0.04%			6.50%	0.00%
PepsiCo Inc	PEP	1,377.71	180.66	248,897	0.92%	2.55%	0.02%	6.00%	0.05%
Diamondback Energy Inc	FANG	181.86	136.78	24,875		6.61%			
ServiceNow Inc	NOW	202.00	388.27	78,431				45.50%	
Church & Dwight Co Inc	CHD	243.87	80.61	19,658	0.07%	1.30%	0.00%	6.00%	0.00%
Federal Realty Investment Trust	FRT	81.21	101.04	8,205	0.03%	4.28%	0.00%	2.50%	0.00%
MGM Resorts International	MGM	384.02	33.53	12,876		0.03%		25.00%	
American Electric Power Co Inc	AEP	513.86	94.95	48,791	0.18%	3.50%	0.01%	6.50%	0.01%
SolarEdge Technologies Inc	SEDG	55.90	283.27	15,833				22.00%	
Invitation Homes Inc	INVH	611.41	29.64	18,122		2.97%			
PTC Inc	PTC	118.15	120.04	14,183				29.00%	
JB Hunt Transport Services Inc	JBHT	103.54	174.36	18,053	0.07%	0.92%	0.00%	11.50%	0.01%
Lam Research Corp	LRCX	136.38	420.30	57,320	0.21%	1.64%	0.00%	14.00%	0.03%
Mohawk Industries Inc	MHK	63.53	102.22	6,494	0.02%			10.00%	0.00%
Pentair PLC	PNR	164.50	44.98	7,399	0.03%	1.96%	0.00%	12.00%	0.00%
Vertex Pharmaceuticals Inc	VRTX	256.69	288.78	74,127	0.27%			12.50%	0.03%
Amcor PLC	AMCR	1,489.02	11.91	17,734	0.07%	4.11%	0.00%	14.50%	0.01%
Meta Platforms Inc	META	2,255.32	120.34	271,405	1.00%			13.00%	0.13%
T-Mobile US Inc	TMUS	1,244.15	140.00	174,182	0.64%			16.50%	0.11%
United Rentals Inc	URI	69.31	355.42	24,633	0.09%			18.00%	0.02%
Alexandria Real Estate Equities Inc	ARE	164.09	145.67	23,903	0.09%	3.32%	0.00%	10.00%	0.01%
Honeywell International Inc	HON	672.32	214.30	144,079	0.53%	1.92%	0.01%	12.00%	0.06%
Delta Air Lines Inc	DAL	641.19	32.86	21,069					
United Airlines Holdings Inc	UAL	326.73	37.70	12,318					
Seagate Technology Holdings PLC	STX	206.45	52.61	10,862	0.04%	5.32%	0.00%	11.50%	0.00%
News Corp	NWS	193.28	18.44	3,564		1.08%			
Centene Corp	CNC	566.26	82.01	46,439	0.17%			10.00%	0.02%
Martin Marietta Materials Inc	MLM	62.09	337.97	20,985	0.08%	0.78%	0.00%	4.50%	0.00%
Teradyne Inc	TER	155.76	87.35	13,605	0.05%	0.50%	0.00%	11.50%	0.01%
PayPal Holdings Inc	PYPL	1,140.03	71.22	81,193	0.30%			12.00%	0.04%
Tesla Inc	TSLA	3,157.75	123.18	388,972				51.50%	
Arch Capital Group Ltd	ACGL	369.87	62.78	23,221	0.09%			19.50%	0.02%
DISH Network Corp	DISH	292.27	14.04	4,103				-1.50%	
Dow Inc	DOW	703.76	50.39	35,462	0.13%	5.56%	0.01%	15.00%	0.02%
Everest Re Group Ltd	RE	39.17	331.27	12,974	0.05%	1.99%	0.00%	9.50%	0.00%
Teledyne Technologies Inc	TDY	46.87	399.91	18,744	0.07%			11.50%	0.01%
News Corp	NWSA	382.35	18.20	6,959		1.10%			
Exelon Corp	EXC	991.76	43.23	42,874		3.12%			
Global Payments Inc	GPN	270.40	99.32	26,856	0.10%	1.01%	0.00%	17.00%	0.02%
Crown Castle Inc	CCI	433.05	135.64	58,739	0.22%	4.62%	0.01%	12.00%	0.03%
Aptiv PLC	APTV	270.95	93.13	25,234				26.00%	
Advance Auto Parts Inc	AAP	59.25	147.03	8,712	0.03%	4.08%	0.00%	15.50%	0.00%
Align Technology Inc	ALGN	78.11	210.90	16,474	0.06%			17.00%	0.01%
Illumina Inc	ILMN	157.30	202.20	31,806	0.12%			6.50%	0.01%
Targa Resources Corp	TRGP	226.38	73.50	16,639		1.90%			
LKQ Corp	LKQ	267.18	53.41	14,270	0.05%	2.06%	0.00%	13.00%	0.01%
Zoetis Inc	ZTS	466.07	146.55	68,303	0.25%	1.02%	0.00%	11.00%	0.03%
Digital Realty Trust Inc	DLR	287.52	100.27	28,830		4.87%		-3.50%	
Equinix Inc	EQIX	92.54	655.03	60,615	0.22%	1.89%	0.00%	15.00%	0.03%
Molina Healthcare Inc	MOH	58.40	330.22	19,285	0.07%			11.00%	0.01%
Las Vegas Sands Corp	LVS	764.17	48.07	36,733	0.14%			13.50%	0.02%

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 December 31, 2022
[5] Source: Bloomberg Professional as of December 31, 2022
[6] Equals [4] x [5]
[7] Equals weight in S&P 500 based on market capitalization [6] if Growth Rate >0% and ≤20%
[8] Source: Bloomberg Professional, as of December 31, 2022
[9] Equals [7] x [8]
[10] Source: Value Line, as of December 31, 2022
[11] Equals [7] x [10]



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.911140
R Square	0.830176
Adjusted R Square	0.828784
Standard Error	0.004252
Observations	124

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.010781	0.010781	596.389576	0.000000
Residual	122	0.002205	0.000018		
Total	123	0.012986			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.0862	0.00112	76.97	0.000000	0.084010	0.088445	0.084010	0.088445
U.S. Govt. 30-year Treasury	(0.5646)	0.02312	(24.42)	0.000000	(0.610349)	(0.518817)	(0.610349)	(0.518817)

	U.S. Govt. 30-year Treasury	Risk Premium	ROE
Current 30-day average of 30-year U.S. Treasury bond yield [4]	3.70%	6.53%	10.23%
Blue Chip Near-Term Projected Forecast (Q2 2023 - Q2 2024) [5]	3.88%	6.43%	10.31%
Blue Chip Long-Term Projected Forecast (2024-2028) [6]	3.90%	6.42%	10.32%
AVERAGE			10.29%

Notes:
[1] Source: Regulatory Research Associates, rate cases through December 31, 2022
[2] Source: S&P Capital IQ Pro, quarterly bond yields are the average of each trading day in the quarter
[3] Equals Column [1] − Column [2]
[4] Source: S&P Capital IQ Pro, 30-day average as of December 31, 2022
[5] Source: Blue Chip Financial Forecasts, Vol. 42, No. 1, January 1, 2022, at 2
[6] Source: Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14
[7] See notes [4], [5] & [6]
[8] Equals 0.086227 + (-0.564583 x Column [7])
[9] Equals Column [7] + Column [8]

BOND YIELD PLUS RISK PREMIUM

Quarter	[1] Average Authorized Electric ROE	[2] U.S. Govt. 30-year Treasury	[3] Risk Premium
1992.1	12.38%	7.81%	4.58%
1992.2	11.83%	7.90%	3.93%
1992.3	12.03%	7.45%	4.59%
1992.4	12.14%	7.52%	4.62%
1993.1	11.84%	7.07%	4.76%
1993.2	11.64%	6.86%	4.78%
1993.3	11.15%	6.32%	4.84%
1993.4	11.04%	6.14%	4.91%
1994.1	11.07%	6.58%	4.49%
1994.2	11.13%	7.36%	3.77%
1994.3	12.75%	7.59%	5.16%
1994.4	11.24%	7.96%	3.28%
1995.1	11.96%	7.63%	4.33%
1995.2	11.32%	6.94%	4.37%
1995.3	11.37%	6.72%	4.65%
1995.4	11.58%	6.24%	5.35%
1996.1	11.46%	6.29%	5.17%
1996.2	11.49%	6.92%	4.54%
1996.3	10.70%	6.97%	3.73%
1996.4	11.56%	6.62%	4.94%
1997.1	11.08%	6.82%	4.26%
1997.2	11.62%	6.94%	4.68%
1997.3	12.00%	6.53%	5.47%
1997.4	11.06%	6.15%	4.91%
1998.1	11.31%	5.88%	5.43%
1998.2	12.20%	5.85%	6.35%
1998.3	11.65%	5.48%	6.17%
1998.4	12.30%	5.11%	7.19%
1999.1	10.40%	5.37%	5.03%
1999.2	10.94%	5.80%	5.14%
1999.3	10.75%	6.04%	4.71%
1999.4	11.10%	6.26%	4.84%
2000.1	11.20%	6.30%	4.92%
2000.2	11.00%	5.98%	5.02%
2000.3	11.68%	5.79%	5.89%
2000.4	12.50%	5.69%	6.81%
2001.1	11.38%	5.45%	5.93%
2001.2	11.00%	5.70%	5.30%
2001.3	10.72%	5.53%	5.23%
2001.4	11.99%	5.30%	6.69%
2002.1	10.05%	5.52%	4.53%
2002.2	11.41%	5.62%	5.79%
2002.3	11.65%	5.09%	6.56%
2002.4	11.57%	4.93%	6.63%
2003.1	11.96%	4.85%	6.87%
2003.2	11.16%	4.60%	6.56%
2003.3	10.50%	5.11%	5.39%
2003.4	11.34%	5.11%	6.23%
2004.1	11.13%	4.88%	6.12%
2004.2	10.64%	5.34%	5.30%
2004.3	10.75%	5.11%	5.64%
2004.4	11.24%	4.93%	6.31%
2005.1	10.63%	4.71%	5.92%
2005.2	10.31%	4.47%	5.84%
2005.3	11.08%	4.42%	6.66%
2005.4	10.63%	4.65%	5.98%
2006.1	10.70%	4.63%	6.07%
2006.2	10.79%	5.14%	5.64%
2006.3	10.35%	5.00%	5.35%
2006.4	10.65%	4.74%	5.91%
2007.1	10.59%	4.80%	5.79%
2007.2	10.33%	4.99%	5.34%
2007.3	10.40%	4.95%	5.45%
2007.4	10.65%	4.61%	6.04%
2008.1	10.62%	4.41%	6.21%
2008.2	10.54%	4.57%	5.96%
2008.3	10.43%	4.45%	5.98%
2008.4	10.39%	3.64%	6.74%
2009.1	10.75%	3.44%	7.31%

BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
Quarter	Average Authorized Electric ROE	U.S. Govt. 30-year Treasury	Risk Premium
2009.2	10.75%	4.17%	6.58%
2009.3	10.50%	4.32%	6.18%
2009.4	10.59%	4.34%	6.25%
2010.1	10.59%	4.62%	5.97%
2010.2	10.18%	4.37%	5.81%
2010.3	10.40%	3.86%	6.55%
2010.4	10.38%	4.17%	6.20%
2011.1	10.09%	4.56%	5.53%
2011.2	10.26%	4.34%	5.92%
2011.3	10.57%	3.70%	6.88%
2011.4	10.39%	3.04%	7.35%
2012.1	10.30%	3.14%	7.17%
2012.2	9.95%	2.94%	7.01%
2012.3	9.90%	2.74%	7.16%
2012.4	10.16%	2.86%	7.30%
2013.1	9.85%	3.13%	6.72%
2013.2	9.86%	3.14%	6.72%
2013.3	10.12%	3.71%	6.41%
2013.4	9.97%	3.79%	6.18%
2014.1	9.86%	3.69%	6.16%
2014.2	10.10%	3.44%	6.66%
2014.3	9.90%	3.27%	6.63%
2014.4	9.94%	2.96%	6.98%
2015.1	9.64%	2.55%	7.08%
2015.2	9.83%	2.88%	6.94%
2015.3	9.40%	2.96%	6.44%
2015.4	9.86%	2.96%	6.90%
2016.1	9.70%	2.72%	6.98%
2016.2	9.48%	2.57%	6.91%
2016.3	9.74%	2.28%	7.46%
2016.4	9.83%	2.83%	7.00%
2017.1	9.72%	3.05%	6.67%
2017.2	9.64%	2.90%	6.75%
2017.3	10.00%	2.82%	7.18%
2017.4	9.91%	2.82%	7.09%
2018.1	9.69%	3.02%	6.66%
2018.2	9.75%	3.09%	6.66%
2018.3	9.69%	3.06%	6.63%
2018.4	9.52%	3.27%	6.25%
2019.1	9.72%	3.01%	6.70%
2019.2	9.58%	2.78%	6.79%
2019.3	9.53%	2.29%	7.25%
2019.4	9.89%	2.26%	7.63%
2020.1	9.72%	1.89%	7.83%
2020.2	9.58%	1.38%	8.19%
2020.3	9.30%	1.37%	7.93%
2020.4	9.56%	1.62%	7.94%
2021.1	9.45%	2.07%	7.38%
2021.2	9.47%	2.26%	7.21%
2021.3	9.27%	1.93%	7.34%
2021.4	9.67%	1.95%	7.73%
2022.1	9.45%	2.25%	7.20%
2022.2	9.50%	3.05%	6.45%
2022.3	9.14%	3.26%	5.88%
2022.4	9.93%	3.89%	6.04%
AVERAGE	10.61%	4.56%	6.05%
MEDIAN	10.58%	4.61%	6.18%

Update to Schedule SJW-d11
to Reflect Most Current Data as of the Filing of Dr. Won's Testimony

Growth Rate Estimates
Based on Dividend per Share (DPS) and Earning per Share (EPS)
for the Comparable Electric Utility Companies

			[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
2022 Q4			Past 10-Years			Past 5-Year			Projected				Average			Projected
	Electric Utility Companies	Ticker	EPS	DPS	BVPS	EPS	DPS	BVPS	EPS	DPS	BVPS	Projected	H.EPS	H.DPS	H.BVPS	Nominal GDP
1	Alliant Energy Corporation	LNT	7.00%	6.50%	5.50%	8.00%	6.50%	7.00%	6.00%	6.00%	5.00%	5.67%	7.50%	6.50%	6.25%	3.90%
2	Ameren Corporation	AEE	3.00%	3.00%	1.00%	7.50%	4.00%	4.50%	6.50%	7.00%	6.50%	6.67%	5.25%	3.50%	2.75%	3.90%
3	American Electric Power Company, Inc.	AEP	4.50%	5.00%	4.00%	4.00%	6.00%	3.50%	6.50%	6.00%	6.00%	6.17%	4.25%	5.50%	3.75%	3.90%
4	Avista Corporation	AVA	3.50%	5.50%	4.00%	3.50%	4.00%	3.50%	3.00%	4.00%	3.00%	3.33%	3.50%	4.75%	3.75%	3.90%
5	CMS Energy Corporation	CMS	7.50%	9.50%	5.50%	6.50%	7.00%	6.50%	6.50%	6.00%	7.00%	6.50%	7.00%	8.25%	6.00%	3.90%
6	Duke Energy Corporation	DUK	3.00%	3.00%	2.00%	4.50%	3.50%	1.00%	5.00%	2.00%	2.50%	3.17%	3.75%	3.25%	1.50%	3.90%
7	Entergy Corporation	ETR	0.00%	1.50%	1.50%	1.50%	2.00%	1.50%	4.00%	5.00%	5.00%	4.67%	0.75%	1.75%	1.50%	3.90%
8	IDACORP, Inc.	IDA	4.50%	8.50%	5.00%	4.00%	7.00%	4.50%	4.00%	6.50%	4.00%	4.83%	4.25%	7.75%	4.75%	3.90%
9	Northwestern Corporation	NWE	4.50%	5.50%	6.00%	2.00%	5.50%	4.50%	2.50%	2.00%	3.00%	2.50%	3.25%	5.50%	5.25%	3.90%
10	Pinnacle West Capital Corporation	PNW	6.00%	4.50%	4.00%	5.50%	5.50%	4.00%	0.50%	2.50%	2.50%	1.83%	5.75%	5.00%	4.00%	3.90%
11	Portland General Electric Company	POR	5.00%	4.50%	3.50%	4.50%	6.00%	3.00%	4.50%	6.00%	3.50%	4.67%	4.75%	5.25%	3.25%	3.90%
12	The Southern Company	SO	3.00%	3.50%	3.00%	3.00%	3.50%	2.50%	6.50%	3.50%	3.50%	4.50%	3.00%	3.50%	2.75%	3.90%
13	Xcel Energy Inc.	XEL	6.00%	5.50%	5.00%	6.00%	6.00%	5.00%	6.00%	6.50%	5.50%	6.00%	6.00%	5.75%	5.00%	3.90%
	Average		**4.42%**	**5.08%**	**3.85%**	**4.65%**	**5.12%**	**3.92%**	**4.73%**	**4.85%**	**4.38%**	**4.65%**	**4.54%**	**5.10%**	**3.88%**	**3.90%**

2022 Q3			Past 10-Years			Past 5-Year			Projected				Average			Projected
	Electric Utility Companies	Ticker	EPS	DPS	BVPS	EPS	DPS	BVPS	EPS	DPS	BVPS	Projected	H.EPS	H.DPS	H.BVPS	Nominal GDP
1	Alliant Energy Corporation	LNT	7.00%	6.50%	5.50%	8.00%	6.50%	7.00%	6.00%	6.00%	5.00%	5.67%	7.50%	6.50%	6.25%	3.90%
2	Ameren Corporation	AEE	3.00%	3.00%	1.00%	7.50%	4.00%	4.50%	6.50%	7.00%	6.50%	6.67%	5.25%	3.50%	2.75%	3.90%
3	American Electric Power Company, Inc.	AEP	4.50%	5.00%	4.00%	4.00%	6.00%	3.50%	6.50%	6.00%	6.00%	6.17%	4.25%	5.50%	3.75%	3.90%
4	Avista Corporation	AVA	3.50%	5.50%	4.00%	3.50%	4.00%	3.50%	3.00%	4.00%	3.00%	3.33%	3.50%	4.75%	3.75%	3.90%
5	CMS Energy Corporation	CMS	7.50%	9.50%	5.50%	6.50%	7.00%	6.50%	6.50%	6.00%	7.00%	6.50%	7.00%	8.25%	6.00%	3.90%
6	Duke Energy Corporation	DUK	3.00%	3.00%	2.00%	4.50%	3.50%	1.00%	5.00%	2.00%	2.50%	3.17%	3.75%	3.25%	1.50%	3.90%
7	Entergy Corporation	ETR	0.00%	1.50%	1.50%	1.50%	2.00%	1.50%	4.00%	5.00%	5.00%	4.67%	0.75%	1.75%	1.50%	3.90%
8	IDACORP, Inc.	IDA	4.50%	8.50%	5.00%	4.00%	7.00%	4.50%	4.00%	6.50%	4.00%	4.83%	4.25%	7.75%	4.75%	3.90%
9	Northwestern Corporation	NWE	4.50%	5.50%	6.00%	2.00%	5.50%	4.50%	3.00%	2.00%	3.00%	2.67%	3.25%	5.50%	5.25%	3.90%
10	Pinnacle West Capital Corporation	PNW	6.00%	4.50%	4.00%	5.50%	5.50%	4.00%	0.50%	2.50%	2.50%	1.83%	5.75%	5.00%	4.00%	3.90%
11	Portland General Electric Company	POR	5.00%	4.50%	3.50%	4.50%	6.00%	3.00%	4.50%	6.00%	3.00%	4.50%	4.75%	5.25%	3.25%	3.90%
12	The Southern Company	SO	3.00%	3.50%	3.00%	3.00%	3.50%	2.50%	6.50%	3.50%	3.50%	4.50%	3.00%	3.50%	2.75%	3.90%
13	Xcel Energy Inc.	XEL	6.00%	5.50%	5.00%	6.00%	6.00%	5.00%	6.00%	6.50%	5.50%	6.00%	6.00%	5.75%	5.00%	3.90%
	Average		**4.42%**	**5.08%**	**3.85%**	**4.65%**	**5.12%**	**3.92%**	**4.77%**	**4.85%**	**4.35%**	**4.65%**	**4.54%**	**5.10%**	**3.88%**	**3.90%**

