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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. ER-2022-0337

SURREBUTTAL TESTIMONY

OF

ANN E. BULKLEY

ON

BEHALF OF

UNION ELECTRIC COMPANY

D/B/A AMEREN MISSOURI

St. Louis, Missouri
March 2023

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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 surrebuttal 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 and rebuttal testimony in this proceeding?

A: Yes. I submitted direct and rebuttal testimony regarding the appropriate return on equity ("ROE") for Ameren Missouri in this proceeding on August 1, 2022 and February 15, 2023, respectively.

Q: What is the purpose of your surrebuttal testimony?

A: The purpose of my surrebuttal testimony is to respond to the rebuttal 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

[1] Missouri Public Service Commission, Rebuttal Testimony of Seoung Joun Won, PhD, Case No. ER-2022-0337, February 15, 2023 ("Won Rebuttal Testimony).

("OPC")[2] regarding their respective proposals for the return on equity for the Company in this proceeding. In addition, my surrebuttal testimony also responds to the rebuttal testimony of Mr. Keith Majors on behalf of Staff regarding the regulatory and business risks of the Company.[3]

II. Summary and Overview

Q: Please briefly summarize your surrebuttal testimony and your key conclusions and recommendations regarding the appropriate ROE for Ameren Missouri in this proceeding.

A: My key conclusions are as follows:

- Dr. Won and Mr. Murray dispute that utility share prices are likely to underperform over the near-term; however, neither has provided any evidence that would contradict equity analysts' projections of utility stock underperformance given the interest rate environment. In fact, the evidence demonstrates that the utility sector has underperformed as interest rates have increased:
  - Since July 1, 2022, the yield on the 30-year Treasury bond increased 80 basis points, while the share prices for the vertically-integrated electric utilities in my proxy group declined by 7.90 percent and the price of the S&P 500 Index increased 5.20 percent.
  - The price-to-earnings ("P/E") ratios for the companies in my proxy group declined 11 percent from January 2022 to February 2023.
- It is disingenuous for Dr. Won and Mr. Murray to suggest that I should have relied on the assumptions used by their cost of equity estimation models when they do not directly rely on the results of those models to support their recommended ROEs. Rather their ROE recommendations are well above the results of their respective models, as Dr. Won relies on a comparative methodology leveraging off of an authorized ROE in a proceeding involving a different utility with different circumstances four years ago, while Mr. Murray simply relies on subjective judgment for his ROE recommendation.

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[2] Missouri Public Service Commission, Rebuttal Testimony of David Murray, Case No. ER-2022-0337, February 15, 2023 ("Murray Rebuttal Testimony").

[3] Missouri Public Service Commission, Rebuttal Testimony of Keith Majors, Case No. ER-2022-0337, February 15, 2023 ("Majors Rebuttal Testimony).

- Overall, while Dr. Won and Mr. Murray dispute the assumptions used in my cost of equity estimation models:
    - Neither Dr. Won nor Mr. Murray have demonstrated that their suggested changes to my proxy group are supported. Specifically, there is no basis to include a company that had its utility's projected earnings growth rate reduced to zero or near zero as a result of regulatory issues, nor is there a basis to exclude utilities with unregulated operations but that derive the majority of their operating income from regulated operations and thus are similar to Ameren Missouri, particularly when there is no discernible trend that companies in my proxy group with a relatively higher percentage of unregulated operations had a higher cost of equity than companies with a relatively lower percentage of unregulated operations.
    - Dr. Won's and Mr. Murray's criticism regarding the use of projected earnings growth rates in the constant growth DCF model is unfounded given that earnings are the fundamental driver of dividend growth rates, and there is significant academic research demonstrating that EPS growth rates are most relevant in stock price valuation.
    - Dr. Won's and Mr. Murray's allegation that the market return in my CAPM and ECAPM analyses is too high is contradicted by the fact that the methodology I have used to estimate the market return is consistent with historical average returns, and consistent with the approach accepted by various regulators.
    - Dr. Won's re-specification of my CAPM and ECAPM analyses includes multiple errors, including relying on data from another utility's prior rate proceeding. Due to these errors, Dr. Won's adjustments to my CAPM and ECAPM analyses simply cannot be relied upon.
    - Neither Dr. Won nor Mr. Murray have provided any evidence that the results of my Bond Yield Plus Risk Premium analysis are unreliable, and Dr. Won's re-specification of my analysis by adding a trend variable not only includes errors, but also produces results that are directly contrary to the conclusion in his testimony that, as interest rates increase, so too does the utility cost of equity.
- Dr. Won's review of previously authorized ROEs does not provide the necessary insight to draw meaningful conclusions about the forward-looking investor-required return to establish the ROE in this proceeding. Specifically, Dr. Won does not appropriately consider the authorized ROEs for only risk-comparable vertically-integrated electric utilities, nor has he considered the differences in the market conditions that existed when those returns were authorized relative to current market conditions.

- Given the change in market conditions, including significantly increased interest rates, it is reasonable to expect that the recommended ROEs in this proceeding would be higher than recently authorized ROEs. Again, as Dr. Won acknowledges multiple times in his rebuttal testimony, all else equal, higher interest rates indicate a higher required cost of equity.
- The development of the investor-required ROE is based on a proxy group of risk-comparable companies, and it is important to consider the relative risks of the proxy group companies and the subject company to determine how the subject company's risk profile compares with the group. However, neither Dr. Won, Mr. Murray, nor Mr. Majors have conducted a comparative analysis of the risks of Ameren Missouri relative to the proxy group. Therefore, they have provided no support for their conclusions that Ameren Missouri has reduced business and regulatory risk relative to the proxy group.

III. Capital Markets

Q: Please summarize Dr. Won's and Mr. Murray's concern with your position on how current market conditions affect the cost of equity for utilities.

A: Both Dr. Won and Mr. Murray disagree with my conclusion that the utility sector is expected to underperform over the near-term given the recent increase in interest rates and that interest rates are expected to remain elevated over the period that the Company's rates will be in effect. Mr. Murray claims that investors have factored in expected market conditions into the current share prices of utilities, while Dr. Won contends that there is more of a "possibility" that the utility ROE and cost of equity are overstated given the Federal Reserve's normalization of monetary policy.[4]

[4] Murray Rebuttal Testimony, at 29; Won Rebuttal Testimony, at 6.

Q: Can you provide an example of why it is important to consider interest rate projections?

A: Yes. Reviewing the changes in market conditions since I filed my direct testimony in August 2022 demonstrates why it is important to consider projected interest rates at a time when the Federal policy initiatives are clear that interest rates will be changing. In the analysis presented in my direct testimony, I relied on a near-term projected yield on the 30-year Treasury bond for Q4/2022 through Q4/2023 of 3.74 percent. As of the end of February 2023, the current 30-day average yield on the 30-year Treasury bond was 3.74 percent, which is equivalent to the near-term projected yield that I relied on in the CAPM analysis in my direct testimony. Had I not considered the near-term projected interest rates in my CAPM analysis, I would have understated the cost of equity only several months into the rate proceeding.

Q: Do the recent increases in interest rates have any effect on the share prices of utilities?

A: Yes. As discussed in my direct testimony, interest rates and utility share prices are inversely correlated, which means that an increase in interest rates will result in a decline in the share prices of utilities.[5]

[5] Bulkley Direct Testimony, at 25-26.

Q: Did Mr. Murray conclude in his direct testimony that interest rates and the share prices of utilities are inversely related?

A: Yes, he did. Mr. Murray noted that the valuation levels of utility stocks are inversely related to bond yields, which means that the valuation levels of utilities will decline (increase) as interest rates increase (decrease).[6]

Q: Since Mr. Murray acknowledges the inverse relationship between interest rates and utility share prices, does that mean he agrees utility share prices will decline as a result of the recent increase in interest rates?

A: No. Mr. Murray concludes that the historical inverse relationship has not been evident in the market data for 2022. According to Mr. Murray, the stock prices for the companies in my proxy group declined only 3.11 percent in 2022 despite the fact that the yield on Moody's Baa corporate bonds increased by 74 percent.[7] Furthermore, Mr. Murray contends that the utility sector outperformed broader markets by the "largest margin this century" in 2022.[8]

Similarly, Dr. Won contends that the S&P Utilities Index increased from March to April in 2022 and then again in August 2022 even though interest rates were increasing.[9]

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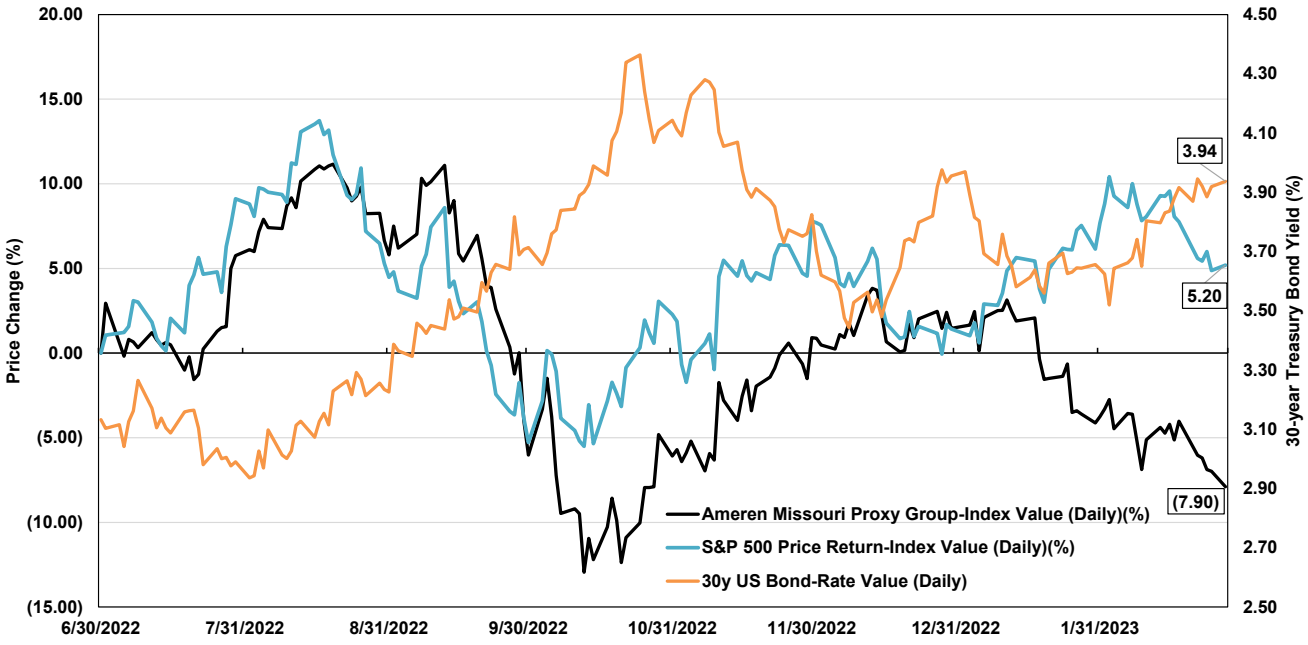
6 Murray Direct Testimony, at 10.
7 Murray Rebuttal Testimony, at 25.
8 Murray Rebuttal Testimony, at 24.
9 Won Rebuttal Testimony, at 6.

Q: Has the utility sector outperformed the broader market as interest rates have increased?

A: No, it has not. I agree that utility stocks outperformed the broader market in the immediate aftermath of Russia's invasion of Ukraine in the beginning of 2022, a time when interest rates were also increasing. However, in the second half of 2022, as interest rates continued to increase, utility stocks have underperformed the broader market as inflation remained at levels not seen in 40 years and interest rates increased significantly. As shown in Figure 1, since July 1, 2022, the share prices for the companies included in my proxy group declined by 7.90 percent while the S&P 500 increased 5.20 percent and the yield on the 30-year Treasury bond increased 80 basis points.

FIGURE 1: RELATIVE PERFORMANCE OF AMEREN MISSOURI'S PROXY GROUP AND THE S&P 500, JULY 2022 – FEBRUARY 2023[10]



Q: Mr. Murray contends that the P/E ratios for your proxy group have remained relatively stable even though interest rates have increased, which indicates that investors' required risk premia for utility stocks have declined.[11] Do you agree?

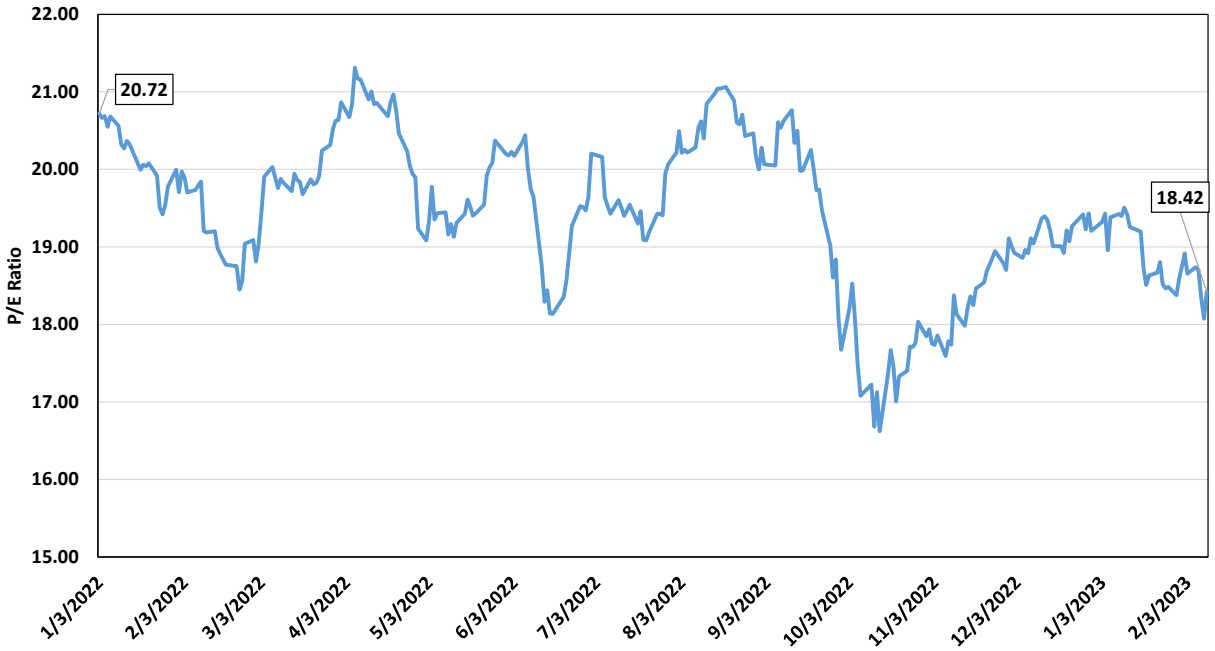
A: No, I do not. On page 27 of his rebuttal testimony, Mr. Murray reviews the P/E ratios for the companies included in my proxy group and concludes that the P/E ratios started 2022 slightly over 20 and ended 2022 slightly under 20, thus implying that the valuations of my proxy group companies have not been affected by the recent increase in interest rates. However, Mr. Murray is not correct and his conclusion is based primarily on how he has displayed the P/E ratios for my proxy group

[10] S&P Capital IQ Pro.

[11] Murray Rebuttal Testimony, at 26-28.

companies in his chart. Therefore, I adjusted Mr. Murray's chart to include data through February 10, 2023, which Mr. Murray provided in his workpapers, and to change the y-axis of the chart to more clearly show the daily changes in the P/E ratios over the period of January 2022 through February 2023. As shown in Figure 2 below, the P/E ratios for the companies in my proxy group declined 11 percent from 20.72 on January 3, 2022 to 18.42 on February 10, 2023. Counter to the conclusion of Mr. Murray, the valuations of my proxy group companies have declined as a result of the recent increase in interest rates.

FIGURE 2: AVERAGE P/E RATIOS OF AMEREN MISSOURI PROXY GROUP, JANUARY 1, 2022 THROUGH FEBRUARY 10, 2023[12]



[12] Murray workpaper "Rebuttal – Valuation Charts.xlsx."

Q: Are interest rates expected to remain elevated over the near-term?

A: Yes. The projected 30-year Treasury bond yield as reported by *Blue Chip Financial Forecasts* for the period of Q2/2023 to Q2/2024 is 3.82 percent.[13] The projected 30-year Treasury bond yield also as reported by *Blue Chip Financial Forecasts* for the period of 2024 to 2028 is 3.90 percent.[14] In fact, in testifying before the Senate Banking Committee on March 7, 2023, Federal Reserve Chairman Powell signaled that the ultimate level of interest rates is likely to be higher than previously anticipated.[15] Therefore, long-term Treasury bond yields are projected to remain elevated for the near term.

Q: Have other regulatory commissions acknowledged the effect of current capital market conditions in establishing the ROE for utilities?

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

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

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[13] *Blue Chip Financial Forecasts*, Vol. 42, No. 2, February 1, 2023, at 2.

[14] *Blue Chip Financial Forecasts*, Vol. 41, No. 12, December 2, 2022, at 14.

[15] Smialek, Jeanna. "Fed Chair Opens Door to Faster Rate Moves and Higher Peak." New York Times. March 7, 2023.

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

We have previously determined, above, that we shall utilize I&E's DCF and CAPM methodologies. I&E's DCF and CAPM produce a range of reasonableness for the ROE in this proceeding from 8.90% [DCF] to 9.89% [CAPM]. Based upon our informed judgment, which includes consideration of a variety of factors, including increasing inflation leading to increases in interest rates and capital costs since the rate filing, we determine that a base ROE of 9.75% is reasonable and appropriate for Aqua.[16]

[16] Pennsylvania Public Utility Commission, Docket Nos. R-2021-3027385 and R-2021-3027386, Opinion and Order, May 12, 2022, pp. 154-155 and 177-178.

It is important to note that the final authorized ROE for Aqua was 10.00 percent (*i.e.*, a 9.75 percent base ROE plus 0.25 percent for management performance) with an equity ratio of 53.95 percent.

IV. Proxy Group

Q: Please summarize Dr. Won's and Mr. Murray's positions with respect to the proxy group that you relied on for Ameren Missouri.

A: Dr. Won suggests that my analysis of Pinnacle West Capital Corporation's ("PNW") stock price is incorrect and that, as a result, I have inappropriately excluded this company from the proxy group. Further, Dr. Won concludes that I have inappropriately included ALLETE, Inc. ("ALE"), NextEra Energy, Inc. ("NEE"), and Otter Tail Corporation ("OTTR") in my proxy group, each of which has regulated assets that represent less than 80 percent of total assets.[17]

Mr. Murray suggests that I do not recognize or discuss that some of the companies contained in my proxy group have "significant exposure" to unregulated operations.[18] Specifically, Mr. Murray notes that I have included Entergy Corp. ("ETR"), NEE, OGE Energy Corporation ("OG&E"), and OTTR in my proxy group, each of which has substantial unregulated operations. Mr. Murray believes that companies with a higher percentage of unregulated operations have greater risk, and therefore, concludes that I have not accounted for the increased risk of

[17] Won Rebuttal Testimony, at 9.

[18] Murray Rebuttal Testimony, at 21.

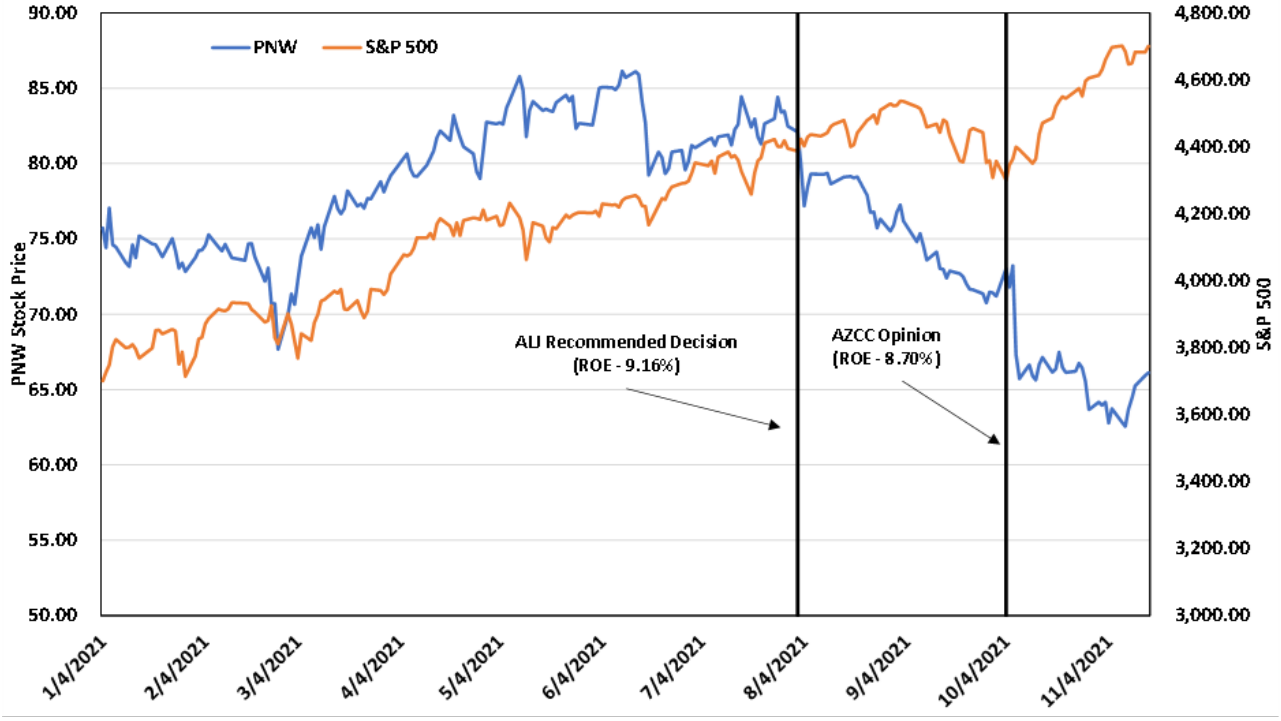
unregulated operations when comparing the business risk of Ameren Missouri to the proxy group.[19]

Q: Is Dr. Won correct that PNW should be included in the proxy group used to determine the ROE for Ameren Missouri?

A: No, for multiple reasons. First, Dr. Won incorrectly suggests that my testimony examines the prices of PNW's stock over the period from October to November 2021. In fact, my testimony correctly examines the period from the initial Administrative Law Judge ("ALJ") decision on August 2, 2021 through when the final decision was issued in the Arizona Public Service ("APS") case on November 4, 2021. As shown in Figure 4 of my rebuttal testimony, and provided again as Figure 3 below, the decline in stock price over this period was 24 percent.

[19] Murray Rebuttal Testimony, at 21-22.

FIGURE 3: PNW STOCK PRICE VS. S&P 500 UTILITIES



Second, as discussed in my rebuttal testimony, the financial effect of the decision in APS's last rate proceeding resulted in a significant downward revision in the projected EPS growth rates for PNW (e.g., the consensus projected EPS growth rate estimate reported by IBES for PNW was reduced to nearly zero, while *Value Line* reduced its estimate of projected EPS growth to "Nil"). Additionally, as discussed in my direct testimony, for inclusion in my proxy group, I required a company have positive projected EPS growth rates from at least two equity analysts. As shown in Figure 4 below, PNW would not currently meet this screen as the company did not have positive growth rates from two equity analysts as of December 31, 2022 (*i.e.*, the end of the analytical period that I relied on in my rebuttal testimony).

FIGURE 4: PNW – PROJECTED EPS GROWTH RATE AS OF DECEMBER 31, 2022

Source	Projected 3-5 year EPS Growth Rate
Value Line	0.50%
Yahoo! Finance	(3.95%)
Zacks	N/A

Finally, the Arizona Corporation Commission's ("ACC") decision in APS's last rate case and the resulting market reaction changed PNW's plans to raise capital. In November 2021, following the stock market's and credit rating agencies' response to the regulatory decision, PNW deferred an equity issuance until after its next rate decision in 2024 in order to protect shareholders from further dilution, reduce O&M expenses, and optimize its balance sheet and capital program.[20] Therefore, it is evident that the decision in APS's last rate proceeding has had a meaningful financial effect on PNW that warrants excluding the company from the proxy group used to estimate the ROE for Ameren Missouri.

Q: Do you agree with Dr. Won's and Mr. Murray's position that your proxy group includes companies with significant unregulated operations that result in greater risk for the proxy group companies?

A: No, I do not. First, Mr. Murray's statement that my proxy group contains companies with substantial unregulated operations is not correct. As I discussed in my direct testimony, I applied a screening criterion that required a company to derive at

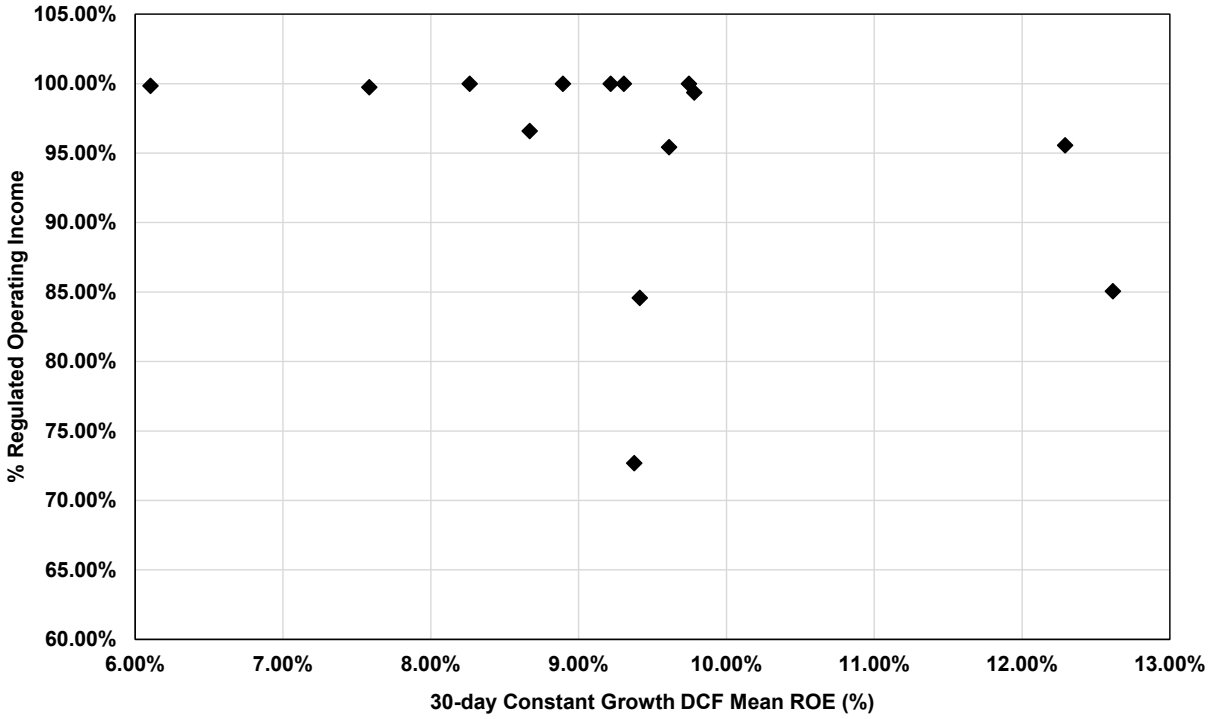
[20] Pinnacle West Capital Corporation NYSE: PNW FQ3 2021 Earnings Call Transcripts, November 5, 2021, at 7-8.

least 60 percent of its operating income from regulated operations, meaning that the majority of the operations of the companies included in my proxy group are regulated similar to Ameren Missouri.[21]

Second, as shown in Figure 5, there was no discernible trend in the constant growth DCF results for the companies in my proxy group to indicate that companies with a relatively higher percentage of unregulated operations had a higher cost of equity than companies with a relatively lower percentage of unregulated operations. This provides further support that the operating risk of companies with a relatively higher percentage of unregulated operations in the proxy group are not perceived to have greater risk than companies in the proxy group with a relatively lower percentage of unregulated operations.