2019 Q4			Past 10-Years			Past 5-Year			Projected				Average			Projected
	Electric Utility Companies	Ticker	EPS	DPS	BVPS	EPS	DPS	BVPS	EPS	DPS	BVPS	Projected	H.EPS	H.DPS	H.BVPS	Nominal GDP
1	Alliant Energy Corporation	LNT	4.50%	7.50%	4.00%	4.50%	7.00%	4.50%	6.50%	5.50%	7.50%	6.50%	4.50%	7.25%	4.25%	3.90%
2	Ameren Corporation	AEE	0.50%	-3.50%	-0.50%	4.50%	2.50%	0.50%	6.50%	4.50%	5.50%	5.50%	2.50%	-0.50%	0.00%	3.90%
3	American Electric Power Company, Inc.	AEP	3.00%	4.50%	4.00%	5.00%	5.00%	3.50%	4.00%	5.50%	4.50%	4.67%	4.00%	4.75%	3.75%	3.90%
4	Avista Corporation	AVA	5.50%	8.50%	4.00%	5.00%	4.50%	4.50%	3.50%	4.00%	3.50%	3.67%	5.25%	6.50%	4.25%	3.90%
5	CMS Energy Corporation	CMS	10.00%	21.50%	4.50%	7.00%	7.00%	5.50%	7.00%	7.00%	7.00%	7.00%	8.50%	14.25%	5.00%	3.90%
6	Duke Energy Corporation	DUK	2.50%	7.00%	1.00%	0.50%	3.00%	1.50%	6.00%	2.50%	2.50%	3.67%	1.50%	5.00%	1.25%	3.90%
7	Entergy Corporation	ETR	0.50%	3.00%	1.00%	-0.50%	1.00%	-2.50%	2.00%	3.50%	4.50%	3.33%	0.00%	2.00%	-0.75%	3.90%
8	IDACORP, Inc.	IDA	7.00%	6.50%	5.50%	4.00%	10.00%	5.00%	3.50%	7.00%	4.00%	4.83%	5.50%	8.25%	5.25%	3.90%
9	Northwestern Corporation	NWE	8.50%	5.00%	5.50%	7.00%	7.00%	8.00%	3.00%	4.50%	3.50%	3.67%	7.75%	6.00%	6.75%	3.90%
10	Pinnacle West Capital Corporation	PNW	4.50%	2.50%	2.50%	5.00%	3.00%	4.50%	5.00%	6.00%	3.50%	4.83%	4.75%	2.75%	3.50%	3.90%
11	Portland General Electric Company	POR	3.50%	4.50%	2.50%	4.00%	4.50%	3.50%	4.50%	6.50%	3.00%	4.67%	3.75%	4.50%	3.00%	3.90%
12	The Southern Company	SO	3.00%	3.50%	4.00%	2.50%	3.50%	3.00%	3.50%	3.00%	3.50%	3.33%	2.75%	3.50%	3.50%	3.90%
13	Xcel Energy Inc.	XEL	5.50%	4.50%	4.50%	5.00%	6.00%	4.50%	5.50%	6.00%	5.00%	5.50%	5.25%	5.25%	4.50%	3.90%
	Average		**4.50%**	**5.77%**	**3.27%**	**4.12%**	**4.92%**	**3.54%**	**4.65%**	**5.04%**	**4.42%**	**4.71%**	**4.31%**	**5.35%**	**3.40%**	**3.90%**

Note:
[1] Source: The Value Line Investment Survey
[2] Source: The Value Line Investment Survey
[3] Source: The Value Line Investment Survey
[4] Source: The Value Line Investment Survey
[5] Source: The Value Line Investment Survey
[6] Source: The Value Line Investment Survey
[7] Source: The Value Line Investment Survey
[8] Source: The Value Line Investment Survey
[9] Source: The Value Line Investment Survey
[10] =([7]+[8]+[9]/3
[11] =([1]+[4])/2
[12] =([2]+[5])/2
[13] =([3]+[6])/2
[14] Source: Congress Budget Office (CBO), Budget Economic Outlook

Update to Schedule SJW-d12
to Reflect Most Current Data as of the Filing of Dr. Won's Testimony

Average High / Low Stock Prices
for the Comparable Electric Utility Companies

2022 Q4

	Company Name	Ticker	[1] October 2022 High Stock Price	[2] October 2022 Low Stock Price	[3] November 2022 High Stock Price	[4] November 2022 Low Stock Price	[5] December 2022 High Stock Price	[6] December 2022 Low Stock Price	[7] Average High/Low Stock Price
1	Alliant Energy Corporation	LNT	$ 51.56	$ 50.16	$ 54.69	$ 53.41	$ 55.81	$ 54.64	$ 53.38
2	Ameren Corporation	AEE	$ 80.04	$ 78.07	$ 85.25	$ 83.55	$ 89.39	$ 87.77	$ 84.01
3	American Electric Power Company, Inc.	AEP	$ 87.28	$ 84.94	$ 92.01	$ 90.00	$ 96.87	$ 95.03	$ 91.02
4	Avista Corporation	AVA	$ 39.12	$ 38.11	$ 39.10	$ 38.03	$ 43.21	$ 42.20	$ 39.96
5	CMS Energy Corporation	CMS	$ 56.92	$ 55.46	$ 59.27	$ 58.05	$ 63.05	$ 61.83	$ 59.09
6	Duke Energy Corporation	DUK	$ 91.64	$ 89.37	$ 96.90	$ 95.00	$ 102.32	$ 100.59	$ 95.97
7	Entergy Corporation	ETR	$ 104.09	$ 101.47	$ 111.65	$ 109.30	$ 116.35	$ 114.27	$ 109.52
8	IDACORP, Inc.	IDA	$ 100.05	$ 97.78	$ 105.24	$ 102.90	$ 108.69	$ 106.70	$ 103.56
9	Northwestern Corporation	NWE	$ 51.88	$ 50.52	$ 54.79	$ 53.57	$ 58.53	$ 57.41	$ 54.45
10	Pinnacle West Capital Corporation	PNW	$ 64.88	$ 63.24	$ 73.09	$ 71.52	$ 78.43	$ 77.14	$ 71.39
11	Portland General Electric Company	POR	$ 44.43	$ 43.26	$ 46.80	$ 45.76	$ 49.20	$ 48.22	$ 46.28
12	The Southern Company	SO	$ 66.32	$ 64.63	$ 65.93	$ 64.65	$ 70.47	$ 69.24	$ 66.87
13	Xcel Energy Inc.	XEL	$ 62.76	$ 61.09	$ 68.09	$ 66.77	$ 70.79	$ 69.53	$ 66.51
									$ 72.46

2022 Q3

	Company Name	Ticker	July 2022 High Stock Price	July 2022 Low Stock Price	August 2022 High Stock Price	August 2022 Low Stock Price	September 2022 High Stock Price	September 2022 Low Stock Price	Average High/Low Stock Price
1	Alliant Energy Corporation	LNT	$ 58.57	$ 57.41	$ 62.86	$ 61.85	$ 61.05	$ 59.66	$ 60.23
2	Ameren Corporation	AEE	$ 89.04	$ 87.42	$ 95.08	$ 93.62	$ 91.91	$ 89.96	$ 91.17
3	American Electric Power Company, Inc.	AEP	$ 95.74	$ 93.86	$ 102.69	$ 101.08	$ 100.78	$ 98.36	$ 98.75
4	Avista Corporation	AVA	$ 42.50	$ 41.60	$ 43.44	$ 42.66	$ 40.87	$ 39.93	$ 41.83
5	CMS Energy Corporation	CMS	$ 66.83	$ 65.53	$ 69.73	$ 68.70	$ 67.09	$ 65.58	$ 67.24
6	Duke Energy Corporation	DUK	$ 107.56	$ 105.60	$ 111.12	$ 109.43	$ 106.49	$ 104.13	$ 107.39
7	Entergy Corporation	ETR	$ 111.81	$ 109.59	$ 119.94	$ 117.96	$ 115.50	$ 112.75	$ 114.59
8	IDACORP, Inc.	IDA	$ 107.28	$ 105.16	$ 113.03	$ 111.25	$ 109.30	$ 106.98	$ 108.83
9	Northwestern Corporation	NWE	$ 57.16	$ 55.91	$ 55.66	$ 54.83	$ 53.76	$ 52.56	$ 54.98
10	Pinnacle West Capital Corporation	PNW	$ 71.87	$ 70.39	$ 76.83	$ 75.60	$ 74.17	$ 72.53	$ 73.57
11	Portland General Electric Company	POR	$ 49.99	$ 48.86	$ 53.92	$ 52.97	$ 50.75	$ 49.54	$ 51.01
12	The Southern Company	SO	$ 72.80	$ 71.48	$ 78.79	$ 77.64	$ 77.39	$ 75.71	$ 75.64
13	Xcel Energy Inc.	XEL	$ 70.51	$ 68.98	$ 75.83	$ 74.70	$ 74.01	$ 72.31	$ 72.72
									$ 78.30

Update to Schedule SJW-d12
to Reflect Most Current Data as of the Filing of Dr. Won's Testimony

Average High / Low Stock Prices
for the Comparable Electric Utility Companies

			[1]	[2]	[3]	[4]	[5]	[6]	[7]
2019 Q4			**October 2019**		**November 2019**		**December 2019**		
	Company Name	Ticker	High Stock Price	Low Stock Price	High Stock Price	Low Stock Price	High Stock Price	Low Stock Price	Average High/Low Stock Price
1	Alliant Energy Corporation	LNT	$ 53.47	$ 52.80	$ 53.02	$ 52.19	$ 53.86	$ 53.25	$ 53.10
2	Ameren Corporation	AEE	$ 77.75	$ 76.76	$ 75.69	$ 74.66	$ 75.70	$ 74.86	$ 75.90
3	American Electric Power Company, Inc.	AEP	$ 93.88	$ 92.78	$ 91.36	$ 90.16	$ 93.25	$ 92.28	$ 92.29
4	Avista Corporation	AVA	$ 48.36	$ 47.74	$ 47.33	$ 46.72	$ 48.08	$ 47.49	$ 47.62
5	CMS Energy Corporation	CMS	$ 64.25	$ 63.39	$ 61.58	$ 60.70	$ 62.13	$ 61.50	$ 62.26
6	Duke Energy Corporation	DUK	$ 95.89	$ 94.90	$ 89.96	$ 88.76	$ 90.16	$ 89.25	$ 91.49
7	Entergy Corporation	ETR	$ 118.97	$ 117.50	$ 117.24	$ 115.71	$ 119.06	$ 117.75	$ 117.71
8	IDACORP, Inc.	IDA	$ 110.46	$ 109.16	$ 105.50	$ 103.96	$ 106.29	$ 105.17	$ 106.76
9	Northwestern Corporation	NWE	$ 74.70	$ 73.71	$ 70.84	$ 69.91	$ 71.80	$ 70.94	$ 71.98
10	Pinnacle West Capital Corporation	PNW	$ 95.41	$ 94.19	$ 88.56	$ 87.27	$ 87.96	$ 86.93	$ 90.05
11	Portland General Electric Company	POR	$ 56.84	$ 56.13	$ 55.96	$ 55.18	$ 55.76	$ 55.19	$ 55.84
12	The Southern Company	SO	$ 61.84	$ 61.13	$ 62.34	$ 61.58	$ 62.82	$ 62.03	$ 61.96
13	Xcel Energy Inc.	XEL	$ 64.15	$ 63.29	$ 61.63	$ 60.70	$ 62.91	$ 62.16	$ 62.47
									$ 76.11