[21] Bulkley Direct Testimony, at 34.

FIGURE 5: COMPARISON OF 30-DAY CONSTANT GROWTH DCF RESULTS AND PERCENTAGE OF REGULATED OPERATING INCOME[22]



Third, neither Dr. Won nor Mr. Murray have conducted any analysis to support their conclusions that the companies with a higher percentage of unregulated operations in my proxy group have greater risk than Ameren Missouri. As discussed in my direct testimony, I compared the business and financial risk of Ameren Missouri to the proxy group,[23] and based on these analyses, I concluded that Ameren Missouri has relatively greater overall risk as compared to the proxy group overall.

[22] Schedule AEB-D2, Attachment 2.

[23] Bulkley Direct Testimony, at 58-73.

V. DCF Analysis

Q: What are Dr. Won's and Mr. Murray's criticisms of your DCF analyses?

A: Dr. Won and Mr. Murray both criticize the use of projected earnings growth rates in the DCF model and suggest that the use of 3- to 5-year earnings growth rates in the constant growth DCF model overstates the cost of equity.[24] Dr. Won suggests that it would be more appropriate to rely on a long-term growth rate that approximates the level of long-term GDP growth.[25] Mr. Murray suggests, without any support, that the use of projected EPS growth rates in the DCF analysis "is not how equity analysts determine fair prices to pay for utility stocks."[26] In addition, Mr. Murray suggests the use of the "Grinold-Kroner" form of the DCF model could be used to consider expected changes in the P/E ratio of utilities.[27]

Q: Do you agree with their assessment of your DCF analyses?

A: No, I do not. It is important to recognize that while both Dr. Won and Mr. Murray essentially suggest that I should have relied on the multi-stage DCF model using their assumptions, neither of them directly rely on the output of their DCF models. Since both Dr. Won and Mr. Murray essentially abandon their cost of equity estimates for purposes of their ROE recommendation, it is unreasonable to suggest that their assumptions or the methodologies they relied on are superior to the analyses I have presented in my testimonies. Further, the results of my constant

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[24] Won Rebuttal Testimony, at 9-11; Murray Rebuttal Testimony, at 31.

[25] Won Rebuttal Testimony, at 9-11.

[26] Murray Rebuttal Testimony, at 31.

[27] *Id*., at 30.

growth DCF model as updated to reflect current data as of the time of my rebuttal testimony are the only results that are within the range of the recommendations offered by all witnesses in this proceeding.[28] Therefore, it is reasonable to conclude that the results of my model demonstrate that the cost of equity estimation methodologies, when properly specified, can produce reasonable results. Mr. Murray's opinion that the DCF model, as I have specified it, is not relied upon by equity analysts is unsupported and should be rejected.

Q: How do you respond to these witnesses regarding the use of projected EPS growth rates in the constant growth DCF model?

A: First, as discussed in my rebuttal testimony, there are several reasons why earnings growth rates are the appropriate measure of growth in the DCF model including, but not limited to, the fact that earnings are the fundamental driver of dividend growth rates (*i.e.*, over the long-term, dividend growth can only be sustained by earnings growth) and there is significant academic research demonstrating that EPS growth rates are most relevant in stock price valuation.[29] Second, as discussed in my direct and rebuttal testimonies, I have not relied exclusively on the results of the constant growth DCF model. Rather, I have considered the results of multiple cost of equity estimation models in determining the range of ROEs that are appropriate to consider for the Company. Finally, as noted above, while each of these witnesses criticizes the use of analysts' projected EPS growth rates in the constant growth DCF model, their preferred specification of the DCF model produced cost of equity estimates

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[28] Bulkley Direct Testimony, at 15, Figure 2.

[29] Bulkley Direct Testimony, at 34-35.

that were below any recently authorized ROE for a vertically-integrated electric utility and well below their own ROE recommendations for Ameren Missouri.

Q: Did you review the academic research Dr. Won referenced to support the use of a GDP growth rate in the DCF model?

A: Yes. In support of the use of a GDP growth rate in the DCF model, Dr. Won referenced Dr. Roger A. Morin's *New Regulatory Finance* where Dr. Morin noted that all growth rates eventually converge to a level consistent with the growth in GDP.[30] However, Dr. Won fails to discuss and chooses not to rely on the methodology that Dr. Morin employs to estimate the long-term growth in GDP that Dr. Won advocates using in his multi-stage DCF analysis. Dr. Morin estimates the long-term growth rate in nominal GDP by first calculating the growth in real GDP and then adding the expected inflation rate.[31] The growth rate in real GDP is estimated by calculating the compound annual growth rate in real GDP from 1929 through the present. The expected inflation rate is estimated as the difference between the yield on the 20-year Treasury bond and the yield on the 20-year Treasury Inflation Protected bond. As Dr. Morin noted in *New Regulatory Finance*, this resulted in a long-term GDP growth rate of 6.5 percent in 2006.[32]

In contrast, Dr. Won relied on the projected GDP growth rate of 3.90 percent reported by the Congressional Budget Office ("CBO") for the period of 2027-2032

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30 Won Rebuttal Testimony, at 10.

31 Morin, Dr. Roger A. New Regulatory Finance. Public Utilities Reports, Inc., 2006, p. 311.

32 *Id.*

as the estimate of long-term growth in his Two-Stage DCF model.[33] Therefore, Dr. Won is relying on a long-term growth rate that only reflects growth for a five-year period.

Q: Have you reviewed any additional academic research that supports Dr. Morin's methodology for estimating the long-term nominal GDP growth rate?

A: Yes, I have. *Morningstar* recommends a methodology to estimate the long-term GDP growth rate that is similar to Dr. Morin's:

> Growth in real GDP (with only a few exceptions) has been reasonably stable over time; therefore, its historical performance is a good estimate of expected long-term future performance. By combining the inflation estimate with the real growth rate estimate, a long-term estimate of nominal growth is formed.[34]

Furthermore, regarding the use of long-term historical data, *Morningstar* notes:

> The 87-year period starting with 1926 is representative of what can happen: it includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect "unusual" events to occur from time to time, and their return expectations reflect this.[35]

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[33] Congressional Budget Office, "The Budget and Economic Outlook 2022 to 2023," May 2022, at 23.

[34] Ibbotson and Associates, Stocks, Bonds, Bills and Inflation, 1926-2012, 2013 Valuation Yearbook, at 52.

[35] *Id.* at 59.

Q: Did you develop an estimate of GDP growth consistent with the methodology outlined by *Morningstar*?

A: Yes, I have. As shown in Schedule AEB-S1, Attachment 1, I estimated a long-term nominal GDP growth rate of 5.50 percent using the methodology outlined by Dr. Morin and *Morningstar*. The long-term nominal GDP growth rate is based on the real GDP growth rate of 3.16 percent from 1929 through 2022, and a projected inflation rate of 2.27 percent. The projected rate of inflation is based on three measures: (1) the average long-term projected growth rate in the Consumer Price Index ("CPI") of 2.20 percent, as reported by *Blue Chip Financial Forecasts*;[36] (2) the compound annual growth rate of the CPI for all urban consumers for 2033-2050 of 2.36 percent as projected by the Energy Information Administration ("EIA") in the Annual Energy Outlook 2022; and (3) the compound annual growth rate of the GDP chain-type price index for 2033-2050 of 2.26 percent, also reported by the EIA in the Annual Energy Outlook 2022.[37]

Q: How does the long-term GDP growth rate consistent with the methodology outlined by Dr. Morin and *Morningstar* compare to the EPS growth rates you relied on in your constant growth DCF model?

A: As noted above, I calculated a long-term GDP growth rate of 5.50 percent. The proxy group average EPS growth rate was 5.86 percent in my direct testimony as shown in Schedule AEB-D2, Attachment 2, and 5.73 percent in my rebuttal testimony as shown in Schedule AEB-R1, Attachment 2. Therefore, the long-

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[36] *Blue Chip Financial Forecasts*, Vol. 41, No. 12, December 2, 2022, at 14.

[37] Energy Information Administration, Annual Energy Outlook 2022 at Table 20, March 3, 2022.

term GDP growth rate is generally consistent with the proxy group average analysts' projected EPS growth rates. It is also important to note that the approach employed by me, Dr. Morin and *Morningstar* to calculate the long-term GDP growth rate results in a long-term GDP growth rate that is approximately 160 basis points greater than the GDP growth rate relied on by Dr. Won.

Q: Mr. Murray states that, in a declining utility valuation scenario, if you had used the Grinold-Kroner form of the DCF model, the cost of equity would be lower.[38] Do you agree with Mr. Murray?

A: No, Mr. Murray has misinterpreted my position. I have noted that equity analysts expect the share prices of utility stocks to decline over the near term as a result of: (1) the recent significant increase in interest rates; (2) the yields on long-term government bonds being higher than the dividend yields of utilities; and (3) the expectation that interest rates will remain elevated for a number of years. Therefore, if the DCF model is estimated at a point in time during the period that Ameren Missouri's rates will be in effect, the DCF results would likely be higher due to the decline in share prices. Mr. Murray's conclusion regarding the Grinold-Kroner model is that if an investor were to estimate the Grinold-Kroner DCF model today, the expected decline in utility P/E ratios over the near-term would reduce the return the investor would expect to earn over the investment period. In other words, Mr. Murray's use of the Grinold-Kroner model still relies on current market data to estimate the cost of equity during the period Ameren Missouri's rates will be in effect,

[38] Murray Rebuttal Testimony, at 30.

which does not invalidate my point. In fact, it provides further support for my point because, if an investor expects a lower return over the near-term due to an expected decline in the P/E ratio, they may not invest in the stock or sell out of the stock. This would result in a decline in the stock price. The resulting decline in stock price would likely increase the cost of equity results of the constant growth DCF model and the Grinold-Kroner form of the DCF model during the period that Ameren Missouri's rates are in effect.

Q: While Mr. Murray suggests that it may be appropriate to rely on use of the Grinold-Kroner form of the DCF model to determine the ROE for Ameren Missouri, has he conducted such an analysis using the proxy group?

A: No. Mr. Murray simply states that the cost of equity using the Grinold-Kroner form of the DCF model would produce a cost of equity result that is lower than the constant growth DCF model. However, Mr. Murray has not provided any support for his position.

Q: In Ameren Missouri's prior rate case, did Mr. Murray also suggest the use of the Grinold-Kroner form of the DCF model to determine the ROE for Ameren Missouri?

A: Yes. However, in that proceeding, Mr. Murray conducted an analysis using the Grinold-Kroner model as applied to the proxy group. Furthermore, the resulting cost of equity from Mr. Murray's Grinold-Kroner model was substantially lower than any ROE authorized by a utility commission in the past 40 years.

Q: Are you aware of any regulatory commission that has relied on the Grinold-Kroner form of the DCF model to establish the authorized ROE for a regulated utility?

A: No. I have testified on return on equity issues in more than 30 states and before the Federal Energy Regulatory Commission (" FERC"), and closely follow regulatory proceedings across the country on cost of capital issues. I am unaware of any regulatory commission that has relied on this methodology to establish the ROE for a regulated utility company.

VI. CAPM Analysis

Q: What is Dr. Won's position regarding your CAPM analyses?

A: Dr. Won states that my CAPM analyses rely on unreasonably high market risk premiums due to the market return on which I have relied.[39] Specifically, Dr. Won suggests that the calculation of the market return should exclude companies that do not pay dividends and should not rely on "short-term" growth rates. Dr. Won states that the market return of 12.94 percent that is used in my direct testimony would be a "reasonable" 9.57 percent when calculated by including only companies in the S&P 500 that pay dividends.[40] Dr. Won also states that taking into account all three risk-free rates that I have relied on would result in the market risk premiums being less than 8.50 percent.[41] Ultimately, Dr. Won states that using a risk-free rate of

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[39] Won Rebuttal Testimony, at 13-14.

[40] *Id*., at 14.

[41] *Id*.

3.74 percent and a market risk premium of 5.50 percent, my average CAPM result would be 8.51 percent.[42]

Q: What does Mr. Murray state regarding your CAPM analyses?

A: Similar to Dr. Won, Mr. Murray claims that my market risk premiums are "irrational."[43] Mr. Murray states that he is unaware of any authoritative sources that calculate the market return such as I have done (*i.e.*, using a constant growth DCF model with projected earnings growth rates as the estimate of growth).[44] Mr. Murray states that the sources he reviewed recommended using a growth rate no higher than the growth rate of gross domestic product ("GDP") when estimating the long-term return for the market.[45] Finally, Mr. Murray asserts that the Wilshire 5000, which is an index of the value of all American stocks traded in the United States, would be approximately 39 times the value of GDP in 50 years if the index grew at the earnings growth rate that I relied on to calculate my market return.[46]

Q: Overall, do you agree with the changes that Dr. Won suggests are reasonable to be made to your CAPM analyses?

A: No. As noted, Dr. Won suggests my market return would be 9.57 percent when calculated by including only companies in the S&P 500 that pay dividends, and as a result, makes changes to both my CAPM and ECAPM analyses. However, there are multiple errors with Dr. Won's "adjustments" to my CAPM and ECAPM analyses:

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42 *Id.*, at 16.
43 Murray Rebuttal Testimony, at 31.
44 *Id.*, at 32.
45 *Id.*
46 *Id.*, at 33.

- The entire data set for the S&P 500 on which Dr. Won bases his 9.57 percent market return is incorrect for this proceeding and outdated. Specifically, as shown on Dr. Won's rebuttal testimony workpaper "5 – Market Return," in columns AR through BG, Dr. Won incorrectly relies on the data for the S&P 500 as of ***December 2020*** that was used in my direct testimony in the rate proceeding for Evergy Missouri West in Docket No. ER-2022-0129-30. This error can be seen on Dr. Won's rebuttal testimony workpaper "5 – Market Return," in the formulas shown in column BZ that is referencing data from the Evergy Missouri West in Docket No. ER-2022-0129-30.
- Also as shown on Dr. Won's rebuttal testimony workpaper "5 – Market Return," in his calculation of his claimed 9.57 percent market return, Dr. Won has incorrectly used the same weighted average dividend yield for the S&P 500 as in my direct testimony (*i.e.*, 1.56 percent). However, since Dr. Won's position is that non-dividend paying companies should be excluded from the calculation of the market return, he cannot simply rely on the same weighted average dividend yield for the S&P 500 as in my direct testimony. Rather, the weighted average dividend yield would increase because the non-dividend paying companies have been excluded from the weighting.
- In "correcting" my CAPM analyses, Dr. Won appears to be attempting to calculate the market return consistent with the FERC's methodology. However, Dr. Won's approach for estimating the growth rates is not consistent with FERC's DCF methodology. The FERC does not weight the projected EPS growth rates and a GDP growth rate in the calculation of the market return such as Dr. Won has done.

Accordingly, because of these errors, Dr. Won's adjustments to my CAPM and ECAPM analyses simply cannot be relied upon.

Q: On this last point, while Dr. Won suggests that the use of the projected EPS growth rates for each of the companies is one of the "critical faults" of your CAPM, does the FERC calculate the market return in the manner Dr. Won suggests?

A: No. The FERC has continued to rely on the constant growth DCF model to calculate the market return as opposed to the use of a multi-stage DCF model using GDP growth as suggested by Dr. Won:

> We also continue to find that the CAPM should use a one-step DCF for its risk premium. This is because the rationale for using a two-step DCF methodology for a specific group of utilities does not apply when conducting a DCF study of the dividend-paying companies in the S&P 500, as the Commission found in Opinion Nos. 531-B and 569. *A long-term component is unnecessary because of the regular updates to the S&P 500, which allows it to continue to grow at a short-term growth rate and because S&P 500 companies include stocks that are both new and mature, the latter of which have a moderating effect on the short-term growth rates*.[47]

The US State Court of Appeals for the District of Columbia recently addressed this issue in its review of FERC Opinion No. 569-B. In the Court's decision, it acknowledged that the FERC has relied on the use of EPS growth rates in the calculation of the market return on the S&P 500 because the S&P 500 is regularly updated to include companies with high market capitalization and it includes companies at all stages of growth, including lower and higher growth potential. The

[47] *Ass'n. of Businesses Advocating Tariff Equity, et. al. v. Midcontinent Indep. Sys. Operator, Inc., et. al.*, 171 FERC ¶ 61,154 (2020) ("Opinion No. 569-A"), at ¶ 85 (emphasis added; footnotes omitted).

Court determined that FERC's rationale for using projected EPS growth rates was sufficient and did not accept the challenge to this assumption.[48]

Q: What would the market return have been if Dr. Won had relied on the correct data set for this proceeding and if he had correctly adjusted the dividend yield of that data to exclude non-dividend paying companies?

A: While I do not agree with excluding non-dividend paying companies from the calculation of the market return as is relied on by the FERC, even if that change is correctly made to the market return calculation in my direct testimony in this proceeding, the market return is only marginally lower. Thus, this means that the CAPM results are also only marginally lower than as filed in my direct testimony, and in fact, these results are higher than the Company's requested ROE of 10.20 percent in every instance.

Specifically, as shown on Schedule AEB-S1, Attachment 2, the market return as filed in my direct testimony was 12.94 percent, and when non-dividend paying companies are excluded, the market return is 12.87 percent. As shown on Schedule AEB-S1, Attachment 5, the long-term historical market return from 1926 through 2021 is 12.34 percent, which is generally consistent with the level of the market return that I relied on in my direct testimony, as well as the market return of 12.63 percent reflected in my rebuttal testimony based on the most recent data. As discussed in my rebuttal testimony, while I do not agree that the use of a historical market return is an appropriate proxy for the forward-looking market return, it

[48] United States Court of Appeals, District of Columbia Circuit, Opinion, Docket No. 16-1325, August 9, 2022, at 19.

nonetheless indicates that my projected market return, and resulting costs of equity from the CAPM and ECAPM analyses, is not an "extreme outlier" as suggested by Dr. Won.[49]

Q: How would the results of your analyses change if you relied on this adjusted market return calculation?

A: Schedule AEB-S1, Attachment 3 compares the calculation of the CAPM and ECAPM results using (1) the market return of 12.94 percent in my direct testimony; (2) the market return of 12.87 percent, which is the same as my direct testimony but excluding non-dividend paying companies; and (3) the market return of 12.34 percent, which is the long-term historical market return. Those CAPM and ECAPM results are summarized in Schedule AEB-S1, Attachment 4, and as shown therein, all of the results are higher than the Company's requested ROE of 10.20 percent in this proceeding.

Q: Dr. Won also suggests a change to your CAPM model using a market risk premium of 5.50 percent, which produces a cost of equity result of 8.51 percent. Is this reasonable?

A: No. Dr. Won's use of a market risk premium of 5.50 percent basically reflects the market risk premium that he relies on in his own CAPM analysis; however, as discussed in my rebuttal testimony, there are numerous problems with Dr. Won's CAPM analysis. Specifically, my rebuttal testimony notes that his market risk premia should not be relied upon because he relies on historical market returns instead of

[49] Won Rebuttal Testimony, at 15.

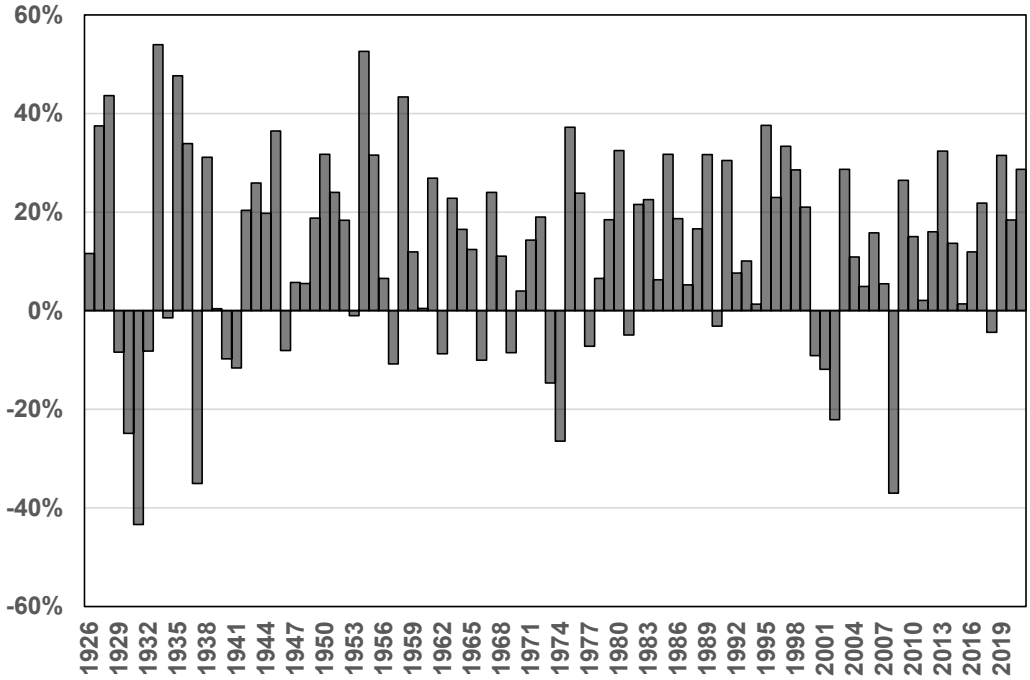
forward-looking market returns, relies on geometric average market returns, fails to appropriately calculate the historical market return, and does not account for the inverse relationship between interest rates and the market risk premium. As a result of these errors, Dr. Won's analysis understates the market risk premium. As stated in my rebuttal testimony, the market risk premium is a forward-looking concept, not a historical analysis as Dr. Won suggests and presents in Figure 3 of his rebuttal testimony.

In addition, a market risk premium of 5.50 percent is certainly not supported by Dr. Won's erroneous "correction" to my CAPM analysis as just discussed. Lastly, Dr. Won cannot suggest a CAPM result of 8.51 percent is reasonable given that that he concludes that Mr. Murray's recommended ROE of 9.00 percent is too low.

Q: Do you agree with Dr. Won and Mr. Murray that the forward-looking market risk premium in your CAPM analysis is overstated?

A: No, I do not for multiple reasons. First, as I discussed in my direct testimony, the expected market return is reasonable and consistent with the range of annual equity returns that have been observed over the past century. Specifically, in 50 out of the past 96 years (or roughly 52 percent of observations), the realized equity return was at least 12.94 percent. Further, as noted previously, the historical average return over this time period is 12.34 percent. This demonstrates that an actual market return in the range that I have estimated is not uncommon or unreasonable.

FIGURE 6: REALIZED U.S. EQUITY MARKET RETURNS (1926-2021)[50]



Second, in a recent cost of capital proceeding for the electric utilities in California, the California Public Utilities Commission noted that all parties recognized that historical market returns and economically logical projections of the market return fall within the range of 12 percent.[51] This recognition by the parties is generally consistent with the market return that is estimated in my CAPM analyses, contrary to Dr. Won's and Mr. Murray's assertions regarding my market return.

Third, as discussed, the FERC also relies on the constant growth DCF model to calculate the market return, and does not use a multi-stage DCF model using GDP growth as suggested by Dr. Won. While I have not excluded non-dividend paying

[50] Depicts total annual returns on large company stocks, as reported in the 2022 Duff & Phelps SBBI Yearbook.

[51] California Public Utilities Commission. Decision 22-12-031. December 15, 2022, at 23.

companies from the market return calculation such as is done by the FERC, as I have shown, the difference in the market return is minimal regardless.

Q: What is your response to Mr. Murray's contention that he is not "aware of any authoritative sources" that use your approach to estimating the market return?

I am aware of multiple authoritative sources that have relied on the constant growth DCF to estimate the market return in the CAPM. As just noted, the FERC relies on the constant growth DCF model to estimate the market return, and so have the Illinois Commerce Commission ("ICC"), the Pennsylvania Public Utilities Commission ("PPUC"), and the Maine Public Utilities Commission ("Maine PUC"). As shown in Figure 7, the Staff of the ICC, the Bureau of Investigation and Enforcement ("I&E") of the PPUC and the Staff of the Maine PUC have all supported the forward-looking market risk premium. In each case, the market return was estimated using the constant growth DCF model and analysts' earnings growth rate projections, which resulted in a range of market return estimates from 11.33 percent to 13.94 percent. As also shown in Figure 7, the regulatory commissions in each of those cases relied on the estimated CAPM results of those parties to determine the authorized ROE and did not dispute the use of the constant growth DCF model to calculate the market return.

FIGURE 7: REGULATORY COMMISSIONS – MARKET RETURN ESTIMATED USING THE CONSTANT GROWTH DCF MODEL

Intervening Party	Company	Docket No.	Market Return	Date of Order	Did the Commission rely on the Party's CAPM?
Staff of the ICC	North Shore Gas Company	Docket 20-0810	CGDCF of the dividend-paying companies in the S&P 500 (11.95%)[52]	9/8/21	Yes[53]
I&E	Aqua Pennsylvania, Inc.	Docket No. R-2021-3027385	CGDCF of the Value Line Universe and S&P 500 (12.14%)[54]	5/12/22	Yes, the PPUC placed primary weight on I&E's CAPM[55]
Staff of the MPUC	Northern Utilities, Inc.	Docket No. 2019-00092	CGDCF of the dividend-paying companies in the S&P 500 (11.33%-13.49%)[56]	4/1/20	Yes[57]

Q: Dr. Won suggests that your market risk premium is an extreme outlier relative to other financial institutions' estimates of the market risk premium. Is Dr. Won's comparison reasonable?

A: No. As just discussed, the decisions of other regulators contradict Dr. Won's conclusion of my market return being an outlier. In addition, the market risk premia that Dr. Won cites in Figure 3 of his rebuttal testimony are largely the market risk premia that he relies on for purposes of the CAPM in his direct testimony, which as I discussed in my rebuttal testimony, suffer from numerous issues.

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[52] Wisconsin Public Service Commission, Docket No. 20-0810, Order, September 8, 2021, at 71.

[53] *Id.*, at 86-87.

[54] Pennsylvania Public Utility Commission, Aqua Pennsylvania, Inc., Opinion and Order, Public Meeting held May 12, 2022, at 147.

[55] *Id.*, at 178.

[56] Maine Public Utilities Commission, Docket No. 2019-00092, Bench Analysis, October 29, 2019, at 21.

[57] New Hampshire Public Utilities Commission, Docket No. 2019-00092, Order Part II, April 1, 2020, at 58.

Dr. Won also presents forward-looking market risk premium estimates from *Value Line*, Duff & Phelps and American Appraisal in Figure 3 of his rebuttal testimony and cites the FERC's Opinion No. 569 as the source for those estimate.[58] However, Dr. Won fails to acknowledge that Opinion No. 569 was issued in November 2019, or over three years ago, which means that these market risk premia are outdated and not relevant for purposes of determining the cost of equity in this proceeding. Additionally, Dr. Won also fails to acknowledge that the market risk premia that he cites from Opinion No. 569 and presents in Figure 3 of his rebuttal testimony were not agreed upon by the FERC in that proceeding. Rather, these estimates were raised by a specific intervenor group in that proceeding and summarized as such in Opinion No. 569 as part of the summary of the record,[59] but the FERC did not agree with that intervenor's position in calculating the market return and thus market risk premium.[60]

Lastly, in Figure 3 of his rebuttal testimony, Dr. Won also cites a 2021 survey conducted by Dr. Pablo Fernandez that suggests the estimated market risk premium was 5.55 percent. Not only is the survey cited by Dr. Won outdated, but Dr. Fernandez, who conducts the survey of the market risk premium, cautions against the use of survey data to estimate the market return and market risk premium. Specifically, Dr. Fernandez notes:

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58 Won Rebuttal Testimony, at 14, footnote 53.

59 *Ass'n. of Businesses Advocating Tariff Equity, et. al. v. Midcontinent Indep. Sys. Operator, Inc., et. al.*, 169 FERC ¶ 61,129 (2019) ("Opinion No. 569"), at ¶ 249.

60 *Id.,* at ¶ 260-261.