			[1]	[2]	[3]	[4]	[5]	[6]	[7]
Aug-Oct 2014			**August 2014**		**September 2014**		**October 2014**		
	Company Name	Ticker	High Stock Price	Low Stock Price	High Stock Price	Low Stock Price	High Stock Price	Low Stock Price	Average High/Low Stock Price
1	Alliant Energy Corporation	LNT	$ 28.61	$ 28.26	$ 28.83	$ 28.46	$ 29.43	$ 28.92	$ 28.75
2	Ameren Corporation	AEE	$ 38.98	$ 38.41	$ 39.05	$ 38.51	$ 40.57	$ 39.74	$ 39.21
3	American Electric Power Company, Inc.	AEP	$ 51.99	$ 51.27	$ 53.27	$ 52.56	$ 55.31	$ 54.27	$ 53.11
4	Avista Corporation	AVA	$ 31.89	$ 31.46	$ 31.96	$ 31.53	$ 33.44	$ 32.77	$ 32.18
5	CMS Energy Corporation	CMS	$ 29.62	$ 29.24	$ 30.09	$ 29.68	$ 31.33	$ 30.78	$ 30.12
6	Duke Energy Corporation	DUK	$ 72.65	$ 71.67	$ 74.38	$ 73.55	$ 78.90	$ 77.62	$ 74.79
7	Entergy Corporation	ETR	$ 74.02	$ 72.90	$ 77.09	$ 75.97	$ 80.63	$ 79.03	$ 76.61
8	IDACORP, Inc.	IDA	$ 54.77	$ 54.02	$ 55.65	$ 54.81	$ 58.09	$ 56.91	$ 55.71
9	Northwestern Corporation	NWE	$ 47.47	$ 46.83	$ 47.59	$ 46.90	$ 49.77	$ 48.76	$ 47.89
10	Pinnacle West Capital Corporation	PNW	$ 54.83	$ 54.09	$ 56.60	$ 55.87	$ 58.14	$ 57.03	$ 56.09
11	Portland General Electric Company	POR	$ 33.24	$ 32.86	$ 33.45	$ 33.02	$ 34.52	$ 33.86	$ 33.49
12	The Southern Company	SO	$ 43.67	$ 43.14	$ 44.02	$ 43.51	$ 46.28	$ 45.50	$ 44.35
13	Xcel Energy Inc.	XEL	$ 31.17	$ 30.74	$ 31.49	$ 31.08	$ 32.28	$ 31.65	$ 31.40
									$ 46.44

Note:
[1] Source: Wall Street Journal, https://www.wsj.com/market-data
[2] Source: Wall Street Journal, https://www.wsj.com/market-data
[3] Source: Wall Street Journal, https://www.wsj.com/market-data
[4] Source: Wall Street Journal, https://www.wsj.com/market-data
[5] Source: Wall Street Journal, https://www.wsj.com/market-data
[6] Source: Wall Street Journal, https://www.wsj.com/market-data
[7] = ([1]+[2]+[3]+[4]+[5]+[6]) / 6

Dr. Won's As-Filed Schedule SJW-d13

Discounted Cash Flow (DCF) Costs of Common Equity (COE) Estimates
Based on Dividend per Share, Earning per Share, Stock Price, and Growth Rate
for the Comparable Electric Utility Companies

2022 Q3 DCF COE estimate

	Electric Utility Companies	Ticker	[1] Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected Weighted Growth	[6] Projected GDP Growth	[7] Growth Rate	[8] COE
1	Alliant Energy Corporation	LNT	$ 1.71	$ 60.23	2.84%	2.91%	5.67%	3.90%	5.31%	8.23%
2	Ameren Corporation	AEE	$ 2.36	$ 91.17	2.59%	2.67%	6.67%	3.90%	6.11%	8.78%
3	American Electric Power Company, Inc.	AEP	$ 3.17	$ 98.75	3.21%	3.30%	6.17%	3.90%	5.71%	9.02%
4	Avista Corporation	AVA	$ 1.76	$ 41.83	4.21%	4.28%	3.33%	3.90%	3.45%	7.73%
5	CMS Energy Corporation	CMS	$ 1.84	$ 67.24	2.74%	2.82%	6.50%	3.90%	5.98%	8.80%
6	Duke Energy Corporation	DUK	$ 3.98	$107.39	3.71%	3.77%	3.17%	3.90%	3.31%	7.08%
7	Entergy Corporation	ETR	$ 4.09	$114.59	3.57%	3.65%	4.67%	3.90%	4.51%	8.16%
8	IDACORP, Inc.	IDA	$ 3.05	$108.83	2.80%	2.87%	4.83%	3.90%	4.65%	7.51%
9	Northwestern Corporation	NWE	$ 2.52	$ 54.98	4.58%	4.65%	2.67%	3.90%	2.91%	7.56%
10	Pinnacle West Capital Corporation	PNW	$ 3.44	$ 73.57	4.68%	4.73%	1.83%	3.90%	2.25%	6.98%
11	Portland General Electric Company	POR	$ 1.80	$ 51.01	3.53%	3.61%	4.50%	3.90%	4.38%	7.99%
12	The Southern Company	SO	$ 2.70	$ 75.64	3.57%	3.65%	4.50%	3.90%	4.38%	8.03%
13	Xcel Energy Inc.	XEL	$ 1.95	$ 72.72	2.68%	2.76%	6.00%	3.90%	5.58%	8.34%
	Average		$ 2.64	$ 78.30	3.44%	3.51%	4.65%	3.90%	4.50%	8.02%
									DCF Lower Bound	7.30%
									DCF Upper Bound	8.79%
									Average	8.04%

2019 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	Dividend per Share	Stock Price	Dividend Yield	Expected Dividend Yield	Projected Weighted Growth	Projected GDP Growth	Growth Rate	COE
1	Alliant Energy Corporation	LNT	$ 1.42	$ 53.10	2.67%	2.75%	6.50%	3.90%	5.98%	8.73%
2	Ameren Corporation	AEE	$ 1.92	$ 75.90	2.53%	2.60%	5.50%	3.90%	5.18%	7.78%
3	American Electric Power Company, Inc.	AEP	$ 2.71	$ 92.29	2.94%	3.00%	4.67%	3.90%	4.51%	7.52%
4	Avista Corporation	AVA	$ 1.55	$ 47.62	3.25%	3.32%	3.67%	3.90%	3.71%	7.03%
5	CMS Energy Corporation	CMS	$ 1.53	$ 62.26	2.46%	2.54%	7.00%	3.90%	6.38%	8.92%
6	Duke Energy Corporation	DUK	$ 3.75	$ 91.49	4.10%	4.18%	3.67%	3.90%	3.71%	7.89%
7	Entergy Corporation	ETR	$ 3.66	$117.71	3.11%	3.16%	3.33%	3.90%	3.45%	6.61%
8	IDACORP, Inc.	IDA	$ 2.56	$106.76	2.40%	2.45%	4.83%	3.90%	4.65%	7.10%
9	Northwestern Corporation	NWE	$ 2.30	$ 71.98	3.20%	3.25%	3.67%	3.90%	3.71%	6.97%
10	Pinnacle West Capital Corporation	PNW	$ 3.04	$ 90.05	3.38%	3.45%	4.83%	3.90%	4.65%	8.10%
11	Portland General Electric Company	POR	$ 1.52	$ 55.84	2.72%	2.78%	4.67%	3.90%	4.51%	7.30%
12	The Southern Company	SO	$ 2.46	$ 61.96	3.97%	4.04%	3.33%	3.90%	3.45%	7.49%
13	Xcel Energy Inc.	XEL	$ 1.62	$ 62.47	2.59%	2.66%	5.50%	3.90%	5.18%	7.84%
	Average		$ 2.31	$ 76.11	3.02%	3.09%	4.71%	3.90%	4.54%	7.64%
									DCF Lower Bound	7.00%
									DCF Upper Bound	8.42%
									Average	7.71%

Comparison DCF Estimates

2019 Q4 DCF COE estimate	7.71%
2022 Q3 DCF COE estimate	8.04%
Difference: Q3 2022 minus Q4 2019	0.34%

Note:
[1] Source: The Value Line Investment Survey: Ratings & Reports.
[2] Source: The Wall Street Journal; Average Monthly Highest and Lowest.
[3] = [1] / [2]
[4] = [3] x (1 + .5 x [7])
[5] Source: [10] of Schedule SJW-11
[6] Source: Congress Budget Office (CBO), Budget Economic Outlook
[7] = (4 x [5] + [6]) / 5
[8] = [4] + [7]

Update to Schedule SJW-d13
to Reflect Most Current Data as of the Filing of Dr. Won's Testimony

Discounted Cash Flow (DCF) Costs of Common Equity (COE) Estimates
Based on Dividend per Share, Earning per Share, Stock Price, and Growth Rate
for the Comparable Electric Utility Companies

2022 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	[1] Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected Weighted Growth	[6] Projected GDP Growth	[7] Growth Rate	[8] COE
1	Alliant Energy Corporation	LNT	$ 1.71	$ 53.38	3.20%	3.29%	5.67%	3.90%	5.31%	8.60%
2	Ameren Corporation	AEE	$ 2.36	$ 84.01	2.81%	2.89%	6.67%	3.90%	6.11%	9.01%
3	American Electric Power Company, Inc.	AEP	$ 3.32	$ 91.02	3.65%	3.75%	6.17%	3.90%	5.71%	9.46%
4	Avista Corporation	AVA	$ 1.76	$ 39.96	4.40%	4.48%	3.33%	3.90%	3.45%	7.93%
5	CMS Energy Corporation	CMS	$ 1.84	$ 59.09	3.11%	3.21%	6.50%	3.90%	5.98%	9.19%
6	Duke Energy Corporation	DUK	$ 4.02	$ 95.97	4.19%	4.26%	3.17%	3.90%	3.31%	7.57%
7	Entergy Corporation	ETR	$ 4.28	$109.52	3.91%	4.00%	4.67%	3.90%	4.51%	8.51%
8	IDACORP, Inc.	IDA	$ 3.16	$103.56	3.05%	3.12%	4.83%	3.90%	4.65%	7.77%
9	Northwestern Corporation	NWE	$ 2.52	$ 54.45	4.63%	4.69%	2.50%	3.90%	2.78%	7.47%
10	Pinnacle West Capital Corporation	PNW	$ 3.46	$ 71.45	4.84%	4.90%	1.83%	3.90%	2.25%	7.14%
11	Portland General Electric Company	POR	$ 1.81	$ 46.28	3.91%	4.00%	4.67%	3.90%	4.51%	8.51%
12	The Southern Company	SO	$ 2.72	$ 66.87	4.07%	4.16%	4.50%	3.90%	4.38%	8.54%
13	Xcel Energy Inc.	XEL	$ 1.95	$ 66.51	2.93%	3.01%	6.00%	3.90%	5.58%	8.59%
	Average		$ 2.69	$ 72.47	3.75%	3.83%	4.65%	3.90%	4.50%	8.33%
									DCF Lower Bound	7.52%
									DCF Upper Bound	9.10%
									Average	8.31%

2019 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	Dividend per Share	Stock Price	Dividend Yield	Expected Dividend Yield	Projected Weighted Growth	Projected GDP Growth	Growth Rate	COE
1	Alliant Energy Corporation	LNT	$ 1.42	$ 53.10	2.67%	2.75%	6.50%	3.90%	5.98%	8.73%
2	Ameren Corporation	AEE	$ 1.92	$ 75.90	2.53%	2.60%	5.50%	3.90%	5.18%	7.78%
3	American Electric Power Company, Inc.	AEP	$ 2.71	$ 92.29	2.94%	3.00%	4.67%	3.90%	4.51%	7.52%
4	Avista Corporation	AVA	$ 1.55	$ 47.62	3.25%	3.32%	3.67%	3.90%	3.71%	7.03%
5	CMS Energy Corporation	CMS	$ 1.53	$ 62.26	2.46%	2.54%	7.00%	3.90%	6.38%	8.92%
6	Duke Energy Corporation	DUK	$ 3.75	$ 91.49	4.10%	4.18%	3.67%	3.90%	3.71%	7.89%
7	Entergy Corporation	ETR	$ 3.66	$117.71	3.11%	3.16%	3.33%	3.90%	3.45%	6.61%
8	IDACORP, Inc.	IDA	$ 2.56	$106.76	2.40%	2.45%	4.83%	3.90%	4.65%	7.10%
9	Northwestern Corporation	NWE	$ 2.30	$ 71.98	3.20%	3.25%	3.67%	3.90%	3.71%	6.97%
10	Pinnacle West Capital Corporation	PNW	$ 3.04	$ 90.05	3.38%	3.45%	4.83%	3.90%	4.65%	8.10%
11	Portland General Electric Company	POR	$ 1.52	$ 55.84	2.72%	2.78%	4.67%	3.90%	4.51%	7.30%
12	The Southern Company	SO	$ 2.46	$ 61.96	3.97%	4.04%	3.33%	3.90%	3.45%	7.49%
13	Xcel Energy Inc.	XEL	$ 1.62	$ 62.47	2.59%	2.66%	5.50%	3.90%	5.18%	7.84%
	Average		$ 2.31	$ 76.11	3.02%	3.09%	4.71%	3.90%	4.54%	7.64%
									DCF Lower Bound	7.00%
									DCF Upper Bound	8.42%
									Average	7.71%

Comparison DCF Estimates

2019 Q4 DCF COE estimate	7.71%
2022 Q4 DCF COE estimate	8.31%
Difference: **2022 Q4** minus Q4 2019	0.60%

Note:
[1] Source: The Value Line Investment Survey: Ratings & Reports.
[2] Source: The Wall Street Journal; Average Monthly Highest and Lowest.
[3] = [1] / [2]
[4] = [3] x (1 + .5 x [7])
[5] Source: [10] of Schedule SJW-11
[6] Source: Congress Budget Office (CBO), Budget Economic Outlook
[7] = (4 x [5] + [6]) / 5
[8] = [4] + [7]

Update to Schedule SJW-d13
to Reflect Most Current Data as of the Filing of Dr. Won's Testimony

Discounted Cash Flow (DCF) Costs of Common Equity (COE) Estimates
Based on EPS Growth Rates
for the Comparable Electric Utility Companies

2022 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	[1] Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected EPS Growth	[6] Projected GDP Growth	[7] Growth Rate	[8] COE
1	Alliant Energy Corporation	LNT	$ 1.71	$ 53.38	3.20%	3.29%	6.00%	3.90%	5.58%	8.87%
2	Ameren Corporation	AEE	$ 2.36	$ 84.01	2.81%	2.89%	6.50%	3.90%	5.98%	8.87%
3	American Electric Power Company, Inc.	AEP	$ 3.32	$ 91.02	3.65%	3.76%	6.50%	3.90%	5.98%	9.74%
4	Avista Corporation	AVA	$ 1.76	$ 39.96	4.40%	4.47%	3.00%	3.90%	3.18%	7.65%
5	CMS Energy Corporation	CMS	$ 1.84	$ 59.09	3.11%	3.21%	6.50%	3.90%	5.98%	9.19%
6	Duke Energy Corporation	DUK	$ 4.02	$ 95.97	4.19%	4.29%	5.00%	3.90%	4.78%	9.07%
7	Entergy Corporation	ETR	$ 4.28	$109.52	3.91%	3.99%	4.00%	3.90%	3.98%	7.97%
8	IDACORP, Inc.	IDA	$ 3.16	$103.56	3.05%	3.11%	4.00%	3.90%	3.98%	7.09%
9	Northwestern Corporation	NWE	$ 2.52	$ 54.45	4.63%	4.70%	3.00%	3.90%	3.18%	7.88%
10	Pinnacle West Capital Corporation	PNW	$ 3.46	$ 71.45	4.84%	4.87%	0.50%	3.90%	1.18%	6.05%
11	Portland General Electric Company	POR	$ 1.81	$ 46.28	3.91%	4.00%	4.50%	3.90%	4.38%	8.38%
12	The Southern Company	SO	$ 2.72	$ 66.87	4.07%	4.19%	6.50%	3.90%	5.98%	10.17%
13	Xcel Energy Inc.	XEL	$ 1.95	$ 66.51	2.93%	3.01%	6.00%	3.90%	5.58%	8.59%
	Average		$ 2.69	$ 72.47	3.75%	3.83%	4.77%	3.90%	4.60%	8.42%
									DCF Lower Bound	7.37%
									DCF Upper Bound	9.46%
									Average	8.42%

2019 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	Dividend per Share	Stock Price	Dividend Yield	Expected Dividend Yield	Projected EPS Growth	Projected GDP Growth	Growth Rate	COE
1	Alliant Energy Corporation	LNT	$ 1.42	$ 53.10	2.67%	2.75%	6.50%	3.90%	5.98%	8.73%
2	Ameren Corporation	AEE	$ 1.92	$ 75.90	2.53%	2.61%	6.50%	3.90%	5.98%	8.59%
3	American Electric Power Company, Inc.	AEP	$ 2.71	$ 92.29	2.94%	2.99%	4.00%	3.90%	3.98%	6.97%
4	Avista Corporation	AVA	$ 1.55	$ 47.62	3.25%	3.31%	3.50%	3.90%	3.58%	6.89%
5	CMS Energy Corporation	CMS	$ 1.53	$ 62.26	2.46%	2.54%	7.00%	3.90%	6.38%	8.92%
6	Duke Energy Corporation	DUK	$ 3.75	$ 91.49	4.10%	4.21%	6.00%	3.90%	5.58%	9.79%
7	Entergy Corporation	ETR	$ 3.66	$117.71	3.11%	3.15%	2.00%	3.90%	2.38%	5.53%
8	IDACORP, Inc.	IDA	$ 2.56	$106.76	2.40%	2.44%	3.50%	3.90%	3.58%	6.02%
9	Northwestern Corporation	NWE	$ 2.30	$ 71.98	3.20%	3.25%	3.00%	3.90%	3.18%	6.43%
10	Pinnacle West Capital Corporation	PNW	$ 3.04	$ 90.05	3.38%	3.46%	5.00%	3.90%	4.78%	8.24%
11	Portland General Electric Company	POR	$ 1.52	$ 55.84	2.72%	2.78%	4.50%	3.90%	4.38%	7.16%
12	The Southern Company	SO	$ 2.46	$ 61.96	3.97%	4.04%	3.50%	3.90%	3.58%	7.62%
13	Xcel Energy Inc.	XEL	$ 1.62	$ 62.47	2.59%	2.66%	5.50%	3.90%	5.18%	7.84%
	Average		$ 2.31	$ 76.11	3.02%	3.09%	4.65%	3.90%	4.50%	7.59%
									DCF Lower Bound	6.22%
									DCF Upper Bound	8.83%
									Average	7.52%

Comparison DCF Estimates

2019 Q4 DCF COE estimate	7.52%
2022 Q4 DCF COE estimate	8.42%
Difference: **2022 Q4** minus Q4 2019	0.89%

Note:
[1] Source: The Value Line Investment Survey: Ratings & Reports.
[2] Source: The Wall Street Journal; Average Monthly Highest and Lowest.
[3] = [1] / [2]
[4] = [3] x (1 + .5 x [7])
[5] Source: [10] of Schedule SJW-11
[6] Source: Congress Budget Office (CBO), Budget Economic Outlook
[7] = (4 x [5] + [6]) / 5
[8] = [4] + [7]

Update to Schedule SJW-d13
to Reflect Most Current Data as of the Filing of Dr. Won's Testimony

Discounted Cash Flow (DCF) Costs of Common Equity (COE) Estimates
Based on EPS Growth Rates
for the Comparable Electric Utility Companies (excluding Pinnacle West Capital Corp)

2022 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	[1] Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected EPS Growth	[6] Projected GDP Growth	[7] Growth Rate	[8] COE
1	Alliant Energy Corporation	LNT	$ 1.71	$ 53.38	3.20%	3.29%	6.00%	3.90%	5.58%	8.87%
2	Ameren Corporation	AEE	$ 2.36	$ 84.01	2.81%	2.89%	6.50%	3.90%	5.98%	8.87%
3	American Electric Power Company, Inc.	AEP	$ 3.32	$ 91.02	3.65%	3.76%	6.50%	3.90%	5.98%	9.74%
4	Avista Corporation	AVA	$ 1.76	$ 39.96	4.40%	4.47%	3.00%	3.90%	3.18%	7.65%
5	CMS Energy Corporation	CMS	$ 1.84	$ 59.09	3.11%	3.21%	6.50%	3.90%	5.98%	9.19%
6	Duke Energy Corporation	DUK	$ 4.02	$ 95.97	4.19%	4.29%	5.00%	3.90%	4.78%	9.07%
7	Entergy Corporation	ETR	$ 4.28	$109.52	3.91%	3.99%	4.00%	3.90%	3.98%	7.97%
8	IDACORP, Inc.	IDA	$ 3.16	$103.56	3.05%	3.11%	4.00%	3.90%	3.98%	7.09%
9	Northwestern Corporation	NWE	$ 2.52	$ 54.45	4.63%	4.70%	3.00%	3.90%	3.18%	7.88%
10	Pinnacle West Capital Corporation	PNW								
11	Portland General Electric Company	POR	$ 1.81	$ 46.28	3.91%	4.00%	4.50%	3.90%	4.38%	8.38%
12	The Southern Company	SO	$ 2.72	$ 66.87	4.07%	4.19%	6.50%	3.90%	5.98%	10.17%
13	Xcel Energy Inc.	XEL	$ 1.95	$ 66.51	2.93%	3.01%	6.00%	3.90%	5.58%	8.59%
	Average		$ 2.62	$ 72.55	3.66%	3.74%	5.13%	3.90%	4.88%	8.62%
									DCF Lower Bound	7.77%
									DCF Upper Bound	9.46%
									Average	8.61%