> We can find out the REP [Required Equity Premium] and the EEP [Expected Equity Premium] of an investor by asking him, although for many investors the REP is not an explicit parameter but, rather, it is implicit in the price they are prepared to pay for the shares. However, it is not possible to determine the REP for the market as a whole, because it does not exist: even if we knew the REPs of all the investors in the market, it would be meaningless to talk of a REP for the market as a whole. There is a distribution of REPs and we can only say that some percentage of investors have REPs contained in a range. The average of that distribution cannot be interpreted as the REP of the market nor as the REP of a representative investor.[61]

Q: What is your response to Mr. Murray's comparison of growth in the Wilshire 5000 Index relative to GDP?

A: As noted, Mr. Murray asserts that assuming the Wilshire 5000 index grew at the earnings growth rate that I relied on to calculate my market return versus the index grew at a long-term GDP growth rate of 4.00 percent, the value of the Wilshire 5000 would be approximately 39 times higher in 50 years. However, the Wilshire 5000 had a ten-year annualized total return as of December 31, 2022 of 11.91. Therefore, the Wilshire 5000 had a total return over the past 10 years that is consistent with my market return estimate.

Further, Mr. Murray's analysis is dependent on the selection of an assumed GDP growth rate of 4.00 percent. However, as shown in Schedule AEB-S1, Attachment 1, Mr. Murray's assumed growth rate is significantly below a long-term projected GDP growth rate of 5.50 percent, which is based on the real historical GDP growth

[61] Pablo Fernandez, Sofia Bañuls and Pablo F. Acin, "Survey: Market Risk Premium and Risk-Free Rate used for 88 countries in 2021," IESE Business School, (June 2021), at 10.

rate of 3.16 percent from 1929 through 2021,[62] plus a projected inflation rate of 2.27 percent.[63]

VII. ECAPM Analysis

Q: What is Dr. Won's position regarding your ECAPM analysis?

A: Dr. Won states that my ECAPM analyses also rely on a market risk premium that is too high, plus he raises an additional concern with the adjustment made in the ECAPM to account for the tendency of the CAPM to underestimate the cost of equity for companies with betas less than 1.00.[64] Dr. Won states that the ECAPM adjustment is based on the findings of Dr. Morin who developed the model based on data between 1926 and 1984, and Dr. Won asserts that there is no evidence that Dr. Morin's findings would still be relevant based on data after 1984.[65] Furthermore, Dr. Won contends that Dr. Morin presented other studies that produced returns between -9.61 percent to 13.56 percent, which Dr. Won claims means that the CAPM overestimated the return in some instances and that such findings do not lend credibility to the use of the ECAPM.[66]

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62 U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts Tables, Table 1.1.6, December 22, 2022.

63 The 5.50 percent equals (1 + 3.16 percent) x (1 + 2.27 percent) - 1.

64 Won Rebuttal, at 17.

65 *Id*.

66 *Id*.

Q: Does Mr. Murray discuss your ECAPM analysis?

A: Not specifically. Mr. Murray discusses my ECAPM in the context of his concern regarding the market risk premium of my CAPM, which I have already addressed; however, he does not specifically discuss the ECAPM.[67]

Q: Do you agree with Dr. Won's conclusion based on the studies cited by Dr. Morin regarding the ECAPM?

A: No, I do not. The concept of the ECAPM and the conclusion that the risk-return relationship is flatter than predicted by the CAPM is generally accepted in financial literature. Dr. Morin, in *Modern Regulatory Finance*, provides a list of studies each of which concludes that the CAPM understates the returns for companies with betas less than 1.0 (which is typically utilities) and overstates the return for companies with betas greater than 1.0.[68] It is these empirical studies referenced by Dr. Morin that formed the basis of the development of alternative models such as the ECAPM that would better predict the risk return-relationship observed when reviewing actual market data.

Academics and researchers could then use the equation shown below to determine the value of the constant term (α) or "alpha factor" using historical market data:

$$K_e = r_f + \alpha + \beta\left(\left(r_m - r_f\right) - \alpha\right) \quad \mathrm{K_e\text{-}r_f = \alpha + \beta(r_m\text{-}r_f)}$$

Where:

K_e = the required market ROE;

α = a constant term;

β = Beta coefficient of an individual security;

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[67] Murray Rebuttal, at 33.

[68] Morin, Dr. Roger A. Modern Regulatory Finance. Public Utilities Reports, Inc., 2021, at 206-208.

r_f = the risk-free ROR; and

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

There have been numerous additional studies published to estimate the value of the constant term or alpha factor in the ECAPM equation. Figure 8 provides the list of studies summarized by Dr. Morin and referenced by Dr. Won as support for his conclusion that the ECAPM is not credible. However, Dr. Won's conclusion improperly masks the fact that, as shown, six of the eight studies estimated positive values of the constant term, which indicates that the consensus among the studies is that the CAPM understates the observed return. Additionally, among the six studies that estimate only positive values of the constant term, the range of the constant term was 1.63 percent to 13.56 percent. Dr. Morin relied on a constant term in the range of 1 to 2 percent to develop the 0.25 and 0.75 factors included in the ECAPM, and considering the range of the constant term provided in Figure 8, it would appear Dr. Morin's estimate is conservative.

FIGURE 8: EMPIRICAL EVIDENCE ON THE ALPHA FACTOR (CONSTANT TERM)[69]

Author	Range of Alpha
Fischer (1993)	-3.6% to 3.6%
Fischer, Jensen and Scholes (1972)	-9.61% to 12.24%
Fama and McBeth (1972)	4.08% to 9.36%
Fama and French (1992)	10.08% to 13.56%
Litzenberger and Ramaswamy (1979)	5.32% to 8.17%
Litzenberger, Ramaswamy and Sosin (1980)	1.63% to 5.04%
Pettengill, Sundaram and Mathur (1995)	4.6%
Morin (1989)	2.0%

Q: Do any of the studies cited by Dr. Morin examine the ability of the CAPM to estimate the return of utilities?

A: Yes. Litzenberger, Ramaswamy, and Howard (1980) studied the ability of the CAPM to estimate the returns for utilities.[70] The authors found that the CAPM tends to understate the return for stocks such as utilities, which have a beta less than 1.00. To develop the analysis, Litzenberger, *et al*. utilized both adjusted and raw betas, and in both cases, the CAPM understated the return for utilities with betas less than 1.00.

[69] Morin, Dr. Roger A. Modern Regulatory Finance. Public Utilities Reports, Inc., 2021, at 222.

[70] Litzenberger, Robert, *et al*. "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital." The Journal of Finance, Vol. 35, No. 2, 1980, pp. 369–383.

Q: What is your response to Dr. Won's contention that the ECAPM proposed by Dr. Morin may not be applicable if more recent market data is considered?

A: Dr. Won's claim is incorrect as there has been a study published after the publication of Dr. Morin's book, New Regulatory Finance, that considered the use of the ECAPM based on more recent market data. Specifically, Chretien and Coggins (2011) studied the CAPM and its ability to estimate the risk premium for the utility industry in particular subgroups of utilities for a data set that included market data through the end of 2006.[71] Chretian and Coggins considered the CAPM, the Fama-French three-factor model and a model similar to the ECAPM used in my direct testimony. The study shows that the ECAPM significantly outperformed the traditional CAPM at predicting the observed risk premium for the various utility subgroups.

Q: As he did with your CAPM analyses, Dr. Won also recalculates the results of your ECAPM analyses.[72] Is Dr. Won's recalculation of your ECAPM analyses reasonable?

A: No. As I have previously discussed regarding Dr. Won's recalculation of my CAPM analyses,[73] there are multiple errors in Dr. Won's analysis (*i.e.*, relying on data from another utility's prior rate proceeding instead of data from this proceeding to calculate the market return; relying on an incorrect weighted average dividend yield for the S&P 500; and incorrectly estimating the growth rates pursuant to the FERC's DCF methodology), and thus his recalculated or "corrected" results of my ECAPM

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

72 Won Rebuttal Testimony, Workpaper "3 CAPM."

73 See pp. 31-32.

analyses are also not relevant for estimating the cost of equity or establishing the ROE for the Company in this proceeding.

As previously discussed regarding Dr. Won's recalculation of my CAPM analysis, I also corrected Dr. Won's "correction" of my ECAPM analysis, and the results are summarized in Schedule AEB-S1, Attachment 4. As shown therein, once Dr. Won's errors are corrected and the data from this proceeding is utilized, all of the results of the ECAPM analysis are higher than the Company's requested ROE of 10.20 percent in this proceeding

VIII. Risk Premium Analysis

Q: What is Dr. Won's position regarding your Bond Yield Plus Risk Premium ("BYRP") analysis?

A: Dr. Won's primary concerns with the BYRP analysis are that: (1) the analysis relies on projected interest rates; (2) the analysis is determined based on the yield on the 30-year Treasury bond yield; (3) the relationship between the 30-year Treasury bond yield and the ROE is not constant over time; and (4) the analysis did not consider a trend variable to account for the trend in authorized ROEs over time.[74] Dr. Won states that he agrees with the FERC that the BYRP is likely to provide a less accurate current ROE estimate than the DCF or CAPM models because it relies on previous ROE determinations that may not be directly determined by a market-based methodology.[75]

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[74] Won Rebuttal Testimony, at 19.

[75] *Id.*, at 19-20.

Q: What is Mr. Murray's position regarding your BYRP analysis?

A: Mr. Murray suggests that the BYRP analysis does not allow sufficient compression of allowed ROEs versus the utility industry cost of equity, but rather only serves to maintain the current wide spread between the utility industry's cost of equity and authorized ROEs.[76]

Q: Do you agree that relying on projected Treasury bond yields as the risk-free rate in the BYRP approach is "unreliable" as suggested by Dr. Won and thus not acceptable for ratemaking purposes?[77]

A: No. First, as reflected in Schedule AEB-R1, Attachment 6 of my rebuttal testimony, the current interest rate as of the end of December 2022 was consistent with both the near-term projected and longer-term projected interest rates. Therefore, reliance on projected Treasury bond yields relative to the current Treasury bond yield has a relatively minimal impact on the cost of equity (*i.e.*, less than 10 basis points) and does not make the results unreliable for ratemaking purposes as Dr. Won suggests.

Second, Dr. Won's critique of my use of projected data for the risk-free rate is not consistent with his own DCF analyses, whereby Dr. Won relies on projected EPS and GDP growth rates. Therefore, it is unclear why Dr. Won finds these projected inputs reasonable for his estimates of the cost of equity, yet suggests that the use

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[76] Murray Rebuttal Testimony, at 19.

[77] Won Rebuttal Testimony, at 19.

of projected Treasury bond yields in my Bond Yield Plus Risk Premium analysis are somehow "unreliable" and should not be considered.

Further, Dr. Won recognizes in his rebuttal testimony that the Federal Reserve has been increasing interest rates with "unusual speed" to combat the highest inflation in four decades.[78] In an environment where interest rates have been rising rapidly and the Federal Reserve has indicated its intention to continue to increase interest rates, it would be irresponsible, and likely violate the *Hope* and *Bluefield* principles, to rely on cost of equity analyses that do not consider rising interest rates.

Q: Do you agree with Dr. Won's suggestion that the BYRP results are unreliable because the analysis considers only the yield on the 30-year Treasury bond?

A: No. Dr. Won's characterization of the BYRP analysis is inaccurate. As shown in Schedule AEB-R1, Attachment 6 of my rebuttal testimony, when considering the historical relationship between interest rates and authorized ROEs, the regression statistics for the BYRP analysis demonstrate that the coefficients are significant and the R^2 shows that there is a reasonable fit to the data, meaning the BYRP analysis is a reasonable methodology to be considered in estimating the cost of equity.

Likewise, the statistical results also demonstrate that Mr. Murray's suggestion that the BYRP analysis does not allow sufficient compression of allowed ROEs versus the utility industry cost of equity is unfounded. Mr. Murray's criticism of my BYRP analysis ignores the well documented inverse relationship between interest rates and the utility risk premium. While Mr. Murray has estimated a cost of equity using

[78] Won Rebuttal Testimony, at 19.

a "rule of thumb" risk premium that produces a cost of equity ranging between 8.00 percent to 8.25 percent, he has developed no meaningful relationship between his cost of equity estimate and his recommended ROE for the Company. While Mr. Murray criticizes my BYRP approach based on the claim that it does not allow "sufficient compression" of allowed ROEs versus the utility industry cost of equity over time, ironically his "rule of thumb" approach assumes no variation over time but rather simply assumes a static risk premium, which is counter to his own criticism.

Q: Has the FERC relied on the BYRP methodology as one of the approaches used to set the ROE for electric utilities?

A: Yes. Dr. Won cites FERC's Opinion No. 569 and suggests that he agrees with the FERC that the BYRP model is likely to provide less accurate current cost of equity estimates relative to the DCF and CAPM models. However, Dr. Won fails to acknowledge that the FERC reconsidered its findings from Opinion No. 569 regarding the BYRP model, and subsequently issued Opinion No. 569-A in which the FERC established the equal weighting of three methodologies for setting the ROE – the DCF model, the CAPM, and the BYRP analysis.[79] In affording this methodology a one-third weighting, the FERC has considered the results of the BYRP analysis as meaningful as the other cost of equity estimation methodologies.[80]

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[79] *Opinion No. 569-A*, at ¶ 104-114.

[80] As noted previously herein, on August 9, 2022, the U.S. Court of Appeals vacated the FERC Opinion No. 569 decisions as they related to the risk premium model and remanded the case to FERC to reopen proceedings. At the time of drafting this surrebuttal testimony, the FERC has not yet ruled on the Court's remand.

Q: What is your response to Dr. Won's concern regarding the BYRP analysis that there is no justification that the relationship between 30-year Treasury bond yields and authorized ROEs is constant over time and that "stale authorized ROEs" may not provide an up-to-date cost of equity?

A: Dr. Won's concern is that ROE determinations may be made without respect to market-based methodologies and therefore cannot be used to inform the current ROE. However, this suggestion directly contradicts his use of a comparative analysis leveraging off of the authorized ROE in the 2019 Empire District Electric Company rate proceeding ("2019 Empire Case")[81] to set the ROE for the Company in this proceeding. If Dr. Won is concerned with the use of previously authorized ROEs to establish a relationship between the ROEs over differing time periods, then the entire basis of his own ROE recommendation in this proceeding is unsupported. In the current case, Dr. Won assumes a linear relationship between the DCF model results from one period to the next. This analysis relies on a DCF model based on data from 2019 and another based on data from 2022 – neither of which were used by the Commission in the 2019 Empire Case given that Dr. Won developed both models in the current proceeding. Thus, Dr. Won's proposed ROE is based on the assumption that there is a linear relationship between his two DCF models, even though neither has been considered by the Commission, to develop an adjustment to the ROE authorized in the 2019 Empire Case. Dr. Won's suggestion that the Commission should rely on his assumed "relationship" to adjust the ROE authorized

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

in the 2019 Empire Case and reject a statistical model such as the BYRP is not credible.

Q: Dr. Won's last critique of your BYRP analysis is that you did not consider the downward trend of authorized ROEs of electric utilities in the US, and that if you had included a trend variable in the equation, your cost of equity estimate would have been 9.34 percent. Is there any basis to Dr. Won's position?

A: No. There is a critical error with Dr. Won's re-specification of my BYRP analysis by adding a trend variable to the equation, and as a result, his cost of equity estimate of 9.34 percent simply cannot be relied upon. Dr. Won acknowledges multiple times in his testimony that, "[a]ll other things being equal, a higher bond yield indicates a higher required cost of equity."[82] I agree with Dr. Won on this point. However, as shown on Dr. Won's rebuttal workpaper "6 Risk Prem," based on his re-specification of my BYRP analysis, as the bond yield increases from 3.18 percent to 3.74 percent to 3.80 percent, Dr. Won's estimated cost of equity stays the same at 9.34 percent. This clearly highlights the error with Dr. Won's change to the BYRP analysis.

In addition, in calculating the risk premium component of the BYRP, Dr. Won also incorrectly calculates the trend variable. As shown on Dr. Won's rebuttal workpaper "6 Risk Prem," there are 121 observations of quarterly authorized ROEs and 30-year Treasury bond yields from 1992 through mid-2022 in my BYRP analysis. For purposes of calculating his trend variable, Dr. Won assumes that the first quarterly observation (*i.e.*, Q1/1992) is designated as 0, and each quarterly observation

[82] Won Rebuttal Testimony, at 28-29.

thereafter is consecutively numbered until the last observation (*i.e.*, Q2/2022), which is designated as 121. Then, to calculate the risk premium based on the current Treasury bond yield and applying the trend variable from his re-specified BYRP equation, Dr. Won assumes that the current Treasury bond yield represents the 122nd observation.

However, as shown on Dr. Won's rebuttal workpaper "6 Risk Prem" in cell AN34, when he is estimating the cost of equity based on the near-term projected Treasury bond yield, he incorrectly assumes that the near-term projected Treasury bond yield would also be the 122nd observation in the data set. However, the near-term projected Treasury bond yield, which is the average for Q4/2022 through Q4/2023, would be between 2 to 6 quarterly observations beyond the last observation in the data set, and not the 122nd observation as Dr. Won mistakenly assumes. Likewise, when Dr. Won is estimating the cost of equity based on the longer-term projected Treasury bond yield, he incorrectly assumes that the longer-term projected Treasury bond yield would also be the 122nd observation in the data set. However, the longer-term projected Treasury bond yield, which is the average for 2023 through 2027, would be between 2 to 22 quarterly observations beyond the last observation in the data set, and again, not the 122nd observation as Dr. Won mistakenly assumes.

As shown in Schedule AEB-SR-6, when these errors are corrected to Dr. Won's re-specification of my BYRP analysis, the estimated cost of equity decreases as the Treasury bond yields increase. Therefore, again, Dr. Won's re-specified BYRP analysis produces results that are completely counter to the relationship between

Treasury bond yields and the utility cost of equity that he acknowledges, highlighting that his re-specified results cannot be relied upon.

IX. Authorized Returns

Q: What does Dr. Won state regarding authorized ROEs for electric utilities?

A: Dr. Won states that the Company's requested ROE of 10.20 percent is much higher than the average authorized ROE in electric utility cases completed in the first three quarters of 2022.[83]

Q: Do you agree with Dr. Won's calculation of the average authorized ROE for electric utilities through the first three quarters of 2022?

A: No. As discussed in detail in my rebuttal testimony, Dr. Won's review of previously authorized ROEs does not provide the necessary insight to draw meaningful conclusions about the forward-looking investor-required return to establish the ROE in this proceeding.[84] Specifically, as I discussed in my rebuttal testimony, Dr. Won has not considered the authorized ROEs only for risk-comparable vertically-integrated electric utilities, nor has he considered the differences in the market conditions that existed when the returns were authorized in those proceedings relative to current market conditions. While Dr. Won claims that the average authorized ROE for electric utilities through the first three quarters in 2022 was 9.37 percent, as I demonstrated in my rebuttal testimony, the average authorized ROE for vertically-integrated electric utilities in 2022 was 9.77 percent. In fact, the most

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[83] Won Rebuttal Testimony, at 22.

[84] Bulkley Rebuttal Testimony, at 8-14.

recent authorized ROEs in 2022 were in the range of 9.80 to 10.00 percent, with several of the ROE authorizations over 10.00 percent. As Dr. Won acknowledges multiple times in his rebuttal testimony that, all else equal, higher interest rates indicate a higher required cost of equity. Therefore, Dr. Won's review of authorized ROEs does not support his conclusion that the Company's recommended ROE is "much higher" than the average authorized ROE cases that are most comparable to the Company.

X. Business Risk Factors

Q: What are Dr. Won's and Mr. Murray's positions regarding the Company's business risks and the effect on the Company's ROE?

A: Dr. Won alleges that I have suggested that the Company has "unusually high" regulatory risk, and that such a position is "baseless."[85] Dr. Won contends that Ameren Missouri does not have greater risk than the proxy group since: (1) Ameren Missouri's expected capital expenditures as a percentage of net utility plant is not significantly higher than the average ratio of the proxy group; (2) Ameren Missouri, like other utilities, has benefited from an improved regulatory environment, including the use of cost recovery mechanisms such as Plant-In-Service Accounting ("PISA"), the Renewable Energy Standard Rate Adjustment Mechanism ("RESRAM"), an Energy Efficiency Adjustment Charge, and a fuel adjustment clause; and (3) the Company is classified as "Very Credit Supportive" by S&P's jurisdictional rankings.[86]

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[85] Won Rebuttal Testimony, at 25.

[86] Won Rebuttal Testimony, at 23-25.

Dr. Won also states that the Company's credit ratings from S&P and Moody's are equal to the average credit ratings for electric utilities characterized by these credit rating agencies, and thus consideration of Ameren Missouri's regulatory risk overall for purposes of establishing the ROE in this proceeding is unnecessary because the Company's credit ratings already reflect its regulatory risk.[87]

Similar to Dr. Won, Mr. Murray suggests that Ameren Corp. has generally be viewed as a "premium utility" since the passage of PISA in Missouri in 2018, and that the Company's prospects have improved since PISA.

Q: What is Mr. Majors' position regarding the Company's business risks?

A: Mr. Majors provides a discussion of regulatory lag and business risk from an accounting perspective, discussing the ratemaking impacts of PISA and the RESRAM rider, as well as other currently authorized ratemaking procedures.[88] Mr. Majors concludes that the implementation of PISA, RESRAM, and the property tax tracker reduces Ameren Missouri's overall business risk.[89]

Q: Overall, what is your response to the positions of Dr. Won, Mr. Murray, and Mr. Majors regarding the Company's business and regulatory risks?

A: Neither Mr. Murray nor Mr. Majors evaluates the Company's business and regulatory risks *relative to the proxy group*. Dr. Won largely omits this analysis with the exception that he notes Ameren Missouri's expected capital expenditures as a

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87 *Id.*, at 25.

88 Majors Rebuttal Testimony, at 2.

89 *Id.*, at 3.

percentage of net utility plant relative to the average ratio of the proxy group. Thus, these witnesses focus solely or nearly solely on the ratemaking mechanisms in use by Ameren Missouri to support their conclusions that the Company has reduced overall business risk. In developing the proxy group, it is essential to balance the relative risk of the companies included in the proxy group with the overall size of the proxy group. Therefore, it is always the case that the proxy companies do not have exactly the same risk profile as the subject company. As such, it is necessary to compare the relative risks of the proxy group companies to the risk of the subject company to determine how the subject company's risk profile compares with the group. The development of the investor-required ROE is based on a proxy group of risk-comparable companies and it is important to determine the appropriate placement of the ROE within the range of results established using the proxy group companies.

Neither Dr. Won, Mr. Murray, nor Mr. Majors have conducted such a comparative analysis of the risks of Ameren Missouri relative to the proxy group. In fact, while Mr. Majors claims that Ameren Missouri's business risk has been reduced in absolute terms because of PISA and RESRAM, he concedes that he has not conducted any comparative analysis of business risks, and simply assumes that the Company's business risk "can reasonably ***be assumed*** to be lower in relative terms compared to its utility peers."[90] Similarly, Mr. Majors acknowledges that he has "not

[90] Majors Rebuttal Testimony, at 9.

performed any assessment of CWIP ratemaking allowed in other states."[91] In contrast, I evaluated various regulatory and business risks to which Ameren Missouri is subject relative to the proxy group in my direct testimony, and concluded that the Company has relatively greater regulatory and business risk than the proxy group.

Q: Has Dr. Won mischaracterized your testimony?

A: Yes. Dr. Won alleges that I have suggested that the Company has "unusually high" regulatory risk, which is simply not true. Nowhere in my direct testimony did I suggest that the Company has "unusually high" regulatory risk. Rather, I considered the Company's regulatory adjustment mechanisms and concluded that the Company has relatively greater risk of timely cost recovery and earnings potential as compared to the proxy group companies, and I noted that the Company's regulatory jurisdiction ranked below the proxy group average by both Regulatory Research Associates and S&P.

Q: Do you agree with Dr. Won that consideration of Ameren Missouri's regulatory risk is unnecessary because the Company's credit ratings already reflects its regulatory risk?

A: No. I do not agree with Dr. Won's comparison of credit ratings as being dispositive of Ameren Missouri's relative risk to the proxy group. Credit ratings are assessments of the likelihood a company could default on its debt, whereas the topic of the current proceeding is to determine the riskiness and cost of the

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[91] *Id.*, at 14.

Company's equity. In addition, while credit rating agencies consider the business risks of an individual company, when establishing its debt credit rating, they do not conduct a comparative analysis of business risks relative to the proxy group.

Q: Does this conclude your surrebuttal testimony?

A: Yes.