2019 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	Dividend per Share	Stock Price	Dividend Yield	Expected Dividend Yield	Projected EPS Growth	Projected GDP Growth	Growth Rate	COE
1	Alliant Energy Corporation	LNT	$ 1.42	$ 53.10	2.67%	2.75%	6.50%	3.90%	5.98%	8.73%
2	Ameren Corporation	AEE	$ 1.92	$ 75.90	2.53%	2.61%	6.50%	3.90%	5.98%	8.59%
3	American Electric Power Company, Inc.	AEP	$ 2.71	$ 92.29	2.94%	2.99%	4.00%	3.90%	3.98%	6.97%
4	Avista Corporation	AVA	$ 1.55	$ 47.62	3.25%	3.31%	3.50%	3.90%	3.58%	6.89%
5	CMS Energy Corporation	CMS	$ 1.53	$ 62.26	2.46%	2.54%	7.00%	3.90%	6.38%	8.92%
6	Duke Energy Corporation	DUK	$ 3.75	$ 91.49	4.10%	4.21%	6.00%	3.90%	5.58%	9.79%
7	Entergy Corporation	ETR	$ 3.66	$117.71	3.11%	3.15%	2.00%	3.90%	2.38%	5.53%
8	IDACORP, Inc.	IDA	$ 2.56	$106.76	2.40%	2.44%	3.50%	3.90%	3.58%	6.02%
9	Northwestern Corporation	NWE	$ 2.30	$ 71.98	3.20%	3.25%	3.00%	3.90%	3.18%	6.43%
10	Pinnacle West Capital Corporation	PNW								
11	Portland General Electric Company	POR	$ 1.52	$ 55.84	2.72%	2.78%	4.50%	3.90%	4.38%	7.16%
12	The Southern Company	SO	$ 2.46	$ 61.96	3.97%	4.04%	3.50%	3.90%	3.58%	7.62%
13	Xcel Energy Inc.	XEL	$ 1.62	$ 62.47	2.59%	2.66%	5.50%	3.90%	5.18%	7.84%
	Average		$ 2.25	$ 74.95	2.99%	3.06%	4.63%	3.90%	4.48%	7.54%
									DCF Lower Bound	6.22%
									DCF Upper Bound	8.83%
									Average	7.52%

Comparison DCF Estimates

2019 Q4 DCF COE estimate	7.52%
2022 Q4 DCF COE estimate	8.61%
Difference: **2022 Q4** minus Q4 2019	1.09%

Note:
[1] Source: The Value Line Investment Survey: Ratings & Reports.
[2] Source: The Wall Street Journal; Average Monthly Highest and Lowest.
[3] = [1] / [2]
[4] = [3] x (1 + .5 x [7])
[5] Source: [10] of Schedule SJW-11
[6] Source: Congress Budget Office (CBO), Budget Economic Outlook
[7] = (4 x [5] + [6]) / 5
[8] = [4] + [7]

Dr. Won's As-Filed Schedule SJW-d13

Discounted Cash Flow (DCF) Costs of Common Equity (COE) Estimates
Based on Dividend per Share, Earning per Share, Stock Price, and Growth Rate
for the Comparable Electric Utility Companies

2022 Q3 DCF COE estimate

	Electric Utility Companies	Ticker	[1] Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected Weighted Growth	[6] Projected GDP Growth	Growth Rate	[8] COE
1	Alliant Energy Corporation	LNT	$ 1.71	$ 60.23	2.84%	2.91%	5.67%	3.90%	5.31%	8.23%
2	Ameren Corporation	AEE	$ 2.36	$ 91.17	2.59%	2.67%	6.67%	3.90%	6.11%	8.78%
3	American Electric Power Company, Inc.	AEP	$ 3.17	$ 98.75	3.21%	3.30%	6.17%	3.90%	5.71%	9.02%
4	Avista Corporation	AVA	$ 1.76	$ 41.83	4.21%	4.28%	3.33%	3.90%	3.45%	7.73%
5	CMS Energy Corporation	CMS	$ 1.84	$ 67.24	2.74%	2.82%	6.50%	3.90%	5.98%	8.80%
6	Duke Energy Corporation	DUK	$ 3.98	$107.39	3.71%	3.77%	3.17%	3.90%	3.31%	7.08%
7	Entergy Corporation	ETR	$ 4.09	$114.59	3.57%	3.65%	4.67%	3.90%	4.51%	8.16%
8	IDACORP, Inc.	IDA	$ 3.05	$108.83	2.80%	2.87%	4.83%	3.90%	4.65%	7.51%
9	Northwestern Corporation	NWE	$ 2.52	$ 54.98	4.58%	4.65%	2.67%	3.90%	2.91%	7.56%
10	Pinnacle West Capital Corporation	PNW	$ 3.44	$ 73.57	4.68%	4.73%	1.83%	3.90%	2.25%	6.98%
11	Portland General Electric Company	POR	$ 1.80	$ 51.01	3.53%	3.61%	4.50%	3.90%	4.38%	7.99%
12	The Southern Company	SO	$ 2.70	$ 75.64	3.57%	3.65%	4.50%	3.90%	4.38%	8.03%
13	Xcel Energy Inc.	XEL	$ 1.95	$ 72.72	2.68%	2.76%	6.00%	3.90%	5.58%	8.34%
	Average		$ 2.64	$ 78.30	3.44%	3.51%	4.65%	3.90%	4.50%	8.02%
									DCF Lower Bound	7.30%
									DCF Upper Bound	8.79%
									Average	8.04%

2019 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	Dividend per Share	Stock Price	Dividend Yield	Expected Dividend Yield	Projected Weighted Growth	Projected GDP Growth	Growth Rate	COE
1	Alliant Energy Corporation	LNT	$ 1.42	$ 53.10	2.67%	2.75%	6.50%	3.90%	5.98%	8.73%
2	Ameren Corporation	AEE	$ 1.92	$ 75.90	2.53%	2.60%	5.50%	3.90%	5.18%	7.78%
3	American Electric Power Company, Inc.	AEP	$ 2.71	$ 92.29	2.94%	3.00%	4.67%	3.90%	4.51%	7.52%
4	Avista Corporation	AVA	$ 1.55	$ 47.62	3.25%	3.32%	3.67%	3.90%	3.71%	7.03%
5	CMS Energy Corporation	CMS	$ 1.53	$ 62.26	2.46%	2.54%	7.00%	3.90%	6.38%	8.92%
6	Duke Energy Corporation	DUK	$ 3.75	$ 91.49	4.10%	4.18%	3.67%	3.90%	3.71%	7.89%
7	Entergy Corporation	ETR	$ 3.66	$117.71	3.11%	3.16%	3.33%	3.90%	3.45%	6.61%
8	IDACORP, Inc.	IDA	$ 2.56	$106.76	2.40%	2.45%	4.83%	3.90%	4.65%	7.10%
9	Northwestern Corporation	NWE	$ 2.30	$ 71.98	3.20%	3.25%	3.67%	3.90%	3.71%	6.97%
10	Pinnacle West Capital Corporation	PNW	$ 3.04	$ 90.05	3.38%	3.45%	4.83%	3.90%	4.65%	8.10%
11	Portland General Electric Company	POR	$ 1.52	$ 55.84	2.72%	2.78%	4.67%	3.90%	4.51%	7.30%
12	The Southern Company	SO	$ 2.46	$ 61.96	3.97%	4.04%	3.33%	3.90%	3.45%	7.49%
13	Xcel Energy Inc.	XEL	$ 1.62	$ 62.47	2.59%	2.66%	5.50%	3.90%	5.18%	7.84%
	Average		$ 2.31	$ 76.11	3.02%	3.09%	4.71%	3.90%	4.54%	7.64%
									DCF Lower Bound	7.00%
									DCF Upper Bound	8.42%
									Average	7.71%

Comparison DCF Estimates

2019 Q4 DCF COE estimate	7.71%
2022 Q3 DCF COE estimate	8.04%
Difference: Q3 2022 minus Q4 2019	0.34%

Note:
[1] Source: The Value Line Investment Survey: Ratings & Reports.
[2] Source: The Wall Street Journal; Average Monthly Highest and Lowest.
[3] = [1] / [2]
[4] = [3] x (1 + .5 x [7])
[5] Source: [10] of Schedule SJW-11
[6] Source: Congress Budget Office (CBO), Budget Economic Outlook
[7] = (4 x [5] + [6]) / 5
[8] = [4] + [7]

Update to Schedule SJW-d13
to Reflect Most Current Data as of the Filing of Dr. Won's Testimony
and to Compare Against the Company's 2015 Rate Case

Discounted Cash Flow (DCF) Costs of Common Equity (COE) Estimates
Based on EPS Growth Rates
for the Comparable Electric Utility Companies (excluding Pinnacle West Capital Corp)

2022 Q4 DCF COE estimate

	Electric Utility Companies	Ticker	[1] Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected EPS Growth	[6] Projected GDP Growth	[7] Growth Rate	[8] COE
1	Alliant Energy Corporation	LNT	$ 1.71	$ 53.38	3.20%	3.29%	6.00%	3.90%	5.58%	8.87%
2	Ameren Corporation	AEE	$ 2.36	$ 84.01	2.81%	2.89%	6.50%	3.90%	5.98%	8.87%
3	American Electric Power Company, Inc.	AEP	$ 3.32	$ 91.02	3.65%	3.76%	6.50%	3.90%	5.98%	9.74%
4	Avista Corporation	AVA	$ 1.76	$ 39.96	4.40%	4.47%	3.00%	3.90%	3.18%	7.65%
5	CMS Energy Corporation	CMS	$ 1.84	$ 59.09	3.11%	3.21%	6.50%	3.90%	5.98%	9.19%
6	Duke Energy Corporation	DUK	$ 4.02	$ 95.97	4.19%	4.29%	5.00%	3.90%	4.78%	9.07%
7	Entergy Corporation	ETR	$ 4.28	$109.52	3.91%	3.99%	4.00%	3.90%	3.98%	7.97%
8	IDACORP, Inc.	IDA	$ 3.16	$103.56	3.05%	3.11%	4.00%	3.90%	3.98%	7.09%
9	Northwestern Corporation	NWE	$ 2.52	$ 54.45	4.63%	4.70%	3.00%	3.90%	3.18%	7.88%
10	Pinnacle West Capital Corporation	PNW								
11	Portland General Electric Company	POR	$ 1.81	$ 46.28	3.91%	4.00%	4.50%	3.90%	4.38%	8.38%
12	The Southern Company	SO	$ 2.72	$ 66.87	4.07%	4.19%	6.50%	3.90%	5.98%	10.17%
13	Xcel Energy Inc.	XEL	$ 1.95	$ 66.51	2.93%	3.01%	6.00%	3.90%	5.58%	8.59%
	Average		$ 2.62	$ 72.55	3.66%	3.74%	5.13%	3.90%	4.88%	8.62%
									DCF Lower Bound	7.77%
									DCF Upper Bound	9.46%
									Average	8.61%

Aug-Oct 2014 DCF COE estimate

	Electric Utility Companies	Ticker	Dividend per Share	Stock Price	Dividend Yield	Expected Dividend Yield	Projected EPS Growth	Projected GDP Growth	Growth Rate	COE
1	Alliant Energy Corporation	LNT	$ 1.02	$ 28.75	3.55%	3.63%	4.50%	4.20%	4.44%	8.07%
2	Ameren Corporation	AEE	$ 1.64	$ 39.21	4.18%	4.28%	4.50%	4.20%	4.44%	8.72%
3	American Electric Power Company, Inc.	AEP	$ 2.12	$ 53.11	3.99%	4.08%	4.50%	4.20%	4.44%	8.52%
4	Avista Corporation	AVA	$ 1.27	$ 32.18	3.95%	4.05%	5.50%	4.20%	5.24%	9.29%
5	CMS Energy Corporation	CMS	$ 1.08	$ 30.12	3.59%	3.69%	6.50%	4.20%	6.04%	9.73%
6	Duke Energy Corporation	DUK	$ 3.18	$ 74.79	4.25%	4.35%	5.00%	4.20%	4.84%	9.19%
7	Entergy Corporation	ETR	$ 3.32	$ 76.61	4.33%	4.37%	1.00%	4.20%	1.64%	6.01%
8	IDACORP, Inc.	IDA	$ 1.88	$ 55.71	3.37%	3.41%	1.50%	4.20%	2.04%	5.45%
9	Northwestern Corporation	NWE	$ 1.60	$ 47.89	3.34%	3.40%	3.50%	4.20%	3.64%	7.04%
10	Pinnacle West Capital Corporation	PNW								
11	Portland General Electric Company	POR	$ 1.12	$ 33.49	3.34%	3.43%	5.00%	4.20%	4.84%	8.27%
12	The Southern Company	SO	$ 2.10	$ 44.35	4.73%	4.82%	3.50%	4.20%	3.64%	8.46%
13	Xcel Energy Inc.	XEL	$ 1.20	$ 31.40	3.82%	3.92%	5.50%	4.20%	5.24%	9.16%
	Average		$ 1.79	$ 45.63	3.87%	3.95%	4.21%	4.20%	4.21%	8.16%
									DCF Lower Bound	6.53%
									DCF Upper Bound	9.24%
									Average	7.88%

Comparison DCF Estimates

Aug-Oct 2014 DCF COE estimate	7.88%
2022 Q4 DCF COE estimate	8.61%
Difference: **2022 Q4** minus **Aug-Oct 2014**	0.73%

Note:
[1] Source: The Value Line Investment Survey: Ratings & Reports.
[2] Source: The Wall Street Journal; Average Monthly Highest and Lowest.
[3] = [1] / [2]
[4] = [3] x (1 + .5 x [7])
[5] Source: [10] of Schedule SJW-11
[6] Source: Congress Budget Office (CBO), Budget Economic Outlook
[7] = (4 x [5] + [6]) / 5
[8] = [4] + [7]

Capital Asset Pricing Model (CAPM) Costs of Common Equity (COE) Estimates
Based on Historical Return Differences Between Common Stocks and Long-Term U.S. Treasuries
for the Comparable Electric Utility Companies

2022 Q3 CAPM Estimate

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
			Duff&Phelps (1926-2021)				NYU Stern (1928-2021)				Market Risk Premium				CAPM Cost of Common Equity			
			Large Company Stocks		Long-term G-Bonds		S&P 500		US Treasury Bond		Duff&Phelps		NYU Stern		Duff&Phelps		NYU Stern	
			Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic
	Risk-Free		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Electric Utility Companies	Rate	Beta	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return
1 Alliant Energy Corporation	3.26%	0.85	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.18%	8.39%	7.63%	8.97%
2 Ameren Corporation	3.26%	0.80	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.95%	8.09%	7.37%	8.63%
3 American Electric Power Company, Ir	3.26%	0.75	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.72%	7.79%	7.11%	8.30%
4 Avista Corporation	3.26%	0.95	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.64%	8.99%	8.14%	9.64%
5 CMS Energy Corporation	3.26%	0.80	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.95%	8.09%	7.37%	8.63%
6 Duke Energy Corporation	3.26%	0.85	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.18%	8.39%	7.63%	8.97%
7 Entergy Corporation	3.26%	0.95	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.64%	8.99%	8.14%	9.64%
8 IDACORP, Inc.	3.26%	0.80	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.95%	8.09%	7.37%	8.63%
9 Northwestern Corporation	3.26%	0.95	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.64%	8.99%	8.14%	9.64%
10 Pinnacle West Capital Corporation	3.26%	0.90	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.41%	8.69%	7.88%	9.30%
11 Portland General Electric Company	3.26%	0.85	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.18%	8.39%	7.63%	8.97%
12 The Southern Company	3.26%	0.95	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.64%	8.99%	8.14%	9.64%
13 Xcel Energy Inc.	3.26%	0.80	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	6.95%	8.09%	7.37%	8.63%
Average	3.26%	0.86	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.23%	8.46%	7.68%	9.04%
																CAPM Lower Bound		7.23%
																CAPM Upper Bound		9.04%
																Average		**8.14%**

2019 Q4 CAPM Estimate

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
			Duff&Phelps (1926-2018)				NYU Stern (1928-2018)				Market Risk Premium				CAPM Cost of Common Equity			
			Large Company Stocks		Long-term G-Bonds		S&P 500		US Treasury Bond		Duff&Phelps		NYU Stern		Duff&Phelps		NYU Stern	
			Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic
	Risk-Free		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Electric Utility Companies	Rate	Beta	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return
1 Alliant Energy Corporation	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
2 Ameren Corporation	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.73%	5.55%	4.82%	5.70%
3 American Electric Power Company, Ir	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.73%	5.55%	4.82%	5.70%
4 Avista Corporation	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
5 CMS Energy Corporation	2.25%	0.50	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.50%	5.25%	4.58%	5.38%
6 Duke Energy Corporation	2.25%	0.50	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.50%	5.25%	4.58%	5.38%
7 Entergy Corporation	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
8 IDACORP, Inc.	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.73%	5.55%	4.82%	5.70%
9 Northwestern Corporation	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
10 Pinnacle West Capital Corporation	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.73%	5.55%	4.82%	5.70%
11 Portland General Electric Company	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
12 The Southern Company	2.25%	0.50	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.50%	5.25%	4.58%	5.38%
13 Xcel Energy Inc.	2.25%	0.50	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.50%	5.25%	4.58%	5.38%
Average	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.75%	5.58%	4.84%	5.72%
																CAPM Lower Bound		4.75%
																CAPM Upper Bound		5.72%
																Average		**5.23%**

Comparison DCF Estimates

2022 Q3 CAPM COE estimate	8.14%
2019 Q4 CAPM COE estimate	5.23%
Difference (2022 Q3 minus 2019 Q4)	2.91%

[1] Source: 3-Month Average of 30-Year Treasury Bond
[2] Source: Value Line, Investment Survey.
[3] Source: Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[4] Source: Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[5] Source: Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[6] Source: Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[7] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[8] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[9] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[10] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[11] = [3] - [5]
[12] = [4] - [6]
[13] = [7] - [9]
[14] = [8] - [10]
[15] = [1] + [2] x [11]
[16] = [1] + [2] x [12]
[17] = [1] + [2] x [13]
[18] = [1] + [2] x [14]

Capital Asset Pricing Model (CAPM) Costs of Common Equity (COE) Estimates
Based on Historical Return Differences Between Common Stocks and Long-Term U.S. Treasuries
for the Comparable Electric Utility Companies

2022 Q4 CAPM Estimate

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
				Duff&Phelps (1926-2021)				NYU Stern (1928-2021)				Market Risk Premium				CAPM Cost of Common Equity			
				Large Company Stocks		Long-term G-Bonds		S&P 500		US Treasury Bond		Duff&Phelps		NYU Stern		Duff&Phelps		NYU Stern	
				Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic
		Risk-Free		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
	Electric Utility Companies	Rate	Beta	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return
1	Alliant Energy Corporation	3.71%	0.85	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.62%	8.83%	8.07%	9.41%
2	Ameren Corporation	3.71%	0.85	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.62%	8.83%	8.07%	9.41%
3	American Electric Power Company, Ir	3.71%	0.75	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.16%	8.23%	7.56%	8.74%
4	Avista Corporation	3.71%	0.90	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.85%	9.13%	8.33%	9.75%
5	CMS Energy Corporation	3.71%	0.80	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.39%	8.53%	7.81%	9.08%
6	Duke Energy Corporation	3.71%	0.85	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.62%	8.83%	8.07%	9.41%
7	Entergy Corporation	3.71%	0.95	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	8.09%	9.44%	8.58%	10.08%
8	IDACORP, Inc.	3.71%	0.80	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.39%	8.53%	7.81%	9.08%
9	Northwestern Corporation	3.71%	0.90	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.85%	9.13%	8.33%	9.75%
10	Pinnacle West Capital Corporation	3.71%	0.90	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.85%	9.13%	8.33%	9.75%
11	Portland General Electric Company	3.71%	0.85	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.62%	8.83%	8.07%	9.41%
12	The Southern Company	3.71%	0.95	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	8.09%	9.44%	8.58%	10.08%
13	Xcel Energy Inc.	3.71%	0.80	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.39%	8.53%	7.81%	9.08%
	Average	3.71%	0.86	10.46%	12.33%	5.85%	6.30%	9.98%	11.82%	4.84%	5.11%	4.61%	6.03%	5.13%	6.71%	7.66%	8.88%	8.11%	9.46%
																	CAPM Lower Bound		7.66%
																	CAPM Upper Bound		9.46%
																	Average		**8.56%**

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
				Duff&Phelps (1926-2018)				NYU Stern (1928-2018)				Market Risk Premium				CAPM Cost of Common Equity			
				Large Company Stocks		Long-term G-Bonds		S&P 500		US Treasury Bond		Duff&Phelps		NYU Stern		Duff&Phelps		NYU Stern	
				Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic	Geometric	Arithmetic
		Risk-Free		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
	Electric Utility Companies	Rate	Beta	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return	Return
1	Alliant Energy Corporation	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
2	Ameren Corporation	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.73%	5.55%	4.82%	5.70%
3	American Electric Power Company, Ir	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.73%	5.55%	4.82%	5.70%
4	Avista Corporation	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
5	CMS Energy Corporation	2.25%	0.50	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.50%	5.25%	4.58%	5.38%
6	Duke Energy Corporation	2.25%	0.50	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.50%	5.25%	4.58%	5.38%
7	Entergy Corporation	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
8	IDACORP, Inc.	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.73%	5.55%	4.82%	5.70%
9	Northwestern Corporation	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
10	Pinnacle West Capital Corporation	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.73%	5.55%	4.82%	5.70%
11	Portland General Electric Company	2.25%	0.60	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.95%	5.85%	5.05%	6.01%
12	The Southern Company	2.25%	0.50	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.50%	5.25%	4.58%	5.38%
13	Xcel Energy Inc.	2.25%	0.50	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.50%	5.25%	4.58%	5.38%
	Average	2.25%	0.55	10.00%	11.90%	5.50%	5.90%	9.49%	11.36%	4.83%	5.10%	4.50%	6.00%	4.66%	6.26%	4.75%	5.58%	4.84%	5.72%
																	CAPM Lower Bound		4.75%
																	CAPM Upper Bound		5.72%
																	Average		**5.23%**