CALCULATION OF LONG-TERM GDP GROWTH RATE

Description	Notes	Years	Amount
Historical GDP			
Real GDP ($ Billions) [1]	[1]	1929	$ 1,110.2
		2022	$ 20,018.0
Compound Annual Growth Rate			3.16%
Projected Inflation			
Consumer Price Index (YoY % Change)	[2]	2029-2033	2.20%
Consumer Price Index (All-Urban)	[3]	2033	3.54
Consumer Price Index (All-Urban)		2050	5.26
Compound Annual Growth Rate			2.36%
GDP Chain-type Price Index (2012=1.000)	[3]	2033	1.55
GDP Chain-type Price Index (2012=1.000)		2050	2.27
Compound Annual Growth Rate			2.26%
Average Inflation Forecast			2.27%
Projeted Long-Term GDP Growth Rate			**5.50%**

Notes:
[1] Bureau of Economic Analysis, December 22, 2022
[2] Blue Chip Financial Forecasts, Vol. 40, No. 12, December 2, 2022 at 14
[3] Energy Information Administration, Annual Energy Outlook 2022 at Table 20, March 3, 2022

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

Bulkley As-Filed Direct Testimony		
Estimated Weighted Average Dividend Yield:	1.83%	[1]
Estimated Weighted Average Long-Term Growth Rate:	11.02%	[2]
Estimated S&P 500 Required Market Return:	**12.94%**	[3]

Dr. Won "Adjustments" Corrected		
Estimated Weighted Average Dividend Yield:	2.12%	[12]
Estimated Weighted Average Long-Term Growth Rate:	10.64%	[13]
Estimated S&P 500 Required Market Return:	**12.87%**	[14]

Historical Market Return (1926-2021) on Large Company Stocks: **12.34%** [15]

					Bulkey Direct Testimony As-Filed					Bulkey Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[16]	[17]	[18]	[19]	[20]
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.	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	327.62	87.46	28,654	0.11%	5.44%	0.01%	3.50%	0.00%	0.12%	5.44%	0.01%	3.50%	0.00%
Signature Bank/New York NY	SBNY	63.07	179.21	11,302		1.25%		24.50%			1.25%		24.50%	
American Express Co	AXP	753.06	138.62	104,389	0.39%	1.50%	0.01%	10.00%	0.04%	0.45%	1.50%	0.01%	10.00%	0.05%
Verizon Communications Inc	VZ	4,199.64	50.75	213,132	0.80%	5.04%	0.04%	3.00%	0.02%	0.93%	5.04%	0.05%	3.00%	0.03%
Broadcom Inc	AVGO	403.82	485.81	196,179		3.38%		23.00%			3.38%		23.00%	
Boeing Co/The	BA	591.64	136.72	80,888										
Caterpillar Inc	CAT	533.37	178.76	95,346	0.36%	2.69%	0.01%	8.00%	0.03%	0.41%	2.69%	0.01%	8.00%	0.03%
JPMorgan Chase & Co	JPM	2,937.05	112.61	330,741	1.24%	3.55%	0.04%	5.00%	0.06%	1.44%	3.55%	0.05%	5.00%	0.07%
Chevron Corp	CVX	1,964.81	144.78	284,466		3.92%		26.00%			3.92%		26.00%	
Coca-Cola Co/The	KO	4,335.03	62.91	272,717	1.02%	2.80%	0.03%	7.00%	0.07%	1.19%	2.80%	0.03%	7.00%	0.08%
AbbVie Inc	ABBV	1,767.11	153.16	270,651	1.02%	3.68%	0.04%	4.50%	0.05%	1.18%	3.68%	0.04%	4.50%	0.05%
Walt Disney Co/The	DIS	1,821.48	94.40	171,948				30.50%					30.50%	
FleetCor Technologies Inc	FLT	77.34	210.11	16,250	0.06%			10.50%	0.01%				10.50%	
Extra Space Storage Inc	EXR	134.28	170.12	22,844	0.09%	3.53%	0.00%	4.00%	0.00%	0.10%	3.53%	0.00%	4.00%	0.00%
Exxon Mobil Corp	XOM	4,212.54	85.64	360,762		4.11%					4.11%			
Phillips 66	PSX	481.10	81.99	39,445		4.73%		85.00%			4.73%		85.00%	
General Electric Co	GE	1,100.67	63.67	70,079	0.26%	0.50%	0.00%	15.00%	0.04%	0.30%	0.50%	0.00%	15.00%	0.05%
HP Inc	HPQ	1,034.14	32.78	33,899	0.13%	3.05%	0.00%	12.50%	0.02%	0.15%	3.05%	0.00%	12.50%	0.02%
Home Depot Inc/The	HD	1,027.76	274.27	281,882	1.06%	2.77%	0.03%	9.00%	0.10%	1.23%	2.77%	0.03%	9.00%	0.11%
Monolithic Power Systems Inc	MPWR	46.64	384.04	17,913	0.07%	0.78%	0.00%	18.00%	0.01%	0.08%	0.78%	0.00%	18.00%	0.01%
International Business Machines Corp	IBM	899.44	141.19	126,991	0.48%	4.67%	0.02%	3.00%	0.01%	0.55%	4.67%	0.03%	3.00%	0.02%
Johnson & Johnson	JNJ	2,631.40	177.51	467,100	1.75%	2.55%	0.04%	8.00%	0.14%	2.03%	2.55%	0.05%	8.00%	0.16%
McDonald's Corp	MCD	739.55	246.88	182,579	0.68%	2.24%	0.02%	10.50%	0.07%	0.79%	2.24%	0.02%	10.50%	0.08%
Merck & Co Inc	MRK	2,528.81	91.17	230,551	0.86%	3.03%	0.03%	8.00%	0.07%	1.00%	3.03%	0.03%	8.00%	0.08%
3M Co	MMM	569.06	129.41	73,642	0.28%	4.61%	0.01%	5.50%	0.02%	0.32%	4.61%	0.01%	5.50%	0.02%
American Water Works Co Inc	AWK	181.75	148.77	27,039	0.10%	1.76%	0.00%	8.50%	0.01%	0.12%	1.76%	0.00%	8.50%	0.01%
Bank of America Corp	BAC	8,056.88	31.13	250,811	0.94%	2.70%	0.03%	9.00%	0.08%	1.09%	2.70%	0.03%	9.00%	0.10%
Pfizer Inc	PFE	5,610.90	52.43	294,179	1.10%	3.05%	0.03%	6.50%	0.07%	1.28%	3.05%	0.04%	6.50%	0.08%
Procter & Gamble Co/The	PG	2,399.30	143.79	344,995	1.29%	2.54%	0.03%	6.50%	0.08%	1.50%	2.54%	0.04%	6.50%	0.10%
AT&T Inc	T	7,159.00	20.96	150,053	0.56%	5.30%	0.03%	0.50%	0.00%	0.65%	5.30%	0.03%	0.50%	0.00%
Travelers Cos Inc/The	TRV	239.96	169.13	40,585	0.15%	2.20%	0.00%	8.00%	0.01%	0.18%	2.20%	0.00%	8.00%	0.01%
Raytheon Technologies Corp	RTX	1,487.22	96.11	142,936	0.54%	2.29%	0.01%	7.50%	0.04%	0.62%	2.29%	0.01%	7.50%	0.05%
Analog Devices Inc	ADI	519.81	146.09	75,938	0.28%	2.08%	0.01%	14.00%	0.04%	0.33%	2.08%	0.01%	14.00%	0.05%
Walmart Inc	WMT	2,741.15	121.58	333,269	1.25%	1.84%	0.02%	7.50%	0.09%	1.45%	1.84%	0.03%	7.50%	0.11%
Cisco Systems Inc	CSCO	4,140.96	42.64	176,571	0.66%	3.56%	0.02%	8.00%	0.05%	0.77%	3.56%	0.03%	8.00%	0.06%
Intel Corp	INTC	4,089.00	37.41	152,969	0.57%	3.90%	0.02%	6.00%	0.03%	0.67%	3.90%	0.03%	6.00%	0.04%
General Motors Co	GM	1,458.02	31.76	46,307	0.17%			11.00%	0.02%				11.00%	
Microsoft Corp	MSFT	7,479.03	256.83	1,920,840	7.20%	0.97%	0.07%	17.50%	1.26%	8.36%	0.97%	0.08%	17.50%	1.46%
Dollar General Corp	DG	227.00	245.44	55,714	0.21%	0.90%	0.00%	10.00%	0.02%	0.24%	0.90%	0.00%	10.00%	0.02%
Cigna Corp	CI	317.27	263.52	83,608	0.31%	1.70%	0.01%	10.00%	0.03%	0.36%	1.70%	0.01%	10.00%	0.04%
Kinder Morgan Inc	KMI	2,267.47	16.76	38,003	0.14%	6.62%	0.01%	19.00%	0.03%	0.17%	6.62%	0.01%	19.00%	0.03%
Citigroup Inc	C	1,941.92	45.99	89,309	0.33%	4.44%	0.01%	4.50%	0.02%	0.39%	4.44%	0.02%	4.50%	0.02%
American International Group Inc	AIG	792.19	51.13	40,505		2.50%		31.50%			2.50%		31.50%	
Altria Group Inc	MO	1,810.56	41.77	75,627	0.28%	8.62%	0.02%	5.50%	0.02%	0.33%	8.62%	0.03%	5.50%	0.02%
HCA Healthcare Inc	HCA	295.48	168.06	49,659	0.19%	1.33%	0.00%	12.50%	0.02%	0.22%	1.33%	0.00%	12.50%	0.03%
International Paper Co	IP	370.63	41.83	15,503	0.06%	4.42%	0.00%	12.50%	0.01%	0.07%	4.42%	0.00%	12.50%	0.01%
Hewlett Packard Enterprise Co	HPE	1,299.33	13.26	17,229	0.06%	3.62%	0.00%	7.50%	0.00%	0.07%	3.62%	0.00%	7.50%	0.01%
Abbott Laboratories	ABT	1,750.94	108.65	190,240	0.71%	1.73%	0.01%	8.00%	0.06%	0.83%	1.73%	0.01%	8.00%	0.07%
Aflac Inc	AFL	644.17	55.33	35,642	0.13%	2.89%	0.00%	9.00%	0.01%	0.16%	2.89%	0.00%	9.00%	0.01%
Air Products and Chemicals Inc	APD	221.77	240.48	53,332	0.20%	2.69%	0.01%	12.00%	0.02%	0.23%	2.69%	0.01%	12.00%	0.03%
Royal Caribbean Cruises Ltd	RCL	254.96	34.91	8,901										
Hess Corp	HES	311.26	105.94	32,975		1.42%					1.42%			
Archer-Daniels-Midland Co	ADM	562.71	77.60	43,666	0.16%	2.06%	0.00%	13.00%	0.02%	0.19%	2.06%	0.00%	13.00%	0.02%
Automatic Data Processing Inc	ADP	417.75	210.04	87,744	0.33%	1.98%	0.01%	9.00%	0.03%	0.38%	1.98%	0.01%	9.00%	0.03%
Verisk Analytics Inc	VRSK	157.90	173.09	27,331	0.10%	0.72%	0.00%	10.50%	0.01%	0.12%	0.72%	0.00%	10.50%	0.01%
AutoZone Inc	AZO	19.49	2,149.12	41,882	0.16%			14.00%	0.02%				14.00%	
Avery Dennison Corp	AVY	81.71	161.87	13,227	0.05%	1.85%	0.00%	12.00%	0.01%	0.06%	1.85%	0.00%	12.00%	0.01%
Enphase Energy Inc	ENPH	135.03	195.24	26,363				26.50%					26.50%	
MSCI Inc	MSCI	81.27	412.15	33,495	0.13%	1.01%	0.00%	14.50%	0.02%	0.15%	1.01%	0.00%	14.50%	0.02%
Ball Corp	BALL	319.79	68.77	21,992		1.16%		21.50%			1.16%		21.50%	
Ceridian HCM Holding Inc	CDAY	152.65	47.08	7,187										
Carrier Global Corp	CARR	848.24	35.66	30,248		1.68%					1.68%			
Bank of New York Mellon Corp/The	BK	807.80	41.71	33,693	0.13%	3.26%	0.00%	6.50%	0.01%	0.15%	3.26%	0.00%	6.50%	0.01%
Otis Worldwide Corp	OTIS	422.79	70.67	29,879		1.64%					1.64%			
Baxter International Inc	BAX	503.53	64.23	32,342	0.12%	1.81%	0.00%	10.00%	0.01%	0.14%	1.81%	0.00%	10.00%	0.01%
Becton Dickinson and Co	BDX	285.07	246.53	70,277	0.26%	1.41%	0.00%	5.50%	0.01%	0.31%	1.41%	0.00%	5.50%	0.02%
Berkshire Hathaway Inc	BRK/B	1,285.75	273.02	351,036	1.32%			6.00%	0.08%				6.00%	
Best Buy Co Inc	BBY	225.17	65.19	14,679	0.06%	5.40%	0.00%	9.50%	0.01%	0.06%	5.40%	0.00%	9.50%	0.01%
Boston Scientific Corp	BSX	1,429.57	37.27	53,280	0.20%			16.00%	0.03%				16.00%	
Bristol-Myers Squibb Co	BMY	2,129.06	77.00	163,938		2.81%					2.81%			
Fortune Brands Home & Security Inc	FBHS	130.81	59.88	7,833	0.03%	1.87%	0.00%	10.00%	0.00%	0.03%	1.87%	0.00%	10.00%	0.00%
Brown-Forman Corp	BF/B	309.90	70.16	21,743	0.08%	1.07%	0.00%	12.00%	0.01%	0.09%	1.07%	0.00%	12.00%	0.01%
Coterra Energy Inc	CTRA	805.81	25.79	20,782		2.33%					2.33%			
Campbell Soup Co	CPB	300.58	48.05	14,443	0.05%	3.08%	0.00%	5.00%	0.00%	0.06%	3.08%	0.00%	5.00%	0.00%
Hilton Worldwide Holdings Inc	HLT	278.33	111.44	31,017		0.54%					0.54%			
Carnival Corp	CCL	994.62	8.65	8,603										
Qorvo Inc	QRVO	103.73	94.32	9,784	0.04%			14.50%	0.01%				14.50%	
Lumen Technologies Inc	LUMN	1,033.06	10.91	11,271	0.04%	9.17%	0.00%	3.50%	0.00%	0.05%	9.17%	0.00%	3.50%	0.00%
UDR Inc	UDR	318.40	46.04	14,659	0.05%	3.30%	0.00%	10.50%	0.01%	0.06%	3.30%	0.00%	10.50%	0.01%
Clorox Co/The	CLX	123.08	140.98	17,352	0.07%	3.29%	0.00%	4.50%	0.00%	0.08%	3.29%	0.00%	4.50%	0.00%
Paycom Software Inc	PAYC	60.25	280.12	16,878	0.06%			20.00%	0.01%				20.00%	
CMS Energy Corp	CMS	290.13	67.50	19,584	0.07%	2.73%	0.00%	6.50%	0.00%	0.09%	2.73%	0.00%	6.50%	0.01%
Newell Brands Inc	NWL	413.50	19.04	7,873		4.83%					4.83%			
Colgate-Palmolive Co	CL	837.94	80.14	67,153	0.25%	2.35%	0.01%	6.50%	0.02%	0.29%	2.35%	0.01%	6.50%	0.02%
EPAM Systems Inc	EPAM	57.15	294.78	16,847				20.50%					20.50%	
Comerica Inc	CMA	130.76	73.38	9,595	0.04%	3.71%	0.00%	6.00%	0.00%	0.04%	3.71%	0.00%	6.00%	0.00%
Conagra Brands Inc	CAG	479.88	34.24	16,431	0.06%	3.65%	0.00%	4.00%	0.00%	0.07%	3.65%	0.00%	4.00%	0.00%
Consolidated Edison Inc	ED	354.30	95.10	33,693	0.13%	3.32%	0.00%	4.50%	0.01%	0.15%	3.32%	0.00%	4.50%	0.01%
Corning Inc	GLW	844.61	31.51	26,614	0.10%	3.43%	0.00%	17.50%	0.02%	0.12%	3.43%	0.00%	17.50%	0.02%
Cummins Inc	CMI	141.10	193.53	27,307	0.10%	3.00%	0.00%	8.00%	0.01%	0.12%	3.00%	0.00%	8.00%	0.01%
Caesars Entertainment Inc	CZR	214.37	38.30	8,210										
Danaher Corp	DHR	727.08	253.52	184,329	0.69%	0.39%	0.00%	17.00%	0.12%	0.80%	0.39%	0.00%	17.00%	0.14%

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

Bulkley As-Filed Direct Testimony		
Estimated Weighted Average Dividend Yield:	1.83%	[1]
Estimated Weighted Average Long-Term Growth Rate:	11.02%	[2]
Estimated S&P 500 Required Market Return:	**12.94%**	[3]

Dr. Won "Adjustments" Corrected		
Estimated Weighted Average Dividend Yield:	2.12%	[12]
Estimated Weighted Average Long-Term Growth Rate:	10.64%	[13]
Estimated S&P 500 Required Market Return:	**12.87%**	[14]

Historical Market Return (1926-2021) on Large Company Stocks: **12.34%** [15]

					Bulkley Direct Testimony As-Filed					Bulkley Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[16]	[17]	[18]	[19]	[20]
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.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Target Corp	TGT	463.70	141.23	65,488	0.25%	3.06%	0.01%	13.00%	0.03%	0.28%	3.06%	0.01%	13.00%	0.04%
Deere & Co	DE	305.64	299.47	91,529	0.34%	1.51%	0.01%	15.00%	0.05%	0.40%	1.51%	0.01%	15.00%	0.06%
Dominion Energy Inc	D	811.27	79.81	64,747	0.24%	3.35%	0.01%	14.00%	0.03%	0.28%	3.35%	0.01%	14.00%	0.04%
Dover Corp	DOV	144.16	121.32	17,490	0.07%	1.65%	0.00%	9.00%	0.01%	0.08%	1.65%	0.00%	9.00%	0.01%
Alliant Energy Corp	LNT	250.81	58.61	14,700	0.06%	2.92%	0.00%	6.00%	0.00%	0.06%	2.92%	0.00%	6.00%	0.00%
Duke Energy Corp	DUK	770.00	107.21	82,552	0.31%	3.68%	0.01%	6.00%	0.02%	0.36%	3.68%	0.01%	6.00%	0.02%
Regency Centers Corp	REG	172.36	59.31	10,223	0.04%	4.22%	0.00%	12.50%	0.00%	0.04%	4.22%	0.00%	12.50%	0.01%
Eaton Corp PLC	ETN	399.00	125.99	50,270	0.19%	2.57%	0.00%	12.00%	0.02%	0.22%	2.57%	0.01%	12.00%	0.03%
Ecolab Inc	ECL	285.66	153.76	43,922	0.16%	1.33%	0.00%	10.50%	0.02%	0.19%	1.33%	0.00%	10.50%	0.02%
PerkinElmer Inc	PKI	126.15	142.22	17,941	0.07%	0.20%	0.00%	5.00%	0.00%	0.08%	0.20%	0.00%	5.00%	0.00%
Emerson Electric Co	EMR	594.00	79.54	47,247	0.18%	2.59%	0.00%	10.00%	0.02%	0.21%	2.59%	0.01%	10.00%	0.02%
EOG Resources Inc	EOG	585.71	110.44	64,686	0.24%	2.72%	0.01%	18.00%	0.04%	0.28%	2.72%	0.01%	18.00%	0.05%
Aon PLC	AON	212.38	269.68	57,276	0.21%	0.83%	0.00%	7.50%	0.02%	0.25%	0.83%	0.00%	7.50%	0.02%
Entergy Corp	ETR	203.37	112.64	22,908	0.09%	3.59%	0.00%	4.00%	0.00%	0.10%	3.59%	0.00%	4.00%	0.00%
Equifax Inc	EFX	122.34	182.78	22,360	0.08%	0.85%	0.00%	10.00%	0.01%	0.10%	0.85%	0.00%	10.00%	0.01%
IQVIA Holdings Inc	IQV	189.28	216.99	41,072	0.15%			14.50%	0.02%				14.50%	
Gartner Inc	IT	80.54	241.83	19,477	0.07%			15.50%	0.01%				15.50%	
FedEx Corp	FDX	259.18	226.71	58,758	0.22%	2.03%	0.00%	13.00%	0.03%	0.26%	2.03%	0.01%	13.00%	0.03%
FMC Corp	FMC	125.94	107.01	13,477	0.05%	1.98%	0.00%	11.00%	0.01%	0.06%	1.98%	0.00%	11.00%	0.01%
Brown & Brown Inc	BRO	282.27	58.34	16,468	0.06%	0.70%	0.00%	10.50%	0.01%	0.07%	0.70%	0.00%	10.50%	0.01%
Ford Motor Co	F	3,948.91	11.13	43,951		3.59%		33.50%			3.59%		33.50%	
NextEra Energy Inc	NEE	1,964.50	77.46	152,170	0.57%	2.19%	0.01%	12.50%	0.07%	0.66%	2.19%	0.01%	12.50%	0.08%
Franklin Resources Inc	BEN	499.92	23.31	11,653	0.04%	4.98%	0.00%	9.00%	0.00%	0.05%	4.98%	0.00%	9.00%	0.00%
Garmin Ltd	GRMN	193.13	98.25	18,975	0.07%	2.97%	0.00%	8.00%	0.01%	0.08%	2.97%	0.00%	8.00%	0.01%
Freeport-McMoRan Inc	FCX	1,449.26	29.26	42,405		2.05%		29.00%			2.05%		29.00%	
Dexcom Inc	DXCM	392.50	74.53	29,253										
General Dynamics Corp	GD	277.71	221.25	61,442	0.23%	2.28%	0.01%	8.00%	0.02%	0.27%	2.28%	0.01%	8.00%	0.02%
General Mills Inc	GIS	597.16	75.45	45,056	0.17%	2.86%	0.00%	4.00%	0.01%	0.20%	2.86%	0.01%	4.00%	0.01%
Genuine Parts Co	GPC	141.60	133.00	18,832	0.07%	2.69%	0.00%	8.50%	0.01%	0.08%	2.69%	0.00%	8.50%	0.01%
Atmos Energy Corp	ATO	139.02	112.10	15,584	0.06%	2.43%	0.00%	7.50%	0.00%	0.07%	2.43%	0.00%	7.50%	0.01%
WW Grainger Inc	GWW	51.10	454.43	23,222	0.09%	1.51%	0.00%	7.00%	0.01%	0.10%	1.51%	0.00%	7.00%	0.01%
Halliburton Co	HAL	901.98	31.36	28,286		1.53%		26.00%			1.53%		26.00%	
L3Harris Technologies Inc	LHX	192.88	241.70	46,618	0.17%	1.85%	0.00%	18.50%	0.03%	0.20%	1.85%	0.00%	18.50%	0.04%
Healthpeak Properties Inc	PEAK	539.56	25.91	13,980	0.05%	4.63%	0.00%	17.00%	0.01%	0.06%	4.63%	0.00%	17.00%	0.01%
Catalent Inc	CTLT	179.21	107.29	19,228				21.00%					21.00%	
Fortive Corp	FTV	358.45	54.38	19,492	0.07%	0.51%	0.00%	12.00%	0.01%	0.08%	0.51%	0.00%	12.00%	0.01%
Hershey Co/The	HSY	145.99	215.16	31,411	0.12%	1.68%	0.00%	6.50%	0.01%	0.14%	1.68%	0.00%	6.50%	0.01%
Synchrony Financial	SYF	501.49	27.62	13,851	0.05%	3.19%	0.00%	9.50%	0.00%	0.06%	3.19%	0.00%	9.50%	0.01%
Hormel Foods Corp	HRL	546.06	47.36	25,861	0.10%	2.20%	0.00%	6.50%	0.01%	0.11%	2.20%	0.00%	6.50%	0.01%
Arthur J Gallagher & Co	AJG	210.07	163.04	34,249	0.13%	1.25%	0.00%	16.50%	0.02%	0.15%	1.25%	0.00%	16.50%	0.02%
Mondelez International Inc	MDLZ	1,383.92	62.09	85,928	0.32%	2.25%	0.01%	9.50%	0.03%	0.37%	2.25%	0.01%	9.50%	0.04%
CenterPoint Energy Inc	CNP	629.43	29.58	18,619	0.07%	2.30%	0.00%	6.50%	0.00%	0.08%	2.30%	0.00%	6.50%	0.01%
Humana Inc	HUM	126.49	468.07	59,208	0.22%	0.67%	0.00%	11.00%	0.02%	0.26%	0.67%	0.00%	11.00%	0.03%
Willis Towers Watson PLC	WTW	111.49	197.39	22,007	0.08%	1.66%	0.00%	8.00%	0.01%	0.10%	1.66%	0.00%	8.00%	0.01%
Illinois Tool Works Inc	ITW	311.44	182.25	56,760	0.21%	2.68%	0.01%	11.00%	0.02%	0.25%	2.68%	0.01%	11.00%	0.03%
CDW Corp/DE	CDW	135.12	157.56	21,289	0.08%	1.27%	0.00%	11.00%	0.01%	0.09%	1.27%	0.00%	11.00%	0.01%
Trane Technologies PLC	TT	233.86	129.87	30,371		2.06%					2.06%			
Interpublic Group of Cos Inc/The	IPG	393.66	27.53	10,838	0.04%	4.21%	0.00%	12.00%	0.00%	0.05%	4.21%	0.00%	12.00%	0.01%
International Flavors & Fragrances Inc	IFF	254.84	119.12	30,356	0.11%	2.65%	0.00%	7.50%	0.01%	0.13%	2.65%	0.00%	7.50%	0.01%
Jacobs Engineering Group Inc	J	128.63	127.13	16,352	0.06%	0.72%	0.00%	15.00%	0.01%	0.07%	0.72%	0.00%	15.00%	0.01%
Generac Holdings Inc	GNRC	63.83	210.58	13,441				23.50%					23.50%	
NXP Semiconductors NV	NXPI	262.57	148.03	38,867	0.15%	2.28%	0.00%	12.00%	0.02%	0.17%	2.28%	0.00%	12.00%	0.02%
Kellogg Co	K	337.87	71.34	24,104	0.09%	3.25%	0.00%	3.50%	0.00%	0.10%	3.25%	0.00%	3.50%	0.00%
Broadridge Financial Solutions Inc	BR	117.23	142.55	16,711	0.06%	1.80%	0.00%	9.00%	0.01%	0.07%	1.80%	0.00%	9.00%	0.01%
Kimberly-Clark Corp	KMB	336.93	135.15	45,535	0.17%	3.43%	0.01%	5.50%	0.01%	0.20%	3.43%	0.01%	5.50%	0.01%
Kimco Realty Corp	KIM	618.01	19.77	12,218	0.05%	4.05%	0.00%	8.50%	0.00%	0.05%	4.05%	0.00%	8.50%	0.00%
Oracle Corp	ORCL	2,664.93	69.87	186,198	0.70%	1.83%	0.01%	9.00%	0.06%	0.81%	1.83%	0.01%	9.00%	0.07%
Kroger Co/The	KR	715.56	47.33	33,867	0.13%	2.20%	0.00%	6.50%	0.01%	0.15%	2.20%	0.00%	6.50%	0.01%
Lennar Corp	LEN	258.62	70.57	18,251	0.07%	2.13%	0.00%	9.00%	0.01%	0.08%	2.13%	0.00%	9.00%	0.01%
Eli Lilly & Co	LLY	950.16	324.23	308,070	1.16%	1.21%	0.01%	11.50%	0.13%	1.34%	1.21%	0.02%	11.50%	0.15%
Bath & Body Works Inc	BBWI	228.74	26.92	6,158		2.97%		26.50%			2.97%		26.50%	
Charter Communications Inc	CHTR	160.73	468.53	75,305				21.50%					21.50%	
Lincoln National Corp	LNC	171.95	46.77	8,042	0.03%	3.85%	0.00%	11.50%	0.00%	0.03%	3.85%	0.00%	11.50%	0.00%
Loews Corp	L	246.11	59.26	14,584	0.05%	0.42%	0.00%	16.00%	0.01%	0.06%	0.42%	0.00%	16.00%	0.01%
Lowe's Cos Inc	LOW	639.13	174.67	111,637	0.42%	2.40%	0.01%	12.50%	0.05%	0.49%	2.40%	0.01%	12.50%	0.06%
IDEX Corp	IEX	76.01	181.63	13,805	0.05%	1.32%	0.00%	10.00%	0.01%	0.06%	1.32%	0.00%	10.00%	0.01%
Marsh & McLennan Cos Inc	MMC	502.71	155.25	78,045	0.29%	1.38%	0.00%	11.50%	0.03%	0.34%	1.38%	0.00%	11.50%	0.04%
Masco Corp	MAS	235.94	50.60	11,939	0.04%	2.21%	0.00%	8.50%	0.00%	0.05%	2.21%	0.00%	8.50%	0.00%
S&P Global Inc	SPGI	339.90	337.06	114,567	0.43%	1.01%	0.00%	9.50%	0.04%	0.50%	1.01%	0.01%	9.50%	0.05%
Medtronic PLC	MDT	1,328.71	89.75	119,252	0.45%	3.03%	0.01%	8.50%	0.04%	0.52%	3.03%	0.02%	8.50%	0.04%
Viatris Inc	VTRS	1,212.33	10.47	12,693		4.58%					4.58%			
CVS Health Corp	CVS	1,311.31	92.66	121,506	0.46%	2.37%	0.01%	6.00%	0.03%	0.53%	2.37%	0.01%	6.00%	0.03%
DuPont de Nemours Inc	DD	508.53	55.58	28,264	0.11%	2.37%	0.00%	10.00%	0.01%	0.12%	2.37%	0.00%	10.00%	0.01%
Micron Technology Inc	MU	1,116.67	55.28	61,729		0.83%		24.00%			0.83%		24.00%	
Motorola Solutions Inc	MSI	167.30	209.60	35,065	0.13%	1.51%	0.00%	8.00%	0.01%	0.15%	1.51%	0.00%	8.00%	0.01%
Cboe Global Markets Inc	CBOE	106.19	113.19	12,020	0.05%	1.70%	0.00%	10.00%	0.00%	0.05%	1.70%	0.00%	10.00%	0.01%
Laboratory Corp of America Holdings	LH	93.18	234.36	21,837	0.08%	1.23%	0.00%	6.00%	0.00%	0.10%	1.23%	0.00%	6.00%	0.01%
Newmont Corp	NEM	793.65	59.67	47,357	0.18%	3.69%	0.01%	9.50%	0.02%	0.21%	3.69%	0.01%	9.50%	0.02%
NIKE Inc	NKE	1,268.76	102.20	129,667		1.19%		24.00%			1.19%		24.00%	
NiSource Inc	NI	405.80	29.49	11,967	0.04%	3.19%	0.00%	9.50%	0.00%	0.05%	3.19%	0.00%	9.50%	0.00%
Norfolk Southern Corp	NSC	238.33	227.29	54,171	0.20%	2.18%	0.00%	10.00%	0.02%	0.24%	2.18%	0.01%	10.00%	0.02%
Principal Financial Group Inc	PFG	252.68	66.79	16,877	0.06%	3.83%	0.00%	6.00%	0.00%	0.07%	3.83%	0.00%	6.00%	0.00%
Eversource Energy	ES	344.88	84.47	29,132	0.11%	3.02%	0.00%	6.00%	0.01%	0.13%	3.02%	0.00%	6.00%	0.01%
Northrop Grumman Corp	NOC	155.45	478.57	74,391	0.28%	1.45%	0.00%	7.50%	0.02%	0.32%	1.45%	0.00%	7.50%	0.02%
Wells Fargo & Co	WFC	3,790.35	39.17	148,468	0.56%	2.55%	0.01%	7.50%	0.04%	0.65%	2.55%	0.02%	7.50%	0.05%
Nucor Corp	NUE	266.00	104.41	27,773	0.10%	1.92%	0.00%	10.00%	0.01%	0.12%	1.92%	0.00%	10.00%	0.01%
PVH Corp	PVH	66.96	56.90	3,810	0.01%	0.26%	0.00%	13.50%	0.00%	0.02%	0.26%	0.00%	13.50%	0.00%
Occidental Petroleum Corp	OXY	937.19	58.88	55,182		0.88%					0.88%			
Omnicom Group Inc	OMC	205.73	63.61	13,087	0.05%	4.40%	0.00%	6.00%	0.00%	0.06%	4.40%	0.00%	6.00%	0.00%
ONEOK Inc	OKE	446.62	55.50	24,787	0.09%	6.74%	0.01%	11.00%	0.01%	0.11%	6.74%	0.01%	11.00%	0.01%
Raymond James Financial Inc	RJF	216.66	89.41	19,371	0.07%	1.52%	0.00%	10.50%	0.01%	0.08%	1.52%	0.00%	10.50%	0.01%
Parker-Hannifin Corp	PH	128.37	246.05	31,586	0.12%	2.16%	0.00%	12.50%	0.01%	0.14%	2.16%	0.00%	12.50%	0.02%