Comparison DCF Estimates

2022 Q4 CAPM COE estimate	8.56%
2019 Q4 CAPM COE estimate	5.23%
Difference (**2022 Q4** minus 2019 Q4)	3.33%

[1] Source: 3-Month Average of 30-Year Treasury Bond
[2] Source: Value Line, Investment Survey.
[3] Source: Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[4] Source: Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[5] Source: Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[6] Source: Duff & Phelps, the Stocks, Bonds, Bills, and Inflation (SBBI®) Monthly Dataset.
[7] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[8] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[9] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[10] Source: Risk Premium, Damodaran Online, Stern School of Business, NYU.
[11] = [3] - [5]
[12] = [4] - [6]
[13] = [7] - [9]
[14] = [8] - [10]
[15] = [1] + [2] x [11]
[16] = [1] + [2] x [12]
[17] = [1] + [2] x [13]
[18] = [1] + [2] x [14]

Update to Schedule SJW-d15
Dr. Won's Recommended Authorized Return on Equity

Based Solely on Comparative DCF Analysis

	As-Filed Dr. Won DCF	Notes		As-Adjusted Dr. Won DCF Reflect Updated 4Q/2022 Data Only	Notes	As-Adjusted Dr. Won DCF Reflect 4Q/2022 Data, Excl. PNW, EPS Gwth Rates	Notes
Comparative DCF Analysis			Comparative DCF Analysis				
2022 Q3 Estimate	8.04%	[1]	**2022 Q4** Estimate	8.31%	[6]	8.61%	[11]
2019 Q4 Estimate	7.71%	[2]	2019 Q4 Estimate	7.71%	[7]	7.52%	[12]
COE Change	0.34%	[3]	COE Change	0.60%	[8]	1.09%	[13]
2019 Empire Case Authorized ROE	9.25%	[4]	2019 Empire Case Authorized ROE	9.25%	[9]	9.25%	[14]
Estimated ROE (4Q/2022)	9.59%	[5]	Estimated ROE (4Q/2022)	9.85%	[10]	10.34%	[15]

Notes
[1] Schedule SJW-d13
[2] Schedule SJW-d13
[3] Equals [1] - [2]
[4] Amended Report and Order in Case No. ER-2019-0374
[5] Equals [3] + [4]
[6] Schedule AEB-R1, Attachment 9, p. 2
[7] Schedule AEB-R1, Attachment 9, p. 2
[8] Equals [6] - [7]
[9] Amended Report and Order in Case No. ER-2019-0374
[10] Equals [8] + [9]
[11] Schedule AEB-R1, Attachment 9, p. 4
[12] Schedule AEB-R1, Attachment 9, p. 4
[13] Equals [11] - [12]
[14] Amended Report and Order in Case No. ER-2019-0374
[15] Equals [13] + [14]

Update to Schedule SJW-d15
Dr. Won's Recommended Authorized Return on Equity

Based on Comparative DCF and CAPM Analyses

	Cost of Equity	Notes
Comparative DCF Analysis		
2022 Q3 Estimate	8.04%	[1]
2019 Q4 Estimate	7.71%	[2]
COE Change	0.34%	[3]
Comparative CAPM Analysis		
2022 Q3 Estimate	8.14%	[4]
2019 Q4 Estimate	5.23%	[5]
COE Change	2.91%	[6]
Average COE Change	1.62%	[7]
Last Authorized ROE (Q4/2019)	9.25%	[8]
Estimated ROE (4Q/2022)	10.87%	[9]

	Cost of Equity	Notes
Comparative DCF Analysis		
2022 Q4 Estimate	8.31%	[10]
2019 Q4 Estimate	7.71%	[11]
COE Change	0.60%	[12]
Comparative CAPM Analysis		
2022 Q4 Estimate	8.56%	[13]
2019 Q4 Estimate	5.23%	[14]
COE Change	3.33%	[15]
Average COE Change	1.96%	[16]
Last Authorized ROE (Q4/2019)	9.25%	[17]
Estimated ROE (4Q/2022)	11.21%	[18]

Notes
[1] Schedule SJW-d13
[2] Schedule SJW-d13
[3] Equals [1] - [2]
[4] Schedule AEB-R1, Attachment 10, p. 1
[5] Schedule AEB-R1, Attachment 10, p. 1
[6] Equals [4] - [5]
[7] Average of [3] and [6]
[8] Amended Report and Order in Case No. ER-2019-0374
[9] Equals [7] + [8]
[10] Schedule SJW-d13
[11] Schedule SJW-d13
[12] Equals [10] - [11]
[13] Schedule AEB-R1, Attachment 10, p. 2
[14] Schedule AEB-R1, Attachment 10, p. 2
[15] Equals [13] - [14]
[16] Average of [12] and [15]
[17] Amended Report and Order in Case No. ER-2019-0374
[18] Equals [16] + [17]

Update to Schedule SJW-d15
Dr. Won's Recommended Authorized Return on Equity

Based Solely on Comparative DCF Analysis

	As-Filed Dr. Won DCF	Notes		As-Adjusted Dr. Won DCF Reflect 4Q/2022 Data, Aug-Oct 2014 Data, Excl. PNW, EPS Gwth Rates	Notes
Comparative DCF Analysis			Comparative DCF Analysis		
2022 Q3 Estimate	8.04%	[1]	**2022 Q4** Estimate	8.61%	[6]
2019 Q4 Estimate	7.71%	[2]	**Aug-Oct 2014** Estimate	7.88%	[7]
COE Change	0.34%	[3]	COE Change	0.73%	[8]
2019 Empire Case Authorized ROE	9.25%	[4]	**2015 Ameren MO Case Authorized ROE**	9.53%	[9]
Estimated ROE (4Q/2022)	9.59%	[5]	Estimated ROE (4Q/2022)	10.26%	[10]

Notes
[1] Schedule SJW-d13
[2] Schedule SJW-d13
[3] Equals [1] - [2]
[4] Amended Report and Order in Case No. ER-2019-0374
[5] Equals [3] + [4]
[6] Schedule AEB-R1, Attachment 9B, p. 4
[7] Schedule AEB-R1, Attachment 9B, p. 4
[8] Equals [6] - [7]
[9] Missouri Public Service Commission, Order, Case No. ER-2014-0258
[10] Equals [8] + [9]

MR. MURRAY'S ELECTRIC PROXY GROUP - ZACKS RANK AND STYLE SCORES

			Zacks Style Scores Value Growth Momentum ("VGM")				
Company	Ticker	Zacks Rank	Value	Growth	Momentum	VGM	Overall Numeric Rank
ALLETE, Inc.	ALE	Buy	C	D	C	C	3
Alliant Energy Corporation	LNT	Sell	D	C	A	C	3
Ameren Corporation	AEE	Hold	C	B	B	B	2
American Electric Power Company, Inc.	AEP	Hold	C	B	B	B	2
Avangrid, Inc.	AGR	Hold	C	F	B	D	4
Avista Corporation	AVA	Sell	C	F	A	D	4
Black Hills Corporation	BKH	Sell	C	D	F	D	4
CenterPoint Energy, Inc.	CNP	Buy	C	F	D	D	4
CMS Energy Corporation	CMS	Sell	D	F	A	D	4
Consolidated Edison, Inc.	ED	Buy	C	C	F	D	4
Dominion Energy, Inc.	D	Hold	C	D	F	D	4
DTE Energy Company	DTE	Hold	C	F	B	D	4
Duke Energy Corporation	DUK	Hold	C	D	F	D	4
Edison International	EIX	Hold	B	B	F	B	2
Entergy Corporation	ETR	Hold	B	B	F	B	2
Evergy, Inc.	EVRG	Hold	C	B	C	B	2
Eversource Energy	ES	Sell	C	C	D	C	3
Exelon Corporation	EXC	Hold	B	C	C	B	2
FirstEnergy Corp.	FE	Sell	C	C	A	B	2
Hawaiian Electric Industries, Inc.	HE	Hold	C	D	C	C	3
IDACORP, Inc.	IDA	Hold	C	C	B	C	3
MDU Resources Group, Inc.	MDU	Buy	B	B	B	A	1
MGE Energy, Inc.	MGEE	Strong Buy	F	C	C	D	4
NextEra Energy, Inc.	NEE	Hold	D	D	A	D	4
NiSource Inc.	NI	Hold	B	D	A	C	3
NorthWestern Corporation	NWE	Sell	C	C	A	C	3
OGE Energy Corp.	OGE	Hold	B	B	D	B	2
Otter Tail Corporation	OTTR	Hold	B	A	D	B	2
PG&E Corporation	PCG	Buy	B	B	C	B	2
Pinnacle West Capital Corporation	PNW	Hold	B	C	F	C	3
PNM Resources, Inc.	PNM	Hold	C	B	B	B	2
Portland General Electric Company	POR	Sell	B	A	C	B	2
PPL Corporation	PPL	Hold	C	D	B	D	4
Public Service Enterprise Group Incorporated	PEG	Hold	D	F	F	F	6
Sempra	SRE	Hold	D	F	C	F	6
The Southern Company	SO	Sell	D	C	F	D	4
Unitil Corporation	UTL	Hold	B	D	B	C	3
WEC Energy Group, Inc.	WEC	Sell	D	C	B	C	3
Xcel Energy Inc.	XEL	Hold	C	B	A	A	1

Strong Buy	1	Proxy Group Average	C	3.1
Buy	5			
Hold	23			
Sell	10			
Hold/Sell	84.62%			

Notes:
Source: Zacks Investment Research

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Adjust Its Revenues for Electric Service.	)))	Case No. ER-2022-0337

AFFIDAVIT OF ANN E. BULKLEY

COMMONWEALTH OF MASSACHUSETTS)
) **ss**
CITY OF BOSTON)

Ann E. Bulkley, being first duly sworn states:

My name is Ann E. Bulkley, and on my oath declare that I am of sound mind and lawful age; that I have prepared the foregoing *Rebuttal Testimony*; and further, under the penalty of perjury, that the same is true and correct to the best of my knowledge and belief.

Ann E. Bulkley

Sworn to me this 15th day of February, 2023.