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

Bulkley As-Filed Direct Testimony		
Estimated Weighted Average Dividend Yield:	1.83%	[1]
Estimated Weighted Average Long-Term Growth Rate:	11.02%	[2]
Estimated S&P 500 Required Market Return:	**12.94%**	[3]

Dr. Won "Adjustments" Corrected		
Estimated Weighted Average Dividend Yield:	2.12%	[12]
Estimated Weighted Average Long-Term Growth Rate:	10.64%	[13]
Estimated S&P 500 Required Market Return:	**12.87%**	[14]

Historical Market Return (1926-2021) on Large Company Stocks: **12.34%** [15]

					Bulkey Direct Testimony As-Filed					Bulkey Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[16]	[17]	[18]	[19]	[20]
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.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Rollins Inc	ROL	492.46	34.92	17,197	0.06%	1.15%	0.00%	10.50%	0.01%	0.07%	1.15%	0.00%	10.50%	0.01%
PPL Corp	PPL	735.90	27.13	19,965		3.32%					3.32%			
ConocoPhillips	COP	1,293.45	89.81	116,165	0.44%	2.05%	0.01%	20.00%	0.09%	0.51%	2.05%	0.01%	20.00%	0.10%
PulteGroup Inc	PHM	237.63	39.63	9,417	0.04%	1.51%	0.00%	11.00%	0.00%	0.04%	1.51%	0.00%	11.00%	0.00%
Pinnacle West Capital Corp	PNW	113.00	73.12	8,263	0.03%	4.65%	0.00%	1.50%	0.00%	0.04%	4.65%	0.00%	1.50%	0.00%
PNC Financial Services Group Inc/The	PNC	413.58	157.77	65,251	0.24%	3.80%	0.01%	11.50%	0.03%	0.28%	3.80%	0.01%	11.50%	0.03%
PPG Industries Inc	PPG	236.15	114.34	27,001	0.10%	2.06%	0.00%	4.00%	0.00%	0.12%	2.06%	0.00%	4.00%	0.00%
Progressive Corp/The	PGR	584.90	116.27	68,006	0.26%	0.34%	0.00%	4.50%	0.01%	0.30%	0.34%	0.00%	4.50%	0.01%
Public Service Enterprise Group Inc	PEG	499.26	63.28	31,593	0.12%	3.41%	0.00%	4.00%	0.00%	0.14%	3.41%	0.00%	4.00%	0.01%
Robert Half International Inc	RHI	110.51	74.89	8,276	0.03%	2.30%	0.00%	7.50%	0.00%	0.04%	2.30%	0.00%	7.50%	0.00%
Edison International	EIX	381.20	63.24	24,107		4.43%					4.43%			
Schlumberger NV	SLB	1,413.46	35.76	50,545		1.96%		23.00%			1.96%		23.00%	
Charles Schwab Corp/The	SCHW	1,817.06	63.18	114,802	0.43%	1.27%	0.01%	9.00%	0.04%	0.50%	1.27%	0.01%	9.00%	0.04%
Sherwin-Williams Co/The	SHW	260.13	223.91	58,246	0.22%	1.07%	0.00%	11.50%	0.03%	0.25%	1.07%	0.00%	11.50%	0.03%
West Pharmaceutical Services Inc	WST	74.08	302.37	22,398	0.08%	0.24%	0.00%	17.00%	0.01%	0.10%	0.24%	0.00%	17.00%	0.02%
J M Smucker Co/The	SJM	106.56	128.01	13,640	0.05%	3.09%	0.00%	4.00%	0.00%	0.06%	3.09%	0.00%	4.00%	0.00%
Snap-on Inc	SNA	53.37	197.03	10,516	0.04%	2.88%	0.00%	4.50%	0.00%	0.05%	2.88%	0.00%	4.50%	0.00%
AMETEK Inc	AME	230.91	109.89	25,375	0.10%	0.80%	0.00%	10.00%	0.01%	0.11%	0.80%	0.00%	10.00%	0.01%
Southern Co/The	SO	1,062.53	71.31	75,769	0.28%	3.81%	0.01%	6.50%	0.02%	0.33%	3.81%	0.01%	6.50%	0.02%
Truist Financial Corp	TFC	1,331.41	47.43	63,149	0.24%	4.05%	0.01%	7.00%	0.02%	0.27%	4.05%	0.01%	7.00%	0.02%
Southwest Airlines Co	LUV	592.96	36.12	21,418				29.50%					29.50%	
W R Berkley Corp	WRB	265.19	68.26	18,102	0.07%	0.59%	0.00%	15.50%	0.01%	0.08%	0.59%	0.00%	15.50%	0.01%
Stanley Black & Decker Inc	SWK	150.97	104.86	15,830	0.06%	3.01%	0.00%	6.00%	0.00%	0.07%	3.01%	0.00%	6.00%	0.00%
Public Storage	PSA	175.53	312.67	54,883	0.21%	2.56%	0.01%	8.00%	0.02%	0.24%	2.56%	0.01%	8.00%	0.02%
Arista Networks Inc	ANET	308.26	93.74	28,897	0.11%			4.50%	0.00%				4.50%	
Sysco Corp	SYY	509.48	84.71	43,158	0.16%	2.31%	0.00%	17.50%	0.03%	0.19%	2.31%	0.00%	17.50%	0.03%
Corteva Inc	CTVA	725.32	54.14	39,269	0.15%	1.03%	0.00%	16.50%	0.02%	0.17%	1.03%	0.00%	16.50%	0.03%
Texas Instruments Inc	TXN	922.13	153.65	141,686	0.53%	2.99%	0.02%	9.00%	0.05%	0.62%	2.99%	0.02%	9.00%	0.06%
Textron Inc	TXT	215.08	61.07	13,135	0.05%	0.13%	0.00%	8.50%	0.00%	0.06%	0.13%	0.00%	8.50%	0.00%
Thermo Fisher Scientific Inc	TMO	391.46	543.28	212,673	0.80%	0.22%	0.00%	15.50%	0.12%	0.93%	0.22%	0.00%	15.50%	0.14%
TJX Cos Inc/The	TJX	1,171.64	55.85	65,436	0.25%	2.11%	0.01%	20.00%	0.05%	0.28%	2.11%	0.01%	20.00%	0.06%
Globe Life Inc	GL	98.60	97.47	9,611	0.04%	0.85%	0.00%	8.00%	0.00%	0.04%	0.85%	0.00%	8.00%	0.00%
Johnson Controls International plc	JCI	695.67	47.88	33,309	0.12%	2.92%	0.00%	14.00%	0.02%	0.14%	2.92%	0.00%	14.00%	0.02%
Ulta Beauty Inc	ULTA	51.82	385.48	19,975	0.07%			15.00%	0.01%				15.00%	
Union Pacific Corp	UNP	628.03	213.28	133,945	0.50%	2.44%	0.01%	9.50%	0.05%	0.58%	2.44%	0.01%	9.50%	0.06%
Keysight Technologies Inc	KEYS	179.95	137.85	24,806	0.09%			13.00%	0.01%				13.00%	
UnitedHealth Group Inc	UNH	938.17	513.63	481,873	1.81%	1.28%	0.02%	12.00%	0.22%	2.10%	1.28%	0.03%	12.00%	0.25%
Marathon Oil Corp	MRO	707.69	22.48	15,909		1.42%					1.42%			
Bio-Rad Laboratories Inc	BIO	24.88	495.00	12,314	0.05%			11.50%	0.01%				11.50%	
Ventas Inc	VTR	399.70	51.43	20,556	0.08%	3.50%	0.00%	10.50%	0.01%	0.09%	3.50%	0.00%	10.50%	0.01%
VF Corp	VFC	388.48	44.17	17,159	0.06%	4.53%	0.00%	9.50%	0.01%	0.07%	4.53%	0.00%	9.50%	0.01%
Vornado Realty Trust	VNO	191.74	28.59	5,482		7.42%		-20.50%			7.42%		-20.50%	
Vulcan Materials Co	VMC	132.90	142.10	18,885	0.07%	1.13%	0.00%	8.50%	0.01%	0.08%	1.13%	0.00%	8.50%	0.01%
Weyerhaeuser Co	WY	744.50	33.12	24,658	0.09%	2.17%	0.00%	6.00%	0.01%	0.11%	2.17%	0.00%	6.00%	0.01%
Whirlpool Corp	WHR	56.20	154.87	8,704	0.03%	4.52%	0.00%	9.50%	0.00%	0.04%	4.52%	0.00%	9.50%	0.00%
Williams Cos Inc/The	WMB	1,218.01	31.21	38,014	0.14%	5.45%	0.01%	8.50%	0.01%	0.17%	5.45%	0.01%	8.50%	0.01%
Constellation Energy Corp	CEG	326.66	57.26	18,705		0.98%					0.98%			
WEC Energy Group Inc	WEC	315.44	100.64	31,745	0.12%	2.89%	0.00%	6.00%	0.01%	0.14%	2.89%	0.00%	6.00%	0.01%
Adobe Inc	ADBE	468.00	366.06	171,316	0.64%			14.50%	0.09%				14.50%	
AES Corp/The	AES	667.86	21.01	14,032	0.05%	3.01%	0.00%	14.00%	0.01%	0.06%	3.01%	0.00%	14.00%	0.01%
Amgen Inc	AMGN	534.20	243.30	129,971	0.49%	3.19%	0.02%	5.50%	0.03%	0.57%	3.19%	0.02%	5.50%	0.03%
Apple Inc	AAPL	16,185.18	136.72	2,212,838	8.30%	0.67%	0.06%	14.00%	1.16%	9.63%	0.67%	0.06%	14.00%	1.35%
Autodesk Inc	ADSK	217.27	171.96	37,362	0.14%			14.00%	0.02%				14.00%	
Cintas Corp	CTAS	102.33	373.53	38,221	0.14%	1.02%	0.00%	13.50%	0.02%	0.17%	1.02%	0.00%	13.50%	0.02%
Comcast Corp	CMCSA	4,470.57	39.24	175,425	0.66%	2.75%	0.02%	9.50%	0.06%	0.76%	2.75%	0.02%	9.50%	0.07%
Molson Coors Beverage Co	TAP	200.53	54.51	10,931		2.79%		49.50%			2.79%		49.50%	
KLA Corp	KLAC	149.24	319.08	47,618		1.32%		21.00%			1.32%		21.00%	
Marriott International Inc/MD	MAR	327.30	136.01	44,516	0.17%	0.88%	0.00%	17.50%	0.03%	0.19%	0.88%	0.00%	17.50%	0.03%
McCormick & Co Inc/MD	MKC	250.47	83.25	20,852	0.08%	1.78%	0.00%	6.00%	0.00%	0.09%	1.78%	0.00%	6.00%	0.01%
PACCAR Inc	PCAR	347.68	82.34	28,628	0.11%	1.65%	0.00%	5.00%	0.01%	0.12%	1.65%	0.00%	5.00%	0.01%
Costco Wholesale Corp	COST	442.96	479.28	212,303	0.80%	0.75%	0.01%	10.50%	0.08%	0.92%	0.75%	0.01%	10.50%	0.10%
First Republic Bank/CA	FRC	179.68	144.20	25,910	0.10%	0.75%	0.00%	11.00%	0.01%	0.11%	0.75%	0.00%	11.00%	0.01%
Stryker Corp	SYK	378.15	198.93	75,226	0.28%	1.40%	0.00%	8.50%	0.02%	0.33%	1.40%	0.00%	8.50%	0.03%
Tyson Foods Inc	TSN	291.54	86.06	25,090	0.09%	2.14%	0.00%	6.00%	0.01%	0.11%	2.14%	0.00%	6.00%	0.01%
Lamb Weston Holdings Inc	LW	144.45	71.46	10,322	0.04%	1.37%	0.00%	5.00%	0.00%	0.04%	1.37%	0.00%	5.00%	0.00%
Applied Materials Inc	AMAT	869.95	90.98	79,148	0.30%	1.14%	0.00%	14.50%	0.04%	0.34%	1.14%	0.00%	14.50%	0.05%
American Airlines Group Inc	AAL	649.52	12.68	8,236										
Cardinal Health Inc	CAH	272.43	52.27	14,240	0.05%	3.79%	0.00%	5.00%	0.00%	0.06%	3.79%	0.00%	5.00%	0.00%
Cincinnati Financial Corp	CINF	160.36	118.98	19,079	0.07%	2.32%	0.00%	7.00%	0.01%	0.08%	2.32%	0.00%	7.00%	0.01%
Paramount Global	PARA	608.40	24.68	15,015	0.06%	3.89%	0.00%	4.50%	0.00%	0.07%	3.89%	0.00%	4.50%	0.00%
DR Horton Inc	DHI	352.03	66.19	23,301	0.09%	1.36%	0.00%	13.00%	0.01%	0.10%	1.36%	0.00%	13.00%	0.01%
Electronic Arts Inc	EA	279.31	121.65	33,978	0.13%	0.62%	0.00%	9.00%	0.01%	0.15%	0.62%	0.00%	9.00%	0.01%
Expeditors International of Washington Inc	EXPD	167.75	97.46	16,349	0.06%	1.37%	0.00%	10.00%	0.01%	0.07%	1.37%	0.00%	10.00%	0.01%
Fastenal Co	FAST	575.55	49.92	28,732	0.11%	2.48%	0.00%	8.50%	0.01%	0.13%	2.48%	0.00%	8.50%	0.01%
M&T Bank Corp	MTB	179.42	159.39	28,597	0.11%	3.01%	0.00%	8.00%	0.01%	0.12%	3.01%	0.00%	8.00%	0.01%
Xcel Energy Inc	XEL	544.65	70.76	38,540	0.14%	2.76%	0.00%	6.00%	0.01%	0.17%	2.76%	0.00%	6.00%	0.01%
Fiserv Inc	FISV	646.39	88.97	57,510	0.22%			11.00%	0.02%				11.00%	
Fifth Third Bancorp	FITB	686.09	33.60	23,053	0.09%	3.57%	0.00%	11.00%	0.01%	0.10%	3.57%	0.00%	11.00%	0.01%
Gilead Sciences Inc	GILD	1,254.31	61.81	77,529	0.29%	4.72%	0.01%	13.50%	0.04%	0.34%	4.72%	0.02%	13.50%	0.05%
Hasbro Inc	HAS	139.44	81.88	11,418	0.04%	3.42%	0.00%	11.50%	0.00%	0.05%	3.42%	0.00%	11.50%	0.01%
Huntington Bancshares Inc/OH	HBAN	1,439.18	12.03	17,313	0.06%	5.15%	0.00%	12.50%	0.01%	0.08%	5.15%	0.00%	12.50%	0.01%
Welltower Inc	WELL	453.97	82.35	37,384	0.14%	2.96%	0.00%	3.50%	0.00%	0.16%	2.96%	0.00%	3.50%	0.01%
Biogen Inc	BIIB	146.45	203.94	29,867				-10.50%					-10.50%	
Northern Trust Corp	NTRS	208.38	96.48	20,105	0.08%	2.90%	0.00%	8.00%	0.01%	0.09%	2.90%	0.00%	8.00%	0.01%
Packaging Corp of America	PKG	93.70	137.50	12,884	0.05%	3.64%	0.00%	11.00%	0.01%	0.06%	3.64%	0.00%	11.00%	0.01%
Paychex Inc	PAYX	359.90	113.87	40,982	0.15%	2.78%	0.00%	9.50%	0.01%	0.18%	2.78%	0.00%	9.50%	0.02%
QUALCOMM Inc	QCOM	1,120.00	127.74	143,069	0.54%	2.35%	0.01%	19.00%	0.10%	0.62%	2.35%	0.01%	19.00%	0.12%
Roper Technologies Inc	ROP	105.91	394.65	41,799	0.16%	0.63%	0.00%	8.50%	0.01%	0.18%	0.63%	0.00%	8.50%	0.02%
Ross Stores Inc	ROST	349.93	70.23	24,575	0.09%	1.77%	0.00%	14.00%	0.01%	0.11%	1.77%	0.00%	14.00%	0.01%
IDEXX Laboratories Inc	IDXX	84.01	350.73	29,464	0.11%			12.00%	0.01%				12.00%	
Starbucks Corp	SBUX	1,146.90	76.39	87,612	0.33%	2.57%	0.01%	16.50%	0.05%	0.38%	2.57%	0.01%	16.50%	0.06%
KeyCorp	KEY	932.47	17.23	16,066	0.06%	4.53%	0.00%	9.50%	0.01%	0.07%	4.53%	0.00%	9.50%	0.01%

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

Bulkley As-Filed Direct Testimony		
Estimated Weighted Average Dividend Yield:	1.83%	[1]
Estimated Weighted Average Long-Term Growth Rate:	11.02%	[2]
Estimated S&P 500 Required Market Return:	**12.94%**	[3]

Dr. Won "Adjustments" Corrected		
Estimated Weighted Average Dividend Yield:	2.12%	[12]
Estimated Weighted Average Long-Term Growth Rate:	10.64%	[13]
Estimated S&P 500 Required Market Return:	**12.87%**	[14]

Historical Market Return (1926-2021) on Large Company Stocks: **12.34%** [15]

					Bulkey Direct Testimony As-Filed					Bulkey Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[16]	[17]	[18]	[19]	[20]
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.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Fox Corp	FOXA	311.68	32.16	10,024	0.04%	1.49%	0.00%	10.50%	0.00%	0.04%	1.49%	0.00%	10.50%	0.00%
Fox Corp	FOX	245.07	29.70	7,278		1.62%					1.62%			
State Street Corp	STT	367.12	61.65	22,633	0.08%	3.70%	0.00%	9.50%	0.01%	0.10%	3.70%	0.00%	9.50%	0.01%
Norwegian Cruise Line Holdings Ltd	NCLH	419.10	11.12	4,660										
US Bancorp	USB	1,485.74	46.02	68,374	0.26%	4.00%	0.01%	6.00%	0.02%	0.30%	4.00%	0.01%	6.00%	0.02%
A O Smith Corp	AOS	130.04	54.68	7,110	0.03%	2.05%	0.00%	11.00%	0.00%	0.03%	2.05%	0.00%	11.00%	0.00%
NortonLifeLock Inc	NLOK	571.37	21.96	12,547	0.05%	2.28%	0.00%	9.50%	0.00%	0.05%	2.28%	0.00%	9.50%	0.01%
T Rowe Price Group Inc	TROW	227.30	113.61	25,823	0.10%	4.22%	0.00%	9.50%	0.01%	0.11%	4.22%	0.00%	9.50%	0.01%
Waste Management Inc	WM	415.16	152.98	63,511	0.24%	1.70%	0.00%	6.50%	0.02%	0.28%	1.70%	0.00%	6.50%	0.02%
Constellation Brands Inc	STZ	159.33	233.06	37,133	0.14%	1.37%	0.00%	5.00%	0.01%	0.16%	1.37%	0.00%	5.00%	0.01%
DENTSPLY SIRONA Inc	XRAY	215.45	35.73	7,698	0.03%	1.40%	0.00%	12.00%	0.00%	0.03%	1.40%	0.00%	12.00%	0.00%
Zions Bancorp NA	ZION	151.36	50.90	7,704	0.03%	2.99%	0.00%	7.50%	0.00%	0.03%	2.99%	0.00%	7.50%	0.00%
Alaska Air Group Inc	ALK	126.09	40.05	5,050										
Invesco Ltd	IVZ	455.03	16.13	7,340	0.03%	4.65%	0.00%	15.50%	0.00%	0.03%	4.65%	0.00%	15.50%	0.00%
Linde PLC	LIN	501.93	287.53	144,319	0.54%	1.63%	0.01%	12.00%	0.06%	0.63%	1.63%	0.01%	12.00%	0.08%
Intuit Inc	INTU	282.08	385.44	108,724	0.41%	0.71%	0.00%	17.50%	0.07%	0.47%	0.71%	0.00%	17.50%	0.08%
Morgan Stanley	MS	1,749.28	76.06	133,051	0.50%	3.68%	0.02%	10.50%	0.05%	0.58%	3.68%	0.02%	10.50%	0.06%
Microchip Technology Inc	MCHP	554.50	58.08	32,205	0.12%	1.90%	0.00%	10.00%	0.01%	0.14%	1.90%	0.00%	10.00%	0.01%
Chubb Ltd	CB	423.71	196.58	83,293	0.31%	1.69%	0.01%	11.00%	0.03%	0.36%	1.69%	0.01%	11.00%	0.04%
Hologic Inc	HOLX	249.38	69.30	17,282				25.00%					25.00%	
Citizens Financial Group Inc	CFG	495.45	35.69	17,682	0.07%	4.37%	0.00%	8.50%	0.01%	0.08%	4.37%	0.00%	8.50%	0.01%
O'Reilly Automotive Inc	ORLY	65.73	631.76	41,522	0.16%			13.00%	0.02%				13.00%	
Allstate Corp/The	ALL	274.98	126.73	34,849	0.13%	2.68%	0.00%	4.50%	0.01%	0.15%	2.68%	0.00%	4.50%	0.01%
Equity Residential	EQR	376.04	72.22	27,158		3.46%		-6.00%			3.46%		-6.00%	
BorgWarner Inc	BWA	239.58	33.37	7,995	0.03%	2.04%	0.00%	9.50%	0.00%	0.03%	2.04%	0.00%	9.50%	0.00%
Keurig Dr Pepper Inc	KDP	1,418.55	35.39	50,202	0.19%	2.12%	0.00%	11.50%	0.02%	0.22%	2.12%	0.00%	11.50%	0.03%
Organon & Co	OGN	253.64	33.75	8,560		3.32%					3.32%			
Host Hotels & Resorts Inc	HST	714.78	15.68	11,208		1.53%		59.50%			1.53%		59.50%	
Incyte Corp	INCY	221.51	75.97	16,828				25.50%					25.50%	
Simon Property Group Inc	SPG	328.64	94.92	31,194	0.12%	7.16%	0.01%	3.00%	0.00%	0.14%	7.16%	0.01%	3.00%	0.00%
Eastman Chemical Co	EMN	128.95	89.77	11,576	0.04%	3.39%	0.00%	9.50%	0.00%	0.05%	3.39%	0.00%	9.50%	0.00%
Twitter Inc	TWTR	764.18	37.40	28,580										
AvalonBay Communities Inc	AVB	139.82	194.25	27,160	0.10%	3.27%	0.00%	6.50%	0.01%	0.12%	3.27%	0.00%	6.50%	0.01%
Prudential Financial Inc	PRU	375.00	95.68	35,880	0.13%	5.02%	0.01%	5.50%	0.01%	0.16%	5.02%	0.01%	5.50%	0.01%
United Parcel Service Inc	UPS	734.44	182.54	134,064	0.50%	3.33%	0.02%	11.50%	0.06%	0.58%	3.33%	0.02%	11.50%	0.07%
Walgreens Boots Alliance Inc	WBA	864.26	37.90	32,755	0.12%	5.04%	0.01%	7.50%	0.01%	0.14%	5.04%	0.01%	7.50%	0.01%
STERIS PLC	STE	100.08	206.15	20,631	0.08%	0.83%	0.00%	11.50%	0.01%	0.09%	0.83%	0.00%	11.50%	0.01%
McKesson Corp	MCK	143.58	326.21	46,838	0.18%	0.58%	0.00%	10.00%	0.02%	0.20%	0.58%	0.00%	10.00%	0.02%
Lockheed Martin Corp	LMT	266.11	429.96	114,415	0.43%	2.60%	0.01%	7.00%	0.03%	0.50%	2.60%	0.01%	7.00%	0.03%
AmerisourceBergen Corp	ABC	209.46	141.48	29,635	0.11%	1.30%	0.00%	8.50%	0.01%	0.13%	1.30%	0.00%	8.50%	0.01%
Capital One Financial Corp	COF	393.05	104.19	40,952		2.30%					2.30%			
Waters Corp	WAT	60.24	330.98	19,937	0.07%			6.00%	0.00%				6.00%	
Nordson Corp	NDSN	57.51	202.44	11,643	0.04%	1.01%	0.00%	12.00%	0.01%	0.05%	1.01%	0.00%	12.00%	0.01%
Dollar Tree Inc	DLTR	224.56	155.85	34,997	0.13%			12.00%	0.02%				12.00%	
Darden Restaurants Inc	DRI	124.73	113.12	14,110	0.05%	4.28%	0.00%	19.50%	0.01%	0.06%	4.28%	0.00%	19.50%	0.01%
Match Group Inc	MTCH	285.59	69.69	19,903				21.00%					21.00%	
Domino's Pizza Inc	DPZ	36.05	389.71	14,047	0.05%	1.13%	0.00%	15.50%	0.01%	0.06%	1.13%	0.00%	15.50%	0.01%
NVR Inc	NVR	3.29	4,004.14	13,174	0.05%			5.50%	0.00%				5.50%	
NetApp Inc	NTAP	221.19	65.24	14,430	0.05%	3.07%	0.00%	8.00%	0.00%	0.06%	3.07%	0.00%	8.00%	0.01%
Citrix Systems Inc	CTXS	126.58	97.17	12,300	0.05%			7.50%	0.00%				7.50%	
DXC Technology Co	DXC	229.66	30.31	6,961	0.03%			5.00%	0.00%				5.00%	
Old Dominion Freight Line Inc	ODFL	113.35	256.28	29,050	0.11%	0.47%	0.00%	12.00%	0.01%	0.13%	0.47%	0.00%	12.00%	0.02%
DaVita Inc	DVA	94.60	79.96	7,564	0.03%			12.00%	0.00%				12.00%	
Hartford Financial Services Group Inc/The	HIG	328.87	65.43	21,518	0.08%	2.35%	0.00%	6.50%	0.01%	0.09%	2.35%	0.00%	6.50%	0.01%
Iron Mountain Inc	IRM	290.56	48.69	14,147	0.05%	5.08%	0.00%	11.00%	0.01%	0.06%	5.08%	0.00%	11.00%	0.01%
Estee Lauder Cos Inc/The	EL	231.81	254.67	59,034	0.22%	0.94%	0.00%	14.00%	0.03%	0.26%	0.94%	0.00%	14.00%	0.04%
Cadence Design Systems Inc	CDNS	275.76	150.03	41,372	0.16%			12.00%	0.02%				12.00%	
Tyler Technologies Inc	TYL	41.47	332.48	13,789	0.05%			14.00%	0.01%				14.00%	
Universal Health Services Inc	UHS	67.13	100.71	6,760	0.03%	0.79%	0.00%	9.00%	0.00%	0.03%	0.79%	0.00%	9.00%	0.00%
Skyworks Solutions Inc	SWKS	160.93	92.64	14,908	0.06%	2.42%	0.00%	15.50%	0.01%	0.06%	2.42%	0.00%	15.50%	0.01%
Quest Diagnostics Inc	DGX	117.37	132.98	15,607	0.06%	1.99%	0.00%	7.00%	0.00%	0.07%	1.99%	0.00%	7.00%	0.00%
Activision Blizzard Inc	ATVI	781.88	77.86	60,877	0.23%	0.60%	0.00%	14.00%	0.03%	0.26%	0.60%	0.00%	14.00%	0.04%
Rockwell Automation Inc	ROK	116.26	199.31	23,172	0.09%	2.25%	0.00%	9.50%	0.01%	0.10%	2.25%	0.00%	9.50%	0.01%
Kraft Heinz Co/The	KHC	1,223.95	38.14	46,682	0.18%	4.20%	0.01%	5.50%	0.01%	0.20%	4.20%	0.01%	5.50%	0.01%
American Tower Corp	AMT	465.53	255.59	118,985	0.45%	2.24%	0.01%	9.00%	0.04%	0.52%	2.24%	0.01%	9.00%	0.05%
Regeneron Pharmaceuticals Inc	REGN	108.03	591.13	63,859	0.24%			3.00%	0.01%				3.00%	
Amazon.com Inc	AMZN	10,174.41	106.21	1,080,624				26.50%					26.50%	
Jack Henry & Associates Inc	JKHY	72.86	180.02	13,117	0.05%	1.09%	0.00%	10.50%	0.01%	0.06%	1.09%	0.00%	10.50%	0.01%
Ralph Lauren Corp	RL	44.83	89.65	4,019	0.02%	3.35%	0.00%	11.50%	0.00%	0.02%	3.35%	0.00%	11.50%	0.00%
Boston Properties Inc	BXP	156.71	88.98	13,944		4.41%		-1.00%			4.41%		-1.00%	
Amphenol Corp	APH	597.14	64.38	38,444	0.14%	1.24%	0.00%	12.50%	0.02%	0.17%	1.24%	0.00%	12.50%	0.02%
Howmet Aerospace Inc	HWM	417.91	31.45	13,143	0.05%	0.25%	0.00%	12.00%	0.01%	0.06%	0.25%	0.00%	12.00%	0.01%
Pioneer Natural Resources Co	PXD	241.96	223.08	53,976		13.23%		23.00%			13.23%		23.00%	
Valero Energy Corp	VLO	408.10	106.28	43,372	0.16%	3.69%	0.01%	11.00%	0.02%	0.19%	3.69%	0.01%	11.00%	0.02%
Synopsys Inc	SNPS	152.97	303.70	46,457	0.17%			12.50%	0.02%				12.50%	
Etsy Inc	ETSY	127.12	73.21	9,306				24.50%					24.50%	
CH Robinson Worldwide Inc	CHRW	127.27	101.37	12,901	0.05%	2.17%	0.00%	8.00%	0.00%	0.06%	2.17%	0.00%	8.00%	0.00%
Accenture PLC	ACN	664.19	277.65	184,412	0.69%	1.40%	0.01%	12.50%	0.09%	0.80%	1.40%	0.01%	12.50%	0.10%
TransDigm Group Inc	TDG	54.61	536.67	29,305	0.11%			18.00%	0.02%				18.00%	
Yum! Brands Inc	YUM	285.16	113.51	32,369	0.12%	2.01%	0.00%	10.50%	0.01%	0.14%	2.01%	0.00%	10.50%	0.01%
Prologis Inc	PLD	739.75	117.65	87,031	0.33%	2.69%	0.01%	6.00%	0.02%	0.38%	2.69%	0.01%	6.00%	0.02%
FirstEnergy Corp	FE	570.93	38.39	21,918	0.08%	4.06%	0.00%	7.50%	0.01%	0.10%	4.06%	0.00%	7.50%	0.01%
VeriSign Inc	VRSN	109.55	167.33	18,330	0.07%			8.50%	0.01%				8.50%	
Quanta Services Inc	PWR	143.71	125.34	18,012	0.07%	0.22%	0.00%	12.50%	0.01%	0.08%	0.22%	0.00%	12.50%	0.01%
Henry Schein Inc	HSIC	138.05	76.74	10,594	0.04%			7.00%	0.00%				7.00%	
Ameren Corp	AEE	258.09	90.36	23,321	0.09%	2.61%	0.00%	6.50%	0.01%	0.10%	2.61%	0.00%	6.50%	0.01%
ANSYS Inc	ANSS	86.99	239.29	20,816	0.08%			9.00%	0.01%				9.00%	
FactSet Research Systems Inc	FDS	37.90	384.57	14,574	0.05%	0.93%	0.00%	10.50%	0.01%	0.06%	0.93%	0.00%	10.50%	0.01%
NVIDIA Corp	NVDA	2,500.00	151.59	378,975		0.11%		23.00%			0.11%		23.00%	
Sealed Air Corp	SEE	146.08	57.72	8,432	0.03%	1.39%	0.00%	10.00%	0.00%	0.04%	1.39%	0.00%	10.00%	0.00%
Cognizant Technology Solutions Corp	CTSH	521.17	67.49	35,174	0.13%	1.60%	0.00%	7.00%	0.01%	0.15%	1.60%	0.00%	7.00%	0.01%
SVB Financial Group	SIVB	58.85	394.99	23,246	0.09%			6.00%	0.01%				6.00%	

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

Bulkley As-Filed Direct Testimony		
Estimated Weighted Average Dividend Yield:	1.83%	[1]
Estimated Weighted Average Long-Term Growth Rate:	11.02%	[2]
Estimated S&P 500 Required Market Return:	**12.94%**	[3]

Dr. Won "Adjustments" Corrected		
Estimated Weighted Average Dividend Yield:	2.12%	[12]
Estimated Weighted Average Long-Term Growth Rate:	10.64%	[13]
Estimated S&P 500 Required Market Return:	**12.87%**	[14]

Historical Market Return (1926-2021) on Large Company Stocks: **12.34%** [15]

					Bulkley Direct Testimony As-Filed					Bulkley Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[16]	[17]	[18]	[19]	[20]
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.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Intuitive Surgical Inc	ISRG	358.96	200.71	72,046	0.27%			12.50%	0.03%				12.50%	
Take-Two Interactive Software Inc	TTWO	161.98	122.53	19,848	0.07%			12.50%	0.01%				12.50%	
Republic Services Inc	RSG	315.89	130.87	41,341	0.16%	1.41%	0.00%	12.50%	0.02%	0.18%	1.41%	0.00%	12.50%	0.02%
eBay Inc	EBAY	559.84	41.67	23,329	0.09%	2.11%	0.00%	15.50%	0.01%	0.10%	2.11%	0.00%	15.50%	0.02%
Goldman Sachs Group Inc/The	GS	343.45	297.02	102,011	0.38%	2.69%	0.01%	5.00%	0.02%	0.44%	2.69%	0.01%	5.00%	0.02%
SBA Communications Corp	SBAC	107.83	320.05	34,511		0.89%		35.50%			0.89%		35.50%	
Sempra Energy	SRE	314.31	150.27	47,231	0.18%	3.05%	0.01%	11.50%	0.02%	0.21%	3.05%	0.01%	11.50%	0.02%
Moody's Corp	MCO	184.50	271.97	50,178	0.19%	1.03%	0.00%	8.00%	0.02%	0.22%	1.03%	0.00%	8.00%	0.02%
ON Semiconductor Corp	ON	434.51	50.31	21,860				23.00%					23.00%	
Booking Holdings Inc	BKNG	40.62	1,748.99	71,049	0.27%			14.00%	0.04%				14.00%	
F5 Inc	FFIV	60.47	153.04	9,255	0.03%			10.00%	0.00%				10.00%	
Akamai Technologies Inc	AKAM	160.31	91.33	14,641	0.05%			9.50%	0.01%				9.50%	
Charles River Laboratories International Inc	CRL	50.81	213.97	10,871	0.04%			12.00%	0.00%				12.00%	
MarketAxess Holdings Inc	MKTX	37.74	256.01	9,662	0.04%	1.09%	0.00%	11.50%	0.00%	0.04%	1.09%	0.00%	11.50%	0.00%
Devon Energy Corp	DVN	660.00	55.11	36,373		9.22%		30.00%			9.22%		30.00%	
Bio-Techne Corp	TECH	39.23	346.64	13,600	0.05%	0.37%	0.00%	17.50%	0.01%	0.06%	0.37%	0.00%	17.50%	0.01%
Alphabet Inc	GOOGL	300.76	2,179.26	655,443										
Teleflex Inc	TFX	46.90	245.85	11,530	0.04%	0.55%	0.00%	13.50%	0.01%	0.05%	0.55%	0.00%	13.50%	0.01%
Allegion plc	ALLE	87.81	97.90	8,596	0.03%	1.68%	0.00%	10.50%	0.00%	0.04%	1.68%	0.00%	10.50%	0.00%
Netflix Inc	NFLX	444.27	174.87	77,690	0.29%			12.50%	0.04%				12.50%	
Warner Bros Discovery Inc	WBD	2,426.84	13.42	32,568										
Agilent Technologies Inc	A	298.71	118.77	35,478	0.13%	0.71%	0.00%	11.50%	0.02%	0.15%	0.71%	0.00%	11.50%	0.02%
Trimble Inc	TRMB	250.14	58.23	14,566	0.05%			10.00%	0.01%				10.00%	
Elevance Health Inc	ELV	241.09	482.58	116,343		1.06%					1.06%			
CME Group Inc	CME	359.42	204.70	73,573	0.28%	1.95%	0.01%	7.50%	0.02%	0.32%	1.95%	0.01%	7.50%	0.02%
Juniper Networks Inc	JNPR	323.10	28.50	9,208	0.03%	2.95%	0.00%	9.00%	0.00%	0.04%	2.95%	0.00%	9.00%	0.00%
BlackRock Inc	BLK	151.50	609.04	92,271	0.35%	3.21%	0.01%	10.00%	0.03%	0.40%	3.21%	0.01%	10.00%	0.04%
DTE Energy Co	DTE	193.74	126.75	24,557	0.09%	2.79%	0.00%	4.50%	0.00%	0.11%	2.79%	0.00%	4.50%	0.00%
Celanese Corp	CE	108.31	117.61	12,738	0.05%	2.31%	0.00%	9.50%	0.00%	0.06%	2.31%	0.00%	9.50%	0.01%
Nasdaq Inc	NDAQ	164.68	152.54	25,120	0.09%	1.57%	0.00%	6.00%	0.01%	0.11%	1.57%	0.00%	6.00%	0.01%
Philip Morris International Inc	PM	1,550.11	98.74	153,058	0.57%	5.06%	0.03%	7.00%	0.04%	0.67%	5.06%	0.03%	7.00%	0.05%
Ingersoll Rand Inc	IR	405.93	42.08	17,082		0.19%					0.19%			
Salesforce Inc	CRM	995.00	165.04	164,215	0.62%			16.50%	0.10%				16.50%	
Huntington Ingalls Industries Inc	HII	40.05	217.82	8,723	0.03%	2.17%	0.00%	10.00%	0.00%	0.04%	2.17%	0.00%	10.00%	0.00%
MetLife Inc	MET	813.21	62.79	51,061	0.19%	3.19%	0.01%	7.50%	0.01%	0.22%	3.19%	0.01%	7.50%	0.02%
Tapestry Inc	TPR	251.80	30.52	7,685	0.03%	3.28%	0.00%	10.00%	0.00%	0.03%	3.28%	0.00%	10.00%	0.00%
CSX Corp	CSX	2,174.26	29.06	63,184	0.24%	1.38%	0.00%	10.00%	0.02%	0.27%	1.38%	0.00%	10.00%	0.03%
Edwards Lifesciences Corp	EW	621.75	95.09	59,122	0.22%			12.50%	0.03%				12.50%	
Ameriprise Financial Inc	AMP	109.90	237.68	26,122	0.10%	2.10%	0.00%	15.00%	0.01%	0.11%	2.10%	0.00%	15.00%	0.02%
Zebra Technologies Corp	ZBRA	52.51	293.95	15,436	0.06%			11.50%	0.01%				11.50%	
Zimmer Biomet Holdings Inc	ZBH	209.58	105.06	22,018	0.08%	0.91%	0.00%	7.00%	0.01%	0.10%	0.91%	0.00%	7.00%	0.01%
Camden Property Trust	CPT	106.52	134.48	14,325	0.05%	2.80%	0.00%	2.50%	0.00%	0.06%	2.80%	0.00%	2.50%	0.00%
CBRE Group Inc	CBRE	326.86	73.61	24,060	0.09%			8.50%	0.01%				8.50%	
Mastercard Inc	MA	964.92	315.48	304,413	1.14%	0.62%	0.01%	13.50%	0.15%	1.32%	0.62%	0.01%	13.50%	0.18%
CarMax Inc	KMX	159.17	90.48	14,401	0.05%			13.00%	0.01%				13.00%	
Intercontinental Exchange Inc	ICE	558.27	94.04	52,499	0.20%	1.62%	0.00%	6.50%	0.01%	0.23%	1.62%	0.00%	6.50%	0.01%
Fidelity National Information Services Inc	FIS	610.77	91.67	55,989		2.05%		52.00%			2.05%		52.00%	
Chipotle Mexican Grill Inc	CMG	27.96	1,307.26	36,554	0.14%			16.50%	0.02%				16.50%	
Wynn Resorts Ltd	WYNN	115.97	56.98	6,608				27.00%					27.00%	
Live Nation Entertainment Inc	LYV	228.06	82.58	18,834										
Assurant Inc	AIZ	54.09	172.85	9,349	0.04%	1.57%	0.00%	14.00%	0.00%	0.04%	1.57%	0.00%	14.00%	0.01%
NRG Energy Inc	NRG	237.28	38.17	9,057		3.67%		-10.50%			3.67%		-10.50%	
Monster Beverage Corp	MNST	529.67	92.70	49,101	0.18%			11.50%	0.02%				11.50%	
Regions Financial Corp	RF	934.50	18.75	17,522	0.07%	3.63%	0.00%	10.50%	0.01%	0.08%	3.63%	0.00%	10.50%	0.01%
Baker Hughes Co	BKR	984.58	28.87	28,425		2.49%					2.49%			
Mosaic Co/The	MOS	361.99	47.23	17,097		1.27%		33.00%			1.27%		33.00%	
Expedia Group Inc	EXPE	151.57	94.83	14,374										
Evergy Inc	EVRG	229.48	65.25	14,973	0.06%	3.51%	0.00%	7.50%	0.00%	0.07%	3.51%	0.00%	7.50%	0.00%
CF Industries Holdings Inc	CF	208.60	85.73	17,883		1.87%		26.50%			1.87%		26.50%	
APA Corp	APA	338.23	34.90	11,804		1.43%					1.43%			
Leidos Holdings Inc	LDOS	136.66	100.71	13,763	0.05%	1.43%	0.00%	9.00%	0.00%	0.06%	1.43%	0.00%	9.00%	0.01%
Alphabet Inc	GOOG	313.38	2,187.45	685,494	2.57%			18.50%	0.48%				18.50%	
Cooper Cos Inc/The	COO	49.34	313.12	15,448	0.06%	0.02%	0.00%	16.00%	0.01%	0.07%	0.02%	0.00%	16.00%	0.01%
TE Connectivity Ltd	TEL	322.17	113.15	36,454	0.14%	1.98%	0.00%	10.50%	0.01%	0.16%	1.98%	0.00%	10.50%	0.02%
Discover Financial Services	DFS	280.97	94.58	26,574	0.10%	2.54%	0.00%	16.00%	0.02%	0.12%	2.54%	0.00%	16.00%	0.02%
Visa Inc	V	1,645.72	196.89	324,026	1.22%	0.76%	0.01%	13.50%	0.16%	1.41%	0.76%	0.01%	13.50%	0.19%
Mid-America Apartment Communities Inc	MAA	115.43	174.67	20,162	0.08%	2.86%	0.00%	4.50%	0.00%	0.09%	2.86%	0.00%	4.50%	0.00%
Xylem Inc/NY	XYL	180.09	78.18	14,080	0.05%	1.53%	0.00%	6.50%	0.00%	0.06%	1.53%	0.00%	6.50%	0.00%
Marathon Petroleum Corp	MPC	541.00	82.21	44,475		2.82%					2.82%			
Advanced Micro Devices Inc	AMD	1,620.51	76.47	123,920				25.50%					25.50%	
Tractor Supply Co	TSCO	111.88	193.85	21,688	0.08%	1.90%	0.00%	12.50%	0.01%	0.09%	1.90%	0.00%	12.50%	0.01%
ResMed Inc	RMD	146.29	209.63	30,666	0.12%	0.80%	0.00%	8.50%	0.01%	0.13%	0.80%	0.00%	8.50%	0.01%
Mettler-Toledo International Inc	MTD	22.68	1,148.77	26,054	0.10%			13.50%	0.01%				13.50%	
Copart Inc	CPRT	237.67	108.66	25,826	0.10%			12.00%	0.01%				12.00%	
VICI Properties Inc	VICI	963.00	29.79	28,688	0.11%	4.83%	0.01%	8.50%	0.01%	0.12%	4.83%	0.01%	8.50%	0.01%
Fortinet Inc	FTNT	802.64	56.58	45,413				21.50%					21.50%	
Albemarle Corp	ALB	117.11	208.98	24,474	0.09%	0.76%	0.00%	15.00%	0.01%	0.11%	0.76%	0.00%	15.00%	0.02%
Moderna Inc	MRNA	397.76	142.85	56,820				-2.50%					-2.50%	
Essex Property Trust Inc	ESS	65.33	261.51	17,085		3.37%		-4.00%			3.37%		-4.00%	
Realty Income Corp	O	601.60	68.26	41,065	0.15%	4.35%	0.01%	6.00%	0.01%	0.18%	4.35%	0.01%	6.00%	0.01%
Westrock Co	WRK	254.85	39.84	10,153	0.04%	2.51%	0.00%	20.00%	0.01%	0.04%	2.51%	0.00%	20.00%	0.01%
Westinghouse Air Brake Technologies Corp	WAB	182.65	82.08	14,992	0.06%	0.73%	0.00%	9.00%	0.01%	0.07%	0.73%	0.00%	9.00%	0.01%
Pool Corp	POOL	40.07	351.23	14,075	0.05%	1.14%	0.00%	19.00%	0.01%	0.06%	1.14%	0.00%	19.00%	0.01%
Western Digital Corp	WDC	313.17	44.83	14,039	0.05%			20.00%	0.01%				20.00%	
PepsiCo Inc	PEP	1,382.68	166.66	230,438	0.86%	2.76%	0.02%	6.00%	0.05%	1.00%	2.76%	0.03%	6.00%	0.06%
Diamondback Energy Inc	FANG	177.55	121.15	21,510		10.07%					10.07%			
ServiceNow Inc	NOW	200.46	475.52	95,323				45.50%					45.50%	
Church & Dwight Co Inc	CHD	242.77	92.66	22,495	0.08%	1.13%	0.00%	6.00%	0.01%	0.10%	1.13%	0.00%	6.00%	0.01%
Duke Realty Corp	DRE	384.82	54.95	21,146		2.04%		-2.50%			2.04%		-2.50%	
Federal Realty OP LP	FRT	79.42	95.74	7,604	0.03%	4.47%	0.00%	2.50%	0.00%	0.03%	4.47%	0.00%	2.50%	0.00%
MGM Resorts International	MGM	426.05	28.95	12,334		0.03%		25.00%			0.03%		25.00%	
American Electric Power Co Inc	AEP	513.54	95.94	49,269	0.18%	3.25%	0.01%	6.50%	0.01%	0.21%	3.25%	0.01%	6.50%	0.01%

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

Bulkley As-Filed Direct Testimony		
Estimated Weighted Average Dividend Yield:	1.83%	[1]
Estimated Weighted Average Long-Term Growth Rate:	11.02%	[2]
Estimated S&P 500 Required Market Return:	**12.94%**	[3]

Dr. Won "Adjustments" Corrected		
Estimated Weighted Average Dividend Yield:	2.12%	[12]
Estimated Weighted Average Long-Term Growth Rate:	10.64%	[13]
Estimated S&P 500 Required Market Return:	**12.87%**	[14]

Historical Market Return (1926-2021) on Large Company Stocks: **12.34%** [15]

					Bulkey Direct Testimony As-Filed					Bulkey Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[16]	[17]	[18]	[19]	[20]
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.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
SolarEdge Technologies Inc	SEDG	55.39	273.68	15,158				22.00%					22.00%	
PTC Inc	PTC	116.98	106.34	12,439				29.00%					29.00%	
JB Hunt Transport Services Inc	JBHT	104.78	157.47	16,500	0.06%	1.02%	0.00%	11.50%	0.01%	0.07%	1.02%	0.00%	11.50%	0.01%
Lam Research Corp	LRCX	138.72	426.15	59,113		1.41%		21.50%			1.41%		21.50%	
Mohawk Industries Inc	MHK	63.54	124.09	7,885	0.03%			10.50%	0.00%				10.50%	
Pentair PLC	PNR	165.40	45.77	7,570	0.03%	1.84%	0.00%	13.00%	0.00%	0.03%	1.84%	0.00%	13.00%	0.00%
Vertex Pharmaceuticals Inc	VRTX	255.76	281.79	72,069	0.27%			18.50%	0.05%				18.50%	
Amcor PLC	AMCR	1,502.77	12.43	18,679	0.07%	3.86%	0.00%	15.00%	0.01%	0.08%	3.86%	0.00%	15.00%	0.01%
Meta Platforms Inc	META	2,293.52	161.25	369,830	1.39%			16.00%	0.22%				16.00%	
T-Mobile US Inc	TMUS	1,253.59	134.54	168,657	0.63%			9.50%	0.06%				9.50%	
United Rentals Inc	URI	71.61	242.91	17,395	0.07%			18.00%	0.01%				18.00%	
Alexandria Real Estate Equities Inc	ARE	163.22	145.03	23,672	0.09%	3.25%	0.00%	10.00%	0.01%	0.10%	3.25%	0.00%	10.00%	0.01%
Honeywell International Inc	HON	680.73	173.81	118,318	0.44%	2.26%	0.01%	11.00%	0.05%	0.51%	2.26%	0.01%	11.00%	0.06%
ABIOMED Inc	ABMD	45.63	247.51	11,293	0.04%			7.50%	0.00%				7.50%	
Delta Air Lines Inc	DAL	641.06	28.97	18,571										
United Airlines Holdings Inc	UAL	326.73	35.42	11,573										
Seagate Technology Holdings PLC	STX	214.84	71.44	15,348	0.06%	3.92%	0.00%	15.00%	0.01%	0.07%	3.92%	0.00%	15.00%	0.01%
News Corp	NWS	197.27	15.89	3,135		1.26%					1.26%			
Centene Corp	CNC	584.89	84.61	49,487	0.19%			10.00%	0.02%				10.00%	
Martin Marietta Materials Inc	MLM	62.28	299.24	18,638	0.07%	0.82%	0.00%	5.50%	0.00%	0.08%	0.82%	0.00%	5.50%	0.00%
Teradyne Inc	TER	160.20	89.55	14,346	0.05%	0.49%	0.00%	8.50%	0.00%	0.06%	0.49%	0.00%	8.50%	0.01%
PayPal Holdings Inc	PYPL	1,158.04	69.84	80,878	0.30%			16.00%	0.05%				16.00%	
Tesla Inc	TSLA	1,036.39	673.42	697,926				50.50%					50.50%	
DISH Network Corp	DISH	291.56	17.93	5,228	0.02%			2.50%	0.00%				2.50%	
Penn National Gaming Inc	PENN	166.80	30.42	5,074				28.00%					28.00%	
Dow Inc	DOW	728.10	51.61	37,577	0.14%	5.43%	0.01%	15.00%	0.02%	0.16%	5.43%	0.01%	15.00%	0.02%
Everest Re Group Ltd	RE	39.44	280.28	11,054	0.04%	2.35%	0.00%	17.50%	0.01%	0.05%	2.35%	0.00%	17.50%	0.01%
Teledyne Technologies Inc	TDY	46.84	375.11	17,571	0.07%			11.50%	0.01%				11.50%	
News Corp	NWSA	388.47	15.58	6,052		1.28%					1.28%			
Exelon Corp	EXC	980.14	45.32	44,420		2.98%					2.98%			
Global Payments Inc	GPN	281.54	110.64	31,150	0.12%	0.90%	0.00%	17.00%	0.02%	0.14%	0.90%	0.00%	17.00%	0.02%
Crown Castle International Corp	CCI	433.03	168.38	72,914	0.27%	3.49%	0.01%	12.00%	0.03%	0.32%	3.49%	0.01%	12.00%	0.04%
Aptiv PLC	APTV	270.93	89.07	24,132				27.50%					27.50%	
Advance Auto Parts Inc	AAP	60.64	173.09	10,496	0.04%	3.47%	0.00%	16.00%	0.01%	0.05%	3.47%	0.00%	16.00%	0.01%
Align Technology Inc	ALGN	78.81	236.67	18,651	0.07%			17.00%	0.01%				17.00%	
Illumina Inc	ILMN	157.10	184.36	28,963	0.11%			6.50%	0.01%				6.50%	
LKQ Corp	LKQ	282.83	49.09	13,884	0.05%	2.04%	0.00%	13.00%	0.01%	0.06%	2.04%	0.00%	13.00%	0.01%
Nielsen Holdings PLC	NLSN	359.69	23.22	8,352		1.03%					1.03%			
Zoetis Inc	ZTS	470.63	171.89	80,896	0.30%	0.76%	0.00%	11.00%	0.03%	0.35%	0.76%	0.00%	11.00%	0.04%
Digital Realty Trust Inc	DLR	284.67	129.83	36,959		3.76%		-3.50%			3.76%		-3.50%	
Equinix Inc	EQIX	91.02	657.02	59,803	0.22%	1.89%	0.00%	15.00%	0.03%	0.26%	1.89%	0.00%	15.00%	0.04%
Molina Healthcare Inc	MOH	58.70	279.61	16,413	0.06%			11.00%	0.01%				11.00%	
Las Vegas Sands Corp	LVS	764.11	33.59	25,666	0.10%			13.50%	0.01%				13.50%	

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 June 30, 2022
[5] Source: Bloomberg Professional as of June 30, 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] Bloomberg Professional, as of June 30, 2022
[9] Equals [7] x [8]
[10] Value Line, as of June 30, 2022
[11] Equals [7] x [10]
[12] Equals sum of Col. [19]
[13] Equals sum of Col. [21]
[14] Equals ([12] x (1 + (0.5 x [13]))) + [13]
[15] Kroll
[16] Equals weight in S&P 500 based on market capitalization [6] if Growth Rate >0% and ≤20%
[17] Bloomberg Professional, as of June 30, 2022
[18] Equals [18] x [19]
[19] Value Line, as of June 30, 2022
[20] Equals [18] x [21]

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & VL BETA
BULKLEY AS-FILED MARKET RETURN

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

		[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	3.18%	0.90	12.94%	9.76%	11.96%	12.21%
Alliant Energy Corporation	LNT	3.18%	0.80	12.94%	9.76%	10.99%	11.48%
American Electric Power Company, Inc.	AEP	3.18%	0.75	12.94%	9.76%	10.50%	11.11%
Duke Energy Corporation	DUK	3.18%	0.85	12.94%	9.76%	11.48%	11.84%
Entergy Corporation	ETR	3.18%	0.90	12.94%	9.76%	11.96%	12.21%
Evergy, Inc.	EVRG	3.18%	0.90	12.94%	9.76%	11.96%	12.21%
IDACORP, Inc.	IDA	3.18%	0.80	12.94%	9.76%	10.99%	11.48%
NextEra Energy, Inc.	NEE	3.18%	0.90	12.94%	9.76%	11.96%	12.21%
NorthWestern Corporation	NWE	3.18%	0.95	12.94%	9.76%	12.45%	12.57%
OGE Energy Corporation	OGE	3.18%	1.00	12.94%	9.76%	12.94%	12.94%
Otter Tail Corporation	OTTR	3.18%	0.85	12.94%	9.76%	11.48%	11.84%
Portland General Electric Company	POR	3.18%	0.85	12.94%	9.76%	11.48%	11.84%
Southern Company	SO	3.18%	0.90	12.94%	9.76%	11.96%	12.21%
Xcel Energy Inc.	XEL	3.18%	0.80	12.94%	9.76%	10.99%	11.48%
Mean						11.65%	11.97%
Median						11.72%	12.03%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 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])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & VL BETA
BULKLEY AS-FILED MARKET RETURN

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.90	12.94%	9.20%	12.02%	12.25%
Alliant Energy Corporation	LNT	3.74%	0.80	12.94%	9.20%	11.10%	11.56%
American Electric Power Company, Inc.	AEP	3.74%	0.75	12.94%	9.20%	10.64%	11.22%
Duke Energy Corporation	DUK	3.74%	0.85	12.94%	9.20%	11.56%	11.91%
Entergy Corporation	ETR	3.74%	0.90	12.94%	9.20%	12.02%	12.25%
Evergy, Inc.	EVRG	3.74%	0.90	12.94%	9.20%	12.02%	12.25%
IDACORP, Inc.	IDA	3.74%	0.80	12.94%	9.20%	11.10%	11.56%
NextEra Energy, Inc.	NEE	3.74%	0.90	12.94%	9.20%	12.02%	12.25%
NorthWestern Corporation	NWE	3.74%	0.95	12.94%	9.20%	12.48%	12.60%
OGE Energy Corporation	OGE	3.74%	1.00	12.94%	9.20%	12.94%	12.94%
Otter Tail Corporation	OTTR	3.74%	0.85	12.94%	9.20%	11.56%	11.91%
Portland General Electric Company	POR	3.74%	0.85	12.94%	9.20%	11.56%	11.91%
Southern Company	SO	3.74%	0.90	12.94%	9.20%	12.02%	12.25%
Xcel Energy Inc.	XEL	3.74%	0.80	12.94%	9.20%	11.10%	11.56%
Mean						11.73%	12.03%
Median						11.79%	12.08%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, 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])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & VL BETA
BULKLEY AS-FILED MARKET RETURN

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

		[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	3.80%	0.90	12.94%	9.14%	12.03%	12.26%
Alliant Energy Corporation	LNT	3.80%	0.80	12.94%	9.14%	11.11%	11.57%
American Electric Power Company, Inc.	AEP	3.80%	0.75	12.94%	9.14%	10.66%	11.23%
Duke Energy Corporation	DUK	3.80%	0.85	12.94%	9.14%	11.57%	11.91%
Entergy Corporation	ETR	3.80%	0.90	12.94%	9.14%	12.03%	12.26%
Evergy, Inc.	EVRG	3.80%	0.90	12.94%	9.14%	12.03%	12.26%
IDACORP, Inc.	IDA	3.80%	0.80	12.94%	9.14%	11.11%	11.57%
NextEra Energy, Inc.	NEE	3.80%	0.90	12.94%	9.14%	12.03%	12.26%
NorthWestern Corporation	NWE	3.80%	0.95	12.94%	9.14%	12.48%	12.60%
OGE Energy Corporation	OGE	3.80%	1.00	12.94%	9.14%	12.94%	12.94%
Otter Tail Corporation	OTTR	3.80%	0.85	12.94%	9.14%	11.57%	11.91%
Portland General Electric Company	POR	3.80%	0.85	12.94%	9.14%	11.57%	11.91%
Southern Company	SO	3.80%	0.90	12.94%	9.14%	12.03%	12.26%
Xcel Energy Inc.	XEL	3.80%	0.80	12.94%	9.14%	11.11%	11.57%
Mean						11.73%	12.03%
Median						11.80%	12.08%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 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])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & BLOOMBERG BETA
BULKLEY AS-FILED MARKET RETURN

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

		[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	3.18%	0.82	12.94%	9.76%	11.17%	11.61%
Alliant Energy Corporation	LNT	3.18%	0.81	12.94%	9.76%	11.07%	11.54%
American Electric Power Company, Inc.	AEP	3.18%	0.78	12.94%	9.76%	10.76%	11.31%
Duke Energy Corporation	DUK	3.18%	0.73	12.94%	9.76%	10.31%	10.97%
Entergy Corporation	ETR	3.18%	0.87	12.94%	9.76%	11.71%	12.02%
Evergy, Inc.	EVRG	3.18%	0.81	12.94%	9.76%	11.09%	11.55%
IDACORP, Inc.	IDA	3.18%	0.82	12.94%	9.76%	11.19%	11.63%
NextEra Energy, Inc.	NEE	3.18%	0.82	12.94%	9.76%	11.14%	11.59%
NorthWestern Corporation	NWE	3.18%	0.90	12.94%	9.76%	11.93%	12.18%
OGE Energy Corporation	OGE	3.18%	0.94	12.94%	9.76%	12.34%	12.49%
Otter Tail Corporation	OTTR	3.18%	0.87	12.94%	9.76%	11.67%	11.99%
Portland General Electric Company	POR	3.18%	0.80	12.94%	9.76%	10.96%	11.46%
Southern Company	SO	3.18%	0.80	12.94%	9.76%	10.95%	11.45%
Xcel Energy Inc.	XEL	3.18%	0.75	12.94%	9.76%	10.52%	11.12%
Mean						11.20%	11.64%
Median						11.11%	11.57%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 2022
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 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])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA
BULKLEY AS-FILED MARKET RETURN

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.82	12.94%	9.20%	11.27%	11.69%
Alliant Energy Corporation	LNT	3.74%	0.81	12.94%	9.20%	11.17%	11.62%
American Electric Power Company, Inc.	AEP	3.74%	0.78	12.94%	9.20%	10.89%	11.40%
Duke Energy Corporation	DUK	3.74%	0.73	12.94%	9.20%	10.47%	11.08%
Entergy Corporation	ETR	3.74%	0.87	12.94%	9.20%	11.78%	12.07%
Evergy, Inc.	EVRG	3.74%	0.81	12.94%	9.20%	11.19%	11.63%
IDACORP, Inc.	IDA	3.74%	0.82	12.94%	9.20%	11.29%	11.70%
NextEra Energy, Inc.	NEE	3.74%	0.82	12.94%	9.20%	11.24%	11.67%
NorthWestern Corporation	NWE	3.74%	0.90	12.94%	9.20%	11.99%	12.23%
OGE Energy Corporation	OGE	3.74%	0.94	12.94%	9.20%	12.37%	12.51%
Otter Tail Corporation	OTTR	3.74%	0.87	12.94%	9.20%	11.74%	12.04%
Portland General Electric Company	POR	3.74%	0.80	12.94%	9.20%	11.07%	11.54%
Southern Company	SO	3.74%	0.80	12.94%	9.20%	11.07%	11.54%
Xcel Energy Inc.	XEL	3.74%	0.75	12.94%	9.20%	10.66%	11.23%
Mean						11.30%	11.71%
Median						11.22%	11.65%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 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])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA
BULKLEY AS-FILED MARKET RETURN

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

		[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	3.80%	0.82	12.94%	9.14%	11.28%	11.70%
Alliant Energy Corporation	LNT	3.80%	0.81	12.94%	9.14%	11.19%	11.62%
American Electric Power Company, Inc.	AEP	3.80%	0.78	12.94%	9.14%	10.90%	11.41%
Duke Energy Corporation	DUK	3.80%	0.73	12.94%	9.14%	10.48%	11.10%
Entergy Corporation	ETR	3.80%	0.87	12.94%	9.14%	11.79%	12.08%
Evergy, Inc.	EVRG	3.80%	0.81	12.94%	9.14%	11.20%	11.64%
IDACORP, Inc.	IDA	3.80%	0.82	12.94%	9.14%	11.30%	11.71%
NextEra Energy, Inc.	NEE	3.80%	0.82	12.94%	9.14%	11.25%	11.68%
NorthWestern Corporation	NWE	3.80%	0.90	12.94%	9.14%	12.00%	12.23%
OGE Energy Corporation	OGE	3.80%	0.94	12.94%	9.14%	12.38%	12.52%
Otter Tail Corporation	OTTR	3.80%	0.87	12.94%	9.14%	11.75%	12.05%
Portland General Electric Company	POR	3.80%	0.80	12.94%	9.14%	11.09%	11.55%
Southern Company	SO	3.80%	0.80	12.94%	9.14%	11.08%	11.55%
Xcel Energy Inc.	XEL	3.80%	0.75	12.94%	9.14%	10.67%	11.24%
Mean						11.31%	11.72%
Median						11.23%	11.66%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2022, at 14
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 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])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA
BULKLEY AS-FILED MARKET RETURN

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

		[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	3.18%	0.77	12.94%	9.76%	10.72%	11.27%
Alliant Energy Corporation	LNT	3.18%	0.74	12.94%	9.76%	10.39%	11.03%
American Electric Power Company, Inc.	AEP	3.18%	0.67	12.94%	9.76%	9.69%	10.50%
Duke Energy Corporation	DUK	3.18%	0.64	12.94%	9.76%	9.47%	10.34%
Entergy Corporation	ETR	3.18%	0.72	12.94%	9.76%	10.23%	10.91%
Evergy, Inc.	EVRG	3.18%	0.98	12.94%	9.76%	12.70%	12.76%
IDACORP, Inc.	IDA	3.18%	0.72	12.94%	9.76%	10.23%	10.91%
NextEra Energy, Inc.	NEE	3.18%	0.71	12.94%	9.76%	10.07%	10.78%
NorthWestern Corporation	NWE	3.18%	0.73	12.94%	9.76%	10.28%	10.95%
OGE Energy Corporation	OGE	3.18%	0.92	12.94%	9.76%	12.18%	12.37%
Otter Tail Corporation	OTTR	3.18%	0.85	12.94%	9.76%	11.48%	11.84%
Portland General Electric Company	POR	3.18%	0.74	12.94%	9.76%	10.39%	11.03%
Southern Company	SO	3.18%	0.63	12.94%	9.76%	9.31%	10.22%
Xcel Energy Inc.	XEL	3.18%	0.64	12.94%	9.76%	9.42%	10.30%
Mean						10.47%	11.09%
Median						10.26%	10.93%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 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])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA
BULKLEY AS-FILED MARKET RETURN

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.77	12.94%	9.20%	10.85%	11.37%
Alliant Energy Corporation	LNT	3.74%	0.74	12.94%	9.20%	10.54%	11.14%
American Electric Power Company, Inc.	AEP	3.74%	0.67	12.94%	9.20%	9.87%	10.64%
Duke Energy Corporation	DUK	3.74%	0.64	12.94%	9.20%	9.67%	10.49%
Entergy Corporation	ETR	3.74%	0.72	12.94%	9.20%	10.39%	11.02%
Evergy, Inc.	EVRG	3.74%	0.98	12.94%	9.20%	12.71%	12.77%
IDACORP, Inc.	IDA	3.74%	0.72	12.94%	9.20%	10.39%	11.02%
NextEra Energy, Inc.	NEE	3.74%	0.71	12.94%	9.20%	10.23%	10.91%
NorthWestern Corporation	NWE	3.74%	0.73	12.94%	9.20%	10.44%	11.06%
OGE Energy Corporation	OGE	3.74%	0.92	12.94%	9.20%	12.23%	12.40%
Otter Tail Corporation	OTTR	3.74%	0.85	12.94%	9.20%	11.56%	11.91%
Portland General Electric Company	POR	3.74%	0.74	12.94%	9.20%	10.54%	11.14%
Southern Company	SO	3.74%	0.63	12.94%	9.20%	9.52%	10.37%
Xcel Energy Inc.	XEL	3.74%	0.64	12.94%	9.20%	9.62%	10.45%
Mean						10.61%	11.19%
Median						10.41%	11.04%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, 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])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT BETA
BULKLEY AS-FILED MARKET RETURN

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

		[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	3.80%	0.77	12.94%	9.14%	10.86%	11.38%
Alliant Energy Corporation	LNT	3.80%	0.74	12.94%	9.14%	10.55%	11.15%
American Electric Power Company, Inc.	AEP	3.80%	0.67	12.94%	9.14%	9.89%	10.66%
Duke Energy Corporation	DUK	3.80%	0.64	12.94%	9.14%	9.69%	10.50%
Entergy Corporation	ETR	3.80%	0.72	12.94%	9.14%	10.40%	11.04%
Evergy, Inc.	EVRG	3.80%	0.98	12.94%	9.14%	12.71%	12.77%
IDACORP, Inc.	IDA	3.80%	0.72	12.94%	9.14%	10.40%	11.04%
NextEra Energy, Inc.	NEE	3.80%	0.71	12.94%	9.14%	10.25%	10.92%
NorthWestern Corporation	NWE	3.80%	0.73	12.94%	9.14%	10.45%	11.07%
OGE Energy Corporation	OGE	3.80%	0.92	12.94%	9.14%	12.23%	12.41%
Otter Tail Corporation	OTTR	3.80%	0.85	12.94%	9.14%	11.57%	11.91%
Portland General Electric Company	POR	3.80%	0.74	12.94%	9.14%	10.55%	11.15%
Southern Company	SO	3.80%	0.63	12.94%	9.14%	9.54%	10.39%
Xcel Energy Inc.	XEL	3.80%	0.64	12.94%	9.14%	9.64%	10.47%
Mean						10.62%	11.20%
Median						10.43%	11.06%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 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])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & VL BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[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	3.18%	0.90	12.87%	9.69%	11.90%	12.14%
Alliant Energy Corporation	LNT	3.18%	0.80	12.87%	9.69%	10.93%	11.41%
American Electric Power Company, Inc.	AEP	3.18%	0.75	12.87%	9.69%	10.44%	11.05%
Duke Energy Corporation	DUK	3.18%	0.85	12.87%	9.69%	11.41%	11.78%
Entergy Corporation	ETR	3.18%	0.90	12.87%	9.69%	11.90%	12.14%
Evergy, Inc.	EVRG	3.18%	0.90	12.87%	9.69%	11.90%	12.14%
IDACORP, Inc.	IDA	3.18%	0.80	12.87%	9.69%	10.93%	11.41%
NextEra Energy, Inc.	NEE	3.18%	0.90	12.87%	9.69%	11.90%	12.14%
NorthWestern Corporation	NWE	3.18%	0.95	12.87%	9.69%	12.38%	12.50%
OGE Energy Corporation	OGE	3.18%	1.00	12.87%	9.69%	12.87%	12.87%
Otter Tail Corporation	OTTR	3.18%	0.85	12.87%	9.69%	11.41%	11.78%
Portland General Electric Company	POR	3.18%	0.85	12.87%	9.69%	11.41%	11.78%
Southern Company	SO	3.18%	0.90	12.87%	9.69%	11.90%	12.14%
Xcel Energy Inc.	XEL	3.18%	0.80	12.87%	9.69%	10.93%	11.41%
Mean						11.59%	11.91%
Median						11.65%	11.96%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 2022
[2] Source: Value Line
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & VL BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.90	12.87%	9.13%	11.95%	12.18%
Alliant Energy Corporation	LNT	3.74%	0.80	12.87%	9.13%	11.04%	11.50%
American Electric Power Company, Inc.	AEP	3.74%	0.75	12.87%	9.13%	10.58%	11.15%
Duke Energy Corporation	DUK	3.74%	0.85	12.87%	9.13%	11.50%	11.84%
Entergy Corporation	ETR	3.74%	0.90	12.87%	9.13%	11.95%	12.18%
Evergy, Inc.	EVRG	3.74%	0.90	12.87%	9.13%	11.95%	12.18%
IDACORP, Inc.	IDA	3.74%	0.80	12.87%	9.13%	11.04%	11.50%
NextEra Energy, Inc.	NEE	3.74%	0.90	12.87%	9.13%	11.95%	12.18%
NorthWestern Corporation	NWE	3.74%	0.95	12.87%	9.13%	12.41%	12.52%
OGE Energy Corporation	OGE	3.74%	1.00	12.87%	9.13%	12.87%	12.87%
Otter Tail Corporation	OTTR	3.74%	0.85	12.87%	9.13%	11.50%	11.84%
Portland General Electric Company	POR	3.74%	0.85	12.87%	9.13%	11.50%	11.84%
Southern Company	SO	3.74%	0.90	12.87%	9.13%	11.95%	12.18%
Xcel Energy Inc.	XEL	3.74%	0.80	12.87%	9.13%	11.04%	11.50%
Mean						11.66%	11.96%
Median						11.72%	12.01%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2
[2] Source: Value Line
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & VL BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[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	3.80%	0.90	12.87%	9.07%	11.96%	12.19%
Alliant Energy Corporation	LNT	3.80%	0.80	12.87%	9.07%	11.05%	11.51%
American Electric Power Company, Inc.	AEP	3.80%	0.75	12.87%	9.07%	10.60%	11.17%
Duke Energy Corporation	DUK	3.80%	0.85	12.87%	9.07%	11.51%	11.85%
Entergy Corporation	ETR	3.80%	0.90	12.87%	9.07%	11.96%	12.19%
Evergy, Inc.	EVRG	3.80%	0.90	12.87%	9.07%	11.96%	12.19%
IDACORP, Inc.	IDA	3.80%	0.80	12.87%	9.07%	11.05%	11.51%
NextEra Energy, Inc.	NEE	3.80%	0.90	12.87%	9.07%	11.96%	12.19%
NorthWestern Corporation	NWE	3.80%	0.95	12.87%	9.07%	12.41%	12.53%
OGE Energy Corporation	OGE	3.80%	1.00	12.87%	9.07%	12.87%	12.87%
Otter Tail Corporation	OTTR	3.80%	0.85	12.87%	9.07%	11.51%	11.85%
Portland General Electric Company	POR	3.80%	0.85	12.87%	9.07%	11.51%	11.85%
Southern Company	SO	3.80%	0.90	12.87%	9.07%	11.96%	12.19%
Xcel Energy Inc.	XEL	3.80%	0.80	12.87%	9.07%	11.05%	11.51%
Mean						11.67%	11.97%
Median						11.73%	12.02%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2022, at 14
[2] Source: Value Line
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & BLOOMBERG BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[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	3.18%	0.82	12.87%	9.69%	11.11%	11.55%
Alliant Energy Corporation	LNT	3.18%	0.81	12.87%	9.69%	11.01%	11.47%
American Electric Power Company, Inc.	AEP	3.18%	0.78	12.87%	9.69%	10.70%	11.24%
Duke Energy Corporation	DUK	3.18%	0.73	12.87%	9.69%	10.26%	10.91%
Entergy Corporation	ETR	3.18%	0.87	12.87%	9.69%	11.65%	11.95%
Evergy, Inc.	EVRG	3.18%	0.81	12.87%	9.69%	11.03%	11.49%
IDACORP, Inc.	IDA	3.18%	0.82	12.87%	9.69%	11.13%	11.56%
NextEra Energy, Inc.	NEE	3.18%	0.82	12.87%	9.69%	11.08%	11.52%
NorthWestern Corporation	NWE	3.18%	0.90	12.87%	9.69%	11.86%	12.11%
OGE Energy Corporation	OGE	3.18%	0.94	12.87%	9.69%	12.27%	12.42%
Otter Tail Corporation	OTTR	3.18%	0.87	12.87%	9.69%	11.60%	11.92%
Portland General Electric Company	POR	3.18%	0.80	12.87%	9.69%	10.90%	11.39%
Southern Company	SO	3.18%	0.80	12.87%	9.69%	10.89%	11.39%
Xcel Energy Inc.	XEL	3.18%	0.75	12.87%	9.69%	10.46%	11.06%
Mean						11.14%	11.57%
Median						11.05%	11.51%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 2022
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 2022
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.82	12.87%	9.13%	11.21%	11.62%
Alliant Energy Corporation	LNT	3.74%	0.81	12.87%	9.13%	11.11%	11.55%
American Electric Power Company, Inc.	AEP	3.74%	0.78	12.87%	9.13%	10.83%	11.34%
Duke Energy Corporation	DUK	3.74%	0.73	12.87%	9.13%	10.41%	11.02%
Entergy Corporation	ETR	3.74%	0.87	12.87%	9.13%	11.72%	12.00%
Evergy, Inc.	EVRG	3.74%	0.81	12.87%	9.13%	11.13%	11.57%
IDACORP, Inc.	IDA	3.74%	0.82	12.87%	9.13%	11.23%	11.64%
NextEra Energy, Inc.	NEE	3.74%	0.82	12.87%	9.13%	11.18%	11.60%
NorthWestern Corporation	NWE	3.74%	0.90	12.87%	9.13%	11.92%	12.16%
OGE Energy Corporation	OGE	3.74%	0.94	12.87%	9.13%	12.30%	12.44%
Otter Tail Corporation	OTTR	3.74%	0.87	12.87%	9.13%	11.67%	11.97%
Portland General Electric Company	POR	3.74%	0.80	12.87%	9.13%	11.01%	11.48%
Southern Company	SO	3.74%	0.80	12.87%	9.13%	11.01%	11.47%
Xcel Energy Inc.	XEL	3.74%	0.75	12.87%	9.13%	10.60%	11.17%
Mean						11.24%	11.65%
Median						11.16%	11.58%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 2022
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[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	3.80%	0.82	12.87%	9.07%	11.22%	11.63%
Alliant Energy Corporation	LNT	3.80%	0.81	12.87%	9.07%	11.13%	11.56%
American Electric Power Company, Inc.	AEP	3.80%	0.78	12.87%	9.07%	10.84%	11.35%
Duke Energy Corporation	DUK	3.80%	0.73	12.87%	9.07%	10.43%	11.04%
Entergy Corporation	ETR	3.80%	0.87	12.87%	9.07%	11.72%	12.01%
Evergy, Inc.	EVRG	3.80%	0.81	12.87%	9.07%	11.14%	11.57%
IDACORP, Inc.	IDA	3.80%	0.82	12.87%	9.07%	11.24%	11.65%
NextEra Energy, Inc.	NEE	3.80%	0.82	12.87%	9.07%	11.19%	11.61%
NorthWestern Corporation	NWE	3.80%	0.90	12.87%	9.07%	11.93%	12.16%
OGE Energy Corporation	OGE	3.80%	0.94	12.87%	9.07%	12.30%	12.45%
Otter Tail Corporation	OTTR	3.80%	0.87	12.87%	9.07%	11.68%	11.98%
Portland General Electric Company	POR	3.80%	0.80	12.87%	9.07%	11.03%	11.49%
Southern Company	SO	3.80%	0.80	12.87%	9.07%	11.02%	11.48%
Xcel Energy Inc.	XEL	3.80%	0.75	12.87%	9.07%	10.61%	11.18%
Mean						11.25%	11.65%
Median						11.17%	11.59%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2022, at 14
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 2022
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[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	3.18%	0.77	12.87%	9.69%	10.66%	11.21%
Alliant Energy Corporation	LNT	3.18%	0.74	12.87%	9.69%	10.34%	10.97%
American Electric Power Company, Inc.	AEP	3.18%	0.67	12.87%	9.69%	9.64%	10.44%
Duke Energy Corporation	DUK	3.18%	0.64	12.87%	9.69%	9.42%	10.28%
Entergy Corporation	ETR	3.18%	0.72	12.87%	9.69%	10.17%	10.85%
Evergy, Inc.	EVRG	3.18%	0.98	12.87%	9.69%	12.62%	12.68%
IDACORP, Inc.	IDA	3.18%	0.72	12.87%	9.69%	10.17%	10.85%
NextEra Energy, Inc.	NEE	3.18%	0.71	12.87%	9.69%	10.01%	10.73%
NorthWestern Corporation	NWE	3.18%	0.73	12.87%	9.69%	10.23%	10.89%
OGE Energy Corporation	OGE	3.18%	0.92	12.87%	9.69%	12.11%	12.30%
Otter Tail Corporation	OTTR	3.18%	0.85	12.87%	9.69%	11.41%	11.78%
Portland General Electric Company	POR	3.18%	0.74	12.87%	9.69%	10.34%	10.97%
Southern Company	SO	3.18%	0.63	12.87%	9.69%	9.26%	10.16%
Xcel Energy Inc.	XEL	3.18%	0.64	12.87%	9.69%	9.37%	10.24%
Mean						10.41%	11.02%
Median						10.20%	10.87%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 2022
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.77	12.87%	9.13%	10.79%	11.31%
Alliant Energy Corporation	LNT	3.74%	0.74	12.87%	9.13%	10.48%	11.08%
American Electric Power Company, Inc.	AEP	3.74%	0.67	12.87%	9.13%	9.82%	10.58%
Duke Energy Corporation	DUK	3.74%	0.64	12.87%	9.13%	9.62%	10.43%
Entergy Corporation	ETR	3.74%	0.72	12.87%	9.13%	10.33%	10.96%
Evergy, Inc.	EVRG	3.74%	0.98	12.87%	9.13%	12.64%	12.69%
IDACORP, Inc.	IDA	3.74%	0.72	12.87%	9.13%	10.33%	10.96%
NextEra Energy, Inc.	NEE	3.74%	0.71	12.87%	9.13%	10.18%	10.85%
NorthWestern Corporation	NWE	3.74%	0.73	12.87%	9.13%	10.38%	11.00%
OGE Energy Corporation	OGE	3.74%	0.92	12.87%	9.13%	12.16%	12.33%
Otter Tail Corporation	OTTR	3.74%	0.85	12.87%	9.13%	11.50%	11.84%
Portland General Electric Company	POR	3.74%	0.74	12.87%	9.13%	10.48%	11.08%
Southern Company	SO	3.74%	0.63	12.87%	9.13%	9.47%	10.32%
Xcel Energy Inc.	XEL	3.74%	0.64	12.87%	9.13%	9.57%	10.39%
Mean						10.55%	11.13%
Median						10.36%	10.98%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[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	3.80%	0.77	12.87%	9.07%	10.80%	11.32%
Alliant Energy Corporation	LNT	3.80%	0.74	12.87%	9.07%	10.50%	11.09%
American Electric Power Company, Inc.	AEP	3.80%	0.67	12.87%	9.07%	9.84%	10.60%
Duke Energy Corporation	DUK	3.80%	0.64	12.87%	9.07%	9.64%	10.45%
Entergy Corporation	ETR	3.80%	0.72	12.87%	9.07%	10.35%	10.98%
Evergy, Inc.	EVRG	3.80%	0.98	12.87%	9.07%	12.64%	12.70%
IDACORP, Inc.	IDA	3.80%	0.72	12.87%	9.07%	10.35%	10.98%
NextEra Energy, Inc.	NEE	3.80%	0.71	12.87%	9.07%	10.20%	10.86%
NorthWestern Corporation	NWE	3.80%	0.73	12.87%	9.07%	10.40%	11.01%
OGE Energy Corporation	OGE	3.80%	0.92	12.87%	9.07%	12.16%	12.34%
Otter Tail Corporation	OTTR	3.80%	0.85	12.87%	9.07%	11.51%	11.85%
Portland General Electric Company	POR	3.80%	0.74	12.87%	9.07%	10.50%	11.09%
Southern Company	SO	3.80%	0.63	12.87%	9.07%	9.49%	10.33%
Xcel Energy Inc.	XEL	3.80%	0.64	12.87%	9.07%	9.59%	10.41%
Mean						10.57%	11.14%
Median						10.37%	11.00%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2022, at 14
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & VL BETA
HISTORICAL MARKET RETURN

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

		[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	3.18%	0.90	12.34%	9.16%	11.42%	11.65%
Alliant Energy Corporation	LNT	3.18%	0.80	12.34%	9.16%	10.51%	10.97%
American Electric Power Company, Inc.	AEP	3.18%	0.75	12.34%	9.16%	10.05%	10.62%
Duke Energy Corporation	DUK	3.18%	0.85	12.34%	9.16%	10.97%	11.31%
Entergy Corporation	ETR	3.18%	0.90	12.34%	9.16%	11.42%	11.65%
Evergy, Inc.	EVRG	3.18%	0.90	12.34%	9.16%	11.42%	11.65%
IDACORP, Inc.	IDA	3.18%	0.80	12.34%	9.16%	10.51%	10.97%
NextEra Energy, Inc.	NEE	3.18%	0.90	12.34%	9.16%	11.42%	11.65%
NorthWestern Corporation	NWE	3.18%	0.95	12.34%	9.16%	11.88%	12.00%
OGE Energy Corporation	OGE	3.18%	1.00	12.34%	9.16%	12.34%	12.34%
Otter Tail Corporation	OTTR	3.18%	0.85	12.34%	9.16%	10.97%	11.31%
Portland General Electric Company	POR	3.18%	0.85	12.34%	9.16%	10.97%	11.31%
Southern Company	SO	3.18%	0.90	12.34%	9.16%	11.42%	11.65%
Xcel Energy Inc.	XEL	3.18%	0.80	12.34%	9.16%	10.51%	10.97%
Mean						11.13%	11.43%
Median						11.19%	11.48%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 2022
[2] Source: Value Line
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & VL BETA
HISTORICAL MARKET RETURN

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.90	12.34%	8.60%	11.48%	11.70%
Alliant Energy Corporation	LNT	3.74%	0.80	12.34%	8.60%	10.62%	11.05%
American Electric Power Company, Inc.	AEP	3.74%	0.75	12.34%	8.60%	10.19%	10.73%
Duke Energy Corporation	DUK	3.74%	0.85	12.34%	8.60%	11.05%	11.37%
Entergy Corporation	ETR	3.74%	0.90	12.34%	8.60%	11.48%	11.70%
Evergy, Inc.	EVRG	3.74%	0.90	12.34%	8.60%	11.48%	11.70%
IDACORP, Inc.	IDA	3.74%	0.80	12.34%	8.60%	10.62%	11.05%
NextEra Energy, Inc.	NEE	3.74%	0.90	12.34%	8.60%	11.48%	11.70%
NorthWestern Corporation	NWE	3.74%	0.95	12.34%	8.60%	11.91%	12.02%
OGE Energy Corporation	OGE	3.74%	1.00	12.34%	8.60%	12.34%	12.34%
Otter Tail Corporation	OTTR	3.74%	0.85	12.34%	8.60%	11.05%	11.37%
Portland General Electric Company	POR	3.74%	0.85	12.34%	8.60%	11.05%	11.37%
Southern Company	SO	3.74%	0.90	12.34%	8.60%	11.48%	11.70%
Xcel Energy Inc.	XEL	3.74%	0.80	12.34%	8.60%	10.62%	11.05%
Mean						11.20%	11.49%
Median						11.27%	11.53%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2
[2] Source: Value Line
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & VL BETA
HISTORICAL MARKET RETURN

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

		[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	3.80%	0.90	12.34%	8.54%	11.49%	11.70%
Alliant Energy Corporation	LNT	3.80%	0.80	12.34%	8.54%	10.63%	11.06%
American Electric Power Company, Inc.	AEP	3.80%	0.75	12.34%	8.54%	10.21%	10.74%
Duke Energy Corporation	DUK	3.80%	0.85	12.34%	8.54%	11.06%	11.38%
Entergy Corporation	ETR	3.80%	0.90	12.34%	8.54%	11.49%	11.70%
Evergy, Inc.	EVRG	3.80%	0.90	12.34%	8.54%	11.49%	11.70%
IDACORP, Inc.	IDA	3.80%	0.80	12.34%	8.54%	10.63%	11.06%
NextEra Energy, Inc.	NEE	3.80%	0.90	12.34%	8.54%	11.49%	11.70%
NorthWestern Corporation	NWE	3.80%	0.95	12.34%	8.54%	11.91%	12.02%
OGE Energy Corporation	OGE	3.80%	1.00	12.34%	8.54%	12.34%	12.34%
Otter Tail Corporation	OTTR	3.80%	0.85	12.34%	8.54%	11.06%	11.38%
Portland General Electric Company	POR	3.80%	0.85	12.34%	8.54%	11.06%	11.38%
Southern Company	SO	3.80%	0.90	12.34%	8.54%	11.49%	11.70%
Xcel Energy Inc.	XEL	3.80%	0.80	12.34%	8.54%	10.63%	11.06%
Mean						11.21%	11.49%
Median						11.27%	11.54%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2022, at 14
[2] Source: Value Line
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & BLOOMBERG BETA
HISTORICAL MARKET RETURN

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

		[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	3.18%	0.82	12.34%	9.16%	10.68%	11.09%
Alliant Energy Corporation	LNT	3.18%	0.81	12.34%	9.16%	10.58%	11.02%
American Electric Power Company, Inc.	AEP	3.18%	0.78	12.34%	9.16%	10.30%	10.81%
Duke Energy Corporation	DUK	3.18%	0.73	12.34%	9.16%	9.87%	10.49%
Entergy Corporation	ETR	3.18%	0.87	12.34%	9.16%	11.19%	11.47%
Evergy, Inc.	EVRG	3.18%	0.81	12.34%	9.16%	10.60%	11.03%
IDACORP, Inc.	IDA	3.18%	0.82	12.34%	9.16%	10.70%	11.11%
NextEra Energy, Inc.	NEE	3.18%	0.82	12.34%	9.16%	10.65%	11.07%
NorthWestern Corporation	NWE	3.18%	0.90	12.34%	9.16%	11.39%	11.63%
OGE Energy Corporation	OGE	3.18%	0.94	12.34%	9.16%	11.77%	11.91%
Otter Tail Corporation	OTTR	3.18%	0.87	12.34%	9.16%	11.14%	11.44%
Portland General Electric Company	POR	3.18%	0.80	12.34%	9.16%	10.48%	10.95%
Southern Company	SO	3.18%	0.80	12.34%	9.16%	10.48%	10.94%
Xcel Energy Inc.	XEL	3.18%	0.75	12.34%	9.16%	10.06%	10.63%
Mean						10.71%	11.11%
Median						10.62%	11.05%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 2022
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 2022
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA
HISTORICAL MARKET RETURN

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.82	12.34%	8.60%	10.78%	11.17%
Alliant Energy Corporation	LNT	3.74%	0.81	12.34%	8.60%	10.69%	11.10%
American Electric Power Company, Inc.	AEP	3.74%	0.78	12.34%	8.60%	10.42%	10.90%
Duke Energy Corporation	DUK	3.74%	0.73	12.34%	8.60%	10.03%	10.60%
Entergy Corporation	ETR	3.74%	0.87	12.34%	8.60%	11.26%	11.53%
Evergy, Inc.	EVRG	3.74%	0.81	12.34%	8.60%	10.71%	11.12%
IDACORP, Inc.	IDA	3.74%	0.82	12.34%	8.60%	10.80%	11.18%
NextEra Energy, Inc.	NEE	3.74%	0.82	12.34%	8.60%	10.75%	11.15%
NorthWestern Corporation	NWE	3.74%	0.90	12.34%	8.60%	11.45%	11.67%
OGE Energy Corporation	OGE	3.74%	0.94	12.34%	8.60%	11.81%	11.94%
Otter Tail Corporation	OTTR	3.74%	0.87	12.34%	8.60%	11.22%	11.50%
Portland General Electric Company	POR	3.74%	0.80	12.34%	8.60%	10.60%	11.03%
Southern Company	SO	3.74%	0.80	12.34%	8.60%	10.59%	11.03%
Xcel Energy Inc.	XEL	3.74%	0.75	12.34%	8.60%	10.20%	10.74%
Mean						10.81%	11.19%
Median						10.73%	11.13%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 2022
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA
HISTORICAL MARKET RETURN

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

		[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	3.80%	0.82	12.34%	8.54%	10.79%	11.18%
Alliant Energy Corporation	LNT	3.80%	0.81	12.34%	8.54%	10.70%	11.11%
American Electric Power Company, Inc.	AEP	3.80%	0.78	12.34%	8.54%	10.43%	10.91%
Duke Energy Corporation	DUK	3.80%	0.73	12.34%	8.54%	10.04%	10.62%
Entergy Corporation	ETR	3.80%	0.87	12.34%	8.54%	11.26%	11.53%
Evergy, Inc.	EVRG	3.80%	0.81	12.34%	8.54%	10.72%	11.12%
IDACORP, Inc.	IDA	3.80%	0.82	12.34%	8.54%	10.81%	11.19%
NextEra Energy, Inc.	NEE	3.80%	0.82	12.34%	8.54%	10.76%	11.16%
NorthWestern Corporation	NWE	3.80%	0.90	12.34%	8.54%	11.46%	11.68%
OGE Energy Corporation	OGE	3.80%	0.94	12.34%	8.54%	11.81%	11.94%
Otter Tail Corporation	OTTR	3.80%	0.87	12.34%	8.54%	11.23%	11.50%
Portland General Electric Company	POR	3.80%	0.80	12.34%	8.54%	10.61%	11.04%
Southern Company	SO	3.80%	0.80	12.34%	8.54%	10.60%	11.04%
Xcel Energy Inc.	XEL	3.80%	0.75	12.34%	8.54%	10.22%	10.75%
Mean						10.82%	11.20%
Median						10.74%	11.14%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2022, at 14
[2] Source: Bloomberg Professional, based on 10-year weekly returns, as of June 30, 2022
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA
HISTORICAL MARKET RETURN

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

		[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	3.18%	0.77	12.34%	9.16%	10.25%	10.77%
Alliant Energy Corporation	LNT	3.18%	0.74	12.34%	9.16%	9.95%	10.55%
American Electric Power Company, Inc.	AEP	3.18%	0.67	12.34%	9.16%	9.29%	10.05%
Duke Energy Corporation	DUK	3.18%	0.64	12.34%	9.16%	9.08%	9.90%
Entergy Corporation	ETR	3.18%	0.72	12.34%	9.16%	9.79%	10.43%
Evergy, Inc.	EVRG	3.18%	0.98	12.34%	9.16%	12.11%	12.17%
IDACORP, Inc.	IDA	3.18%	0.72	12.34%	9.16%	9.79%	10.43%
NextEra Energy, Inc.	NEE	3.18%	0.71	12.34%	9.16%	9.64%	10.32%
NorthWestern Corporation	NWE	3.18%	0.73	12.34%	9.16%	9.85%	10.47%
OGE Energy Corporation	OGE	3.18%	0.92	12.34%	9.16%	11.63%	11.81%
Otter Tail Corporation	OTTR	3.18%	0.85	12.34%	9.16%	10.97%	11.31%
Portland General Electric Company	POR	3.18%	0.74	12.34%	9.16%	9.95%	10.55%
Southern Company	SO	3.18%	0.63	12.34%	9.16%	8.93%	9.78%
Xcel Energy Inc.	XEL	3.18%	0.64	12.34%	9.16%	9.03%	9.86%
Mean						10.02%	10.60%
Median						9.82%	10.45%

Notes:
[1] Source: Bloomberg Professional, as of June 30, 2022
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

NEAR-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA
HISTORICAL MARKET RETURN

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q4 2022 - Q4 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	ROE (K)	ECAPM ROE (K)
ALLETE, Inc.	ALE	3.74%	0.77	12.34%	8.60%	10.38%	10.87%
Alliant Energy Corporation	LNT	3.74%	0.74	12.34%	8.60%	10.09%	10.66%
American Electric Power Company, Inc.	AEP	3.74%	0.67	12.34%	8.60%	9.47%	10.19%
Duke Energy Corporation	DUK	3.74%	0.64	12.34%	8.60%	9.28%	10.05%
Entergy Corporation	ETR	3.74%	0.72	12.34%	8.60%	9.95%	10.55%
Evergy, Inc.	EVRG	3.74%	0.98	12.34%	8.60%	12.13%	12.18%
IDACORP, Inc.	IDA	3.74%	0.72	12.34%	8.60%	9.95%	10.55%
NextEra Energy, Inc.	NEE	3.74%	0.71	12.34%	8.60%	9.81%	10.44%
NorthWestern Corporation	NWE	3.74%	0.73	12.34%	8.60%	10.00%	10.58%
OGE Energy Corporation	OGE	3.74%	0.92	12.34%	8.60%	11.67%	11.84%
Otter Tail Corporation	OTTR	3.74%	0.85	12.34%	8.60%	11.05%	11.37%
Portland General Electric Company	POR	3.74%	0.74	12.34%	8.60%	10.09%	10.66%
Southern Company	SO	3.74%	0.63	12.34%	8.60%	9.14%	9.94%
Xcel Energy Inc.	XEL	3.74%	0.64	12.34%	8.60%	9.23%	10.01%
Mean						10.16%	10.71%
Median						9.98%	10.57%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

LONG-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT BETA
HISTORICAL MARKET RETURN

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

		[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	3.80%	0.77	12.34%	8.54%	10.39%	10.88%
Alliant Energy Corporation	LNT	3.80%	0.74	12.34%	8.54%	10.11%	10.67%
American Electric Power Company, Inc.	AEP	3.80%	0.67	12.34%	8.54%	9.49%	10.21%
Duke Energy Corporation	DUK	3.80%	0.64	12.34%	8.54%	9.30%	10.06%
Entergy Corporation	ETR	3.80%	0.72	12.34%	8.54%	9.97%	10.56%
Evergy, Inc.	EVRG	3.80%	0.98	12.34%	8.54%	12.13%	12.18%
IDACORP, Inc.	IDA	3.80%	0.72	12.34%	8.54%	9.97%	10.56%
NextEra Energy, Inc.	NEE	3.80%	0.71	12.34%	8.54%	9.83%	10.45%
NorthWestern Corporation	NWE	3.80%	0.73	12.34%	8.54%	10.02%	10.60%
OGE Energy Corporation	OGE	3.80%	0.92	12.34%	8.54%	11.68%	11.84%
Otter Tail Corporation	OTTR	3.80%	0.85	12.34%	8.54%	11.06%	11.38%
Portland General Electric Company	POR	3.80%	0.74	12.34%	8.54%	10.11%	10.67%
Southern Company	SO	3.80%	0.63	12.34%	8.54%	9.16%	9.96%
Xcel Energy Inc.	XEL	3.80%	0.64	12.34%	8.54%	9.26%	10.03%
Mean						10.18%	10.72%
Median						9.99%	10.58%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2022, at 14
[2] Source: Schedule AEB-D2, Attachment 5
[3] Source: Schedule AEB-S1, Attachment 2
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

COMPARISON OF CAPM/ECAPM RESULTS
BULKLEY AS-FILED v.EXCLUDING NON-DIVIDEND PAYING COMPANIES

	Current 30-Day Avg 30-Year Treasury Yield	Near-Term Projected 30-Year Treasury Yield	Longer-Term Projected 30-Year Treasury Yield
BULKEY AS-FILED			
CAPM:			
Current *Value Line* Beta	11.65%	11.73%	11.73%
Current Bloomberg Beta	11.20%	11.30%	11.31%
Long-term Avg. *Value Line* Beta	10.47%	10.61%	10.62%
ECAPM:			
Current *Value Line* Beta	11.97%	12.03%	12.03%
Current Bloomberg Beta	11.64%	11.71%	11.72%
Long-term Avg. *Value Line* Beta	11.09%	11.19%	11.20%
BULKEY AS-FILED, *except EXCL. NON-DIVIDEND PAYING COMPANIES*			
CAPM:			
Current *Value Line* Beta	11.59%	11.66%	11.67%
Current Bloomberg Beta	11.14%	11.24%	11.25%
Long-term Avg. *Value Line* Beta	10.41%	10.55%	10.57%
ECAPM:			
Current *Value Line* Beta	11.91%	11.96%	11.97%
Current Bloomberg Beta	11.57%	11.65%	11.65%
Long-term Avg. *Value Line* Beta	11.02%	11.13%	11.14%

Historical Market Risk Premium, 1926-2021

Year	Large Co Stock Total Return Table A-1
1926	11.62%
1927	37.49%
1928	43.61%
1929	-8.42%
1930	-24.90%
1931	-43.34%
1932	-8.19%
1933	53.99%
1934	-1.44%
1935	47.67%
1936	33.92%
1937	-35.03%
1938	31.12%
1939	0.41%
1940	-9.78%
1941	-11.59%
1942	20.34%
1943	25.90%
1944	19.75%
1945	36.44%
1946	-8.07%
1947	5.71%
1948	5.50%
1949	18.79%
1950	31.71%
1951	24.02%
1952	18.37%
1953	-0.99%
1954	52.62%
1955	31.56%
1956	6.56%
1957	-10.78%
1958	43.36%
1959	11.96%
1960	0.47%
1961	26.89%
1962	-8.73%
1963	22.80%
1964	16.48%
1965	12.45%
1966	-10.06%
1967	23.98%
1968	11.06%
1969	-8.50%
1970	4.01%
1971	14.31%
1972	18.98%
1973	-14.66%
1974	-26.47%
1975	37.20%
1976	23.84%
1977	-7.18%
1978	6.56%
1979	18.44%

Historical Market Risk Premium, 1926-2021

Year	Large Co Stock Total Return Table A-1
1980	32.50%
1981	-4.92%
1982	21.55%
1983	22.56%
1984	6.27%
1985	31.73%
1986	18.67%
1987	5.25%
1988	16.61%
1989	31.69%
1990	-3.11%
1991	30.47%
1992	7.62%
1993	10.08%
1994	1.32%
1995	37.58%
1996	22.96%
1997	33.36%
1998	28.58%
1999	21.04%
2000	-9.10%
2001	-11.89%
2002	-22.10%
2003	28.68%
2004	10.88%
2005	4.91%
2006	15.79%
2007	5.49%
2008	-37.00%
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%
Arithmetic average	12.34%

Source: Kroll, 2022 Stocks, Bonds, Bills, and Inflation (SBBI) Yearbook

BOND YIELD PLUS RISK PREMIUM

Quarter	[1] Average Authorized Electric ROE	[2] U.S. Govt. 30-year Treasury	[3] Trend	[4] Risk Premium
1992.1	12.38%	7.92%	0	4.46%
1992.2	11.83%	7.90%	1	3.93%
1992.3	12.03%	7.45%	2	4.59%
1992.4	12.14%	7.52%	3	4.62%
1993.1	11.84%	7.07%	4	4.76%
1993.2	11.64%	6.86%	5	4.78%
1993.3	11.15%	6.32%	6	4.84%
1993.4	11.04%	6.14%	7	4.91%
1994.1	11.07%	6.58%	8	4.49%
1994.2	11.13%	7.36%	9	3.77%
1994.3	12.75%	7.59%	10	5.16%
1994.4	11.24%	7.96%	11	3.28%
1995.1	11.96%	7.63%	12	4.33%
1995.2	11.32%	6.94%	13	4.37%
1995.3	11.37%	6.72%	14	4.65%
1995.4	11.58%	6.24%	15	5.35%
1996.1	11.46%	6.29%	16	5.17%
1996.2	11.49%	6.92%	17	4.56%
1996.3	10.70%	6.97%	18	3.73%
1996.4	11.56%	6.62%	19	4.94%
1997.1	11.08%	6.82%	20	4.26%
1997.2	11.62%	6.94%	21	4.68%
1997.3	12.00%	6.53%	22	5.47%
1997.4	11.06%	6.15%	23	4.91%
1998.1	11.31%	5.88%	24	5.43%
1998.2	12.20%	5.85%	25	6.35%
1998.3	11.65%	5.48%	26	6.17%
1998.4	12.30%	5.11%	27	7.19%
1999.1	10.40%	5.37%	28	5.03%
1999.2	10.94%	5.80%	29	5.14%
1999.3	10.75%	6.04%	30	4.71%
1999.4	11.10%	6.26%	31	4.84%
2000.1	11.20%	6.30%	32	4.90%
2000.2	11.00%	5.98%	33	5.02%
2000.3	11.68%	5.79%	34	5.89%
2000.4	12.50%	5.69%	35	6.81%
2001.1	11.38%	5.45%	36	5.93%
2001.2	11.00%	5.70%	37	5.30%
2001.3	10.72%	5.53%	38	5.19%
2001.4	11.99%	5.30%	39	6.69%
2002.1	10.05%	5.52%	40	4.53%
2002.2	11.41%	5.62%	41	5.79%
2002.3	11.65%	5.09%	42	6.56%
2002.4	11.57%	4.93%	43	6.63%
2003.1	11.96%	4.85%	44	7.11%
2003.2	11.16%	4.60%	45	6.56%
2003.3	10.50%	5.11%	46	5.39%
2003.4	11.34%	5.11%	47	6.23%
2004.1	11.13%	4.88%	48	6.25%
2004.2	10.64%	5.34%	49	5.30%
2004.3	10.75%	5.11%	50	5.64%
2004.4	11.24%	4.93%	51	6.31%
2005.1	10.63%	4.71%	52	5.92%
2005.2	10.31%	4.47%	53	5.84%
2005.3	11.08%	4.42%	54	6.66%
2005.4	10.63%	4.65%	55	5.98%
2006.1	10.70%	4.63%	56	6.07%
2006.2	10.79%	5.14%	57	5.64%
2006.3	10.35%	5.00%	58	5.35%
2006.4	10.65%	4.74%	59	5.91%
2007.1	10.59%	4.80%	60	5.79%
2007.2	10.33%	4.99%	61	5.34%
2007.3	10.40%	4.95%	62	5.45%
2007.4	10.65%	4.61%	63	6.04%
2008.1	10.62%	4.41%	64	6.21%
2008.2	10.54%	4.57%	65	5.96%
2008.3	10.43%	4.45%	66	5.98%
2008.4	10.39%	3.64%	67	6.74%
2009.1	10.75%	3.44%	68	7.31%
2009.2	10.75%	4.17%	69	6.58%

BOND YIELD PLUS RISK PREMIUM

Quarter	[1] Average Authorized Electric ROE	[2] U.S. Govt. 30-year Treasury	[3] Trend	[4] Risk Premium
2009.3	10.50%	4.32%	70	6.18%
2009.4	10.59%	4.34%	71	6.25%
2010.1	10.59%	4.62%	72	5.97%
2010.2	10.18%	4.37%	73	5.81%
2010.3	10.40%	3.86%	74	6.55%
2010.4	10.38%	4.17%	75	6.20%
2011.1	10.09%	4.56%	76	5.53%
2011.2	10.26%	4.34%	77	5.92%
2011.3	10.57%	3.70%	78	6.88%
2011.4	10.39%	3.04%	79	7.35%
2012.1	10.30%	3.14%	80	7.17%
2012.2	9.95%	2.94%	81	7.01%
2012.3	9.90%	2.74%	82	7.16%
2012.4	10.16%	2.86%	83	7.30%
2013.1	9.85%	3.13%	84	6.72%
2013.2	9.86%	3.14%	85	6.72%
2013.3	10.12%	3.71%	86	6.41%
2013.4	9.97%	3.79%	87	6.18%
2014.1	9.86%	3.69%	88	6.16%
2014.2	10.10%	3.44%	89	6.66%
2014.3	9.90%	3.27%	90	6.63%
2014.4	9.94%	2.96%	91	6.98%
2015.1	9.64%	2.55%	92	7.08%
2015.2	9.83%	2.88%	93	6.94%
2015.3	9.40%	2.96%	94	6.44%
2015.4	9.86%	2.96%	95	6.90%
2016.1	9.70%	2.72%	96	6.98%
2016.2	9.48%	2.57%	97	6.91%
2016.3	9.74%	2.28%	98	7.46%
2016.4	9.83%	2.83%	99	7.00%
2017.1	9.72%	3.05%	100	6.67%
2017.2	9.64%	2.90%	101	6.75%
2017.3	10.00%	2.82%	102	7.18%
2017.4	9.91%	2.82%	103	7.09%
2018.1	9.69%	3.02%	104	6.66%
2018.2	9.75%	3.09%	105	6.66%
2018.3	9.69%	3.06%	106	6.63%
2018.4	9.52%	3.27%	107	6.25%
2019.1	9.72%	3.01%	108	6.70%
2019.2	9.58%	2.78%	109	6.79%
2019.3	9.53%	2.29%	110	7.25%
2019.4	9.89%	2.26%	111	7.63%
2020.1	9.72%	1.89%	112	7.83%
2020.2	9.58%	1.38%	113	8.19%
2020.3	9.30%	1.37%	114	7.93%
2020.4	9.56%	1.62%	115	7.94%
2021.1	9.45%	2.07%	116	7.38%
2021.2	9.47%	2.26%	117	7.21%
2021.3	9.27%	1.93%	118	7.34%
2021.4	9.67%	1.95%	119	7.73%
2022.1	9.45%	2.25%	120	7.20%
2022.2	9.50%	3.05%	121	6.45%

Notes:

[1] Source: Regulatory Research Associates, rate cases through June 30, 2022

[2] Source: S&P Capital IQ Pro, quarterly bond yields are the average of each trading day in the quarter

[3] Trend Variable

[4] Equals Column [1] − Column [2]

DR. WON'S RISK PREMIUM REGRESSION OUTPUT

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.93240
R Square	0.86937
Adjusted R Square	0.86717
Standard Error	0.00379
Observations	122

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0.0114	0.0057	395.9789	0.0000
Residual	119	0.0017	0.0000		
Total	121	0.0131			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.1188	0.00578	20.56	0.00000	0.10732	0.13019	0.10732	0.13019
U.S. Govt. 30-year Treasury	(0.9965)	0.07830	(12.73)	0.00000	(1.15152)	(0.84145)	(1.15152)	(0.84145)
Trend	(0.0002)	0.00004	(5.66)	0.00000	(0.00028)	(0.00014)	(0.00028)	(0.00014)

DR. WON - RE-SPECIFIED BULKLEY RISK PREMIUM ANALYSIS (INCL. TREND) - AS FILED

	[4]	[5]	[6]	[7]
	U.S. Govt. 30-year Treasury	Trend Variable	Risk Premium	ROE
Current 30-day average of 30-year U.S. Treasury bond yield [1]	3.18%	122	6.16%	9.34%
Blue Chip Near-Term Projected Forecast (Q4 2022 - Q4 2023) [2]	3.74%	122	5.60%	9.34%
Blue Chip Long-Term Projected Forecast (2023-2027) [3]	3.80%	122	5.54%	9.34%
AVERAGE				9.34%

Notes:

[1] Source: S&P Capital IQ Pro, 30-day average as of June 30, 2022

[2] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2

[3] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2021, at 14

[4] See notes [1], [2] & [3]

[5] Trend Variable set to 122 for the current, near-term projected and long-term projected treasury yield scenarios.

[6] Equals 0.1188 + (-0.9965 x Column [4]) + (-0.002 x Column [5])

[7] Equals Column [4] + Column [6]

DR. WON - RE-SPECIFIED BULKLEY RISK PREMIUM ANALYSIS (INCL. TREND) - ADJUSTED TO CORRECT TREND VARIABLE

	[4]	[5]	[6]	[7]
	U.S. Govt. 30-year Treasury	Trend Variable	Risk Premium	ROE
Current 30-day average of 30-year U.S. Treasury bond yield [1]	3.18%	122	6.16%	9.34%
Blue Chip Near-Term Projected Forecast (Q4 2022 - Q4 2023) [2]	3.74%	**125**	5.53%	**9.27%**
Blue Chip Long-Term Projected Forecast (2023-2027) [3]	3.80%	**134**	5.30%	**9.10%**
AVERAGE				9.24%

Notes:
[1] Source: S&P Capital IQ Pro, 30-day average as of June 30, 2022
[2] Source: Blue Chip Financial Forecasts, Vol. 41, No. 7, July 1, 2022, at 2
[3] Source: Blue Chip Financial Forecasts, Vol. 41, No. 6, June 1, 2021, at 14
[4] See notes [1], [2] & [3]
[5] Trend Variable set equal to the time period of the current, near-term projected and long-term projected treasury yields.
[6] Equals 0.1188 + (-0.9965 x Column [4]) + (-0.002 x Column [5])
[7] Equals Column [4] + Column [6]

TREASURY YIELD FORECAST PERIOD

Quarter	Trend
2022.3	122
2022.4	123
2023.1	124
2023.2	125
2023.3	126
2023.4	127
2024.1	128
2024.2	129
2024.3	130
2024.4	131
2025.1	132
2025.2	133
2025.3	134
2025.4	135
2026.1	136
2026.2	137
2026.3	138
2026.4	139
2027.1	140
2027.2	141
2027.3	142
2027.4	143
Average - Q4 2022 - Q4 2023	125
Average - 2023 - 2027	134

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 *Surrebuttal 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 13th day of March, 2023.

Notary Public

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