

FILED
May 01, 2023
Data Center
Missouri Public
Service Commission

Exhibit No. 14

Ameren – Exhibit 14
Ann E. Bulkley
Surrebuttal Testimony
File No. ER-2022-0337

Exhibit No.:
Issue(s): Cost of Capital
Witness: Ann E. Bulkley
Type of Exhibit: Surrebuttal Testimony
Sponsoring Party: Union Electric Company
File No.: ER-2022-0337
Date Testimony Prepared: March 13, 2023

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**

TABLE OF CONTENTS

I.	Introduction.....	3
II.	Summary and Overview.....	4
III.	Capital Markets.....	6
IV.	Proxy Group.....	14
V.	DCF Analysis.....	20
VI.	CAPM Analysis.....	27
VII.	ECAPM Analysis.....	39
VIII.	Risk Premium Analysis.....	44
IX.	Authorized Returns.....	51
X.	Business Risk Factors.....	52

SURREBUTTAL TESTIMONY
OF
ANN E. BULKLEY
FILE NO. ER-2022-0337

1 **I. Introduction**

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

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

5 **Q: On whose behalf are you submitting this surrebuttal testimony?**

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

8 **Q: Did you previously submit direct and rebuttal testimony in this proceeding?**

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

12 **Q: What is the purpose of your surrebuttal testimony?**

13 A: The purpose of my surrebuttal testimony is to respond to the rebuttal testimonies of
14 Dr. Seoung Joun Won on behalf of the Missouri Public Service Commission Staff
15 (“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”).

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

5 **II. Summary and Overview**

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

9 **A:** My key conclusions are as follows:

- 10 • Dr. Won and Mr. Murray dispute that utility share prices are likely to
11 underperform over the near-term; however, neither has provided any
12 evidence that would contradict equity analysts’ projections of utility stock
13 underperformance given the interest rate environment. In fact, the evidence
14 demonstrates that the utility sector has underperformed as interest rates
15 have increased:
 - 16 • Since July 1, 2022, the yield on the 30-year Treasury bond increased
17 80 basis points, while the share prices for the vertically-integrated
18 electric utilities in my proxy group declined by 7.90 percent and the
19 price of the S&P 500 Index increased 5.20 percent.
 - 20 • The price-to-earnings (“P/E”) ratios for the companies in my proxy
21 group declined 11 percent from January 2022 to February 2023.
- 22 • It is disingenuous for Dr. Won and Mr. Murray to suggest that I should have
23 relied on the assumptions used by their cost of equity estimation models
24 when they do not directly rely on the results of those models to support their
25 recommended ROEs. Rather their ROE recommendations are well above
26 the results of their respective models, as Dr. Won relies on a comparative
27 methodology leveraging off of an authorized ROE in a proceeding involving
28 a different utility with different circumstances four years ago, while Mr.
29 Murray simply relies on subjective judgment for his ROE recommendation.

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”).

- 1
- 2
- 3 • Overall, while Dr. Won and Mr. Murray dispute the assumptions used in my
4 cost of equity estimation models:
 - 5 • Neither Dr. Won nor Mr. Murray have demonstrated that their
6 suggested changes to my proxy group are supported. Specifically,
7 there is no basis to include a company that had its utility's projected
8 earnings growth rate reduced to zero or near zero as a result of
9 regulatory issues, nor is there a basis to exclude utilities with
10 unregulated operations but that derive the majority of their operating
11 income from regulated operations and thus are similar to Ameren
12 Missouri, particularly when there is no discernible trend that
13 companies in my proxy group with a relatively higher percentage of
14 unregulated operations had a higher cost of equity than companies
15 with a relatively lower percentage of unregulated operations.
 - 16 • Dr. Won's and Mr. Murray's criticism regarding the use of projected
17 earnings growth rates in the constant growth DCF model is
18 unfounded given that earnings are the fundamental driver of dividend
19 growth rates, and there is significant academic research
20 demonstrating that EPS growth rates are most relevant in stock price
21 valuation.
 - 22 • Dr. Won's and Mr. Murray's allegation that the market return in my
23 CAPM and ECAPM analyses is too high is contradicted by the fact
24 that the methodology I have used to estimate the market return is
25 consistent with historical average returns, and consistent with the
26 approach accepted by various regulators.
 - 27 • Dr. Won's re-specification of my CAPM and ECAPM analyses
28 includes multiple errors, including relying on data from another
29 utility's prior rate proceeding. Due to these errors, Dr. Won's
30 adjustments to my CAPM and ECAPM analyses simply cannot be
31 relied upon.
 - 32 • Neither Dr. Won nor Mr. Murray have provided any evidence that the
33 results of my Bond Yield Plus Risk Premium analysis are unreliable,
34 and Dr. Won's re-specification of my analysis by adding a trend
35 variable not only includes errors, but also produces results that are
36 directly contrary to the conclusion in his testimony that, as interest
37 rates increase, so too does the utility cost of equity.
 - 38 • Dr. Won's review of previously authorized ROEs does not provide the
39 necessary insight to draw meaningful conclusions about the forward-looking
40 investor-required return to establish the ROE in this proceeding.
41 Specifically, Dr. Won does not appropriately consider the authorized ROEs
42 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.

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

15 **III. Capital Markets**

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

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

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

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

3 A: Yes. Reviewing the changes in market conditions since I filed my direct testimony
4 in August 2022 demonstrates why it is important to consider projected interest rates
5 at a time when the Federal policy initiatives are clear that interest rates will be
6 changing. In the analysis presented in my direct testimony, I relied on a near-term
7 projected yield on the 30-year Treasury bond for Q4/2022 through Q4/2023 of 3.74
8 percent. As of the end of February 2023, the current 30-day average yield on the
9 30-year Treasury bond was 3.74 percent, which is equivalent to the near-term
10 projected yield that I relied on in the CAPM analysis in my direct testimony. Had I
11 not considered the near-term projected interest rates in my CAPM analysis, I would
12 have understated the cost of equity only several months into the rate proceeding.

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

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

⁵ Bulkley Direct Testimony, at 25-26.

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

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

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

9 A: No. Mr. Murray concludes that the historical inverse relationship has not been
10 evident in the market data for 2022. According to Mr. Murray, the stock prices for
11 the companies in my proxy group declined only 3.11 percent in 2022 despite the
12 fact that the yield on Moody's Baa corporate bonds increased by 74 percent.⁷
13 Furthermore, Mr. Murray contends that the utility sector outperformed broader
14 markets by the "largest margin this century" in 2022.⁸
15 Similarly, Dr. Won contends that the S&P Utilities Index increased from March to
16 April in 2022 and then again in August 2022 even though interest rates were
17 increasing.⁹

⁶ Murray Direct Testimony, at 10.

⁷ Murray Rebuttal Testimony, at 25.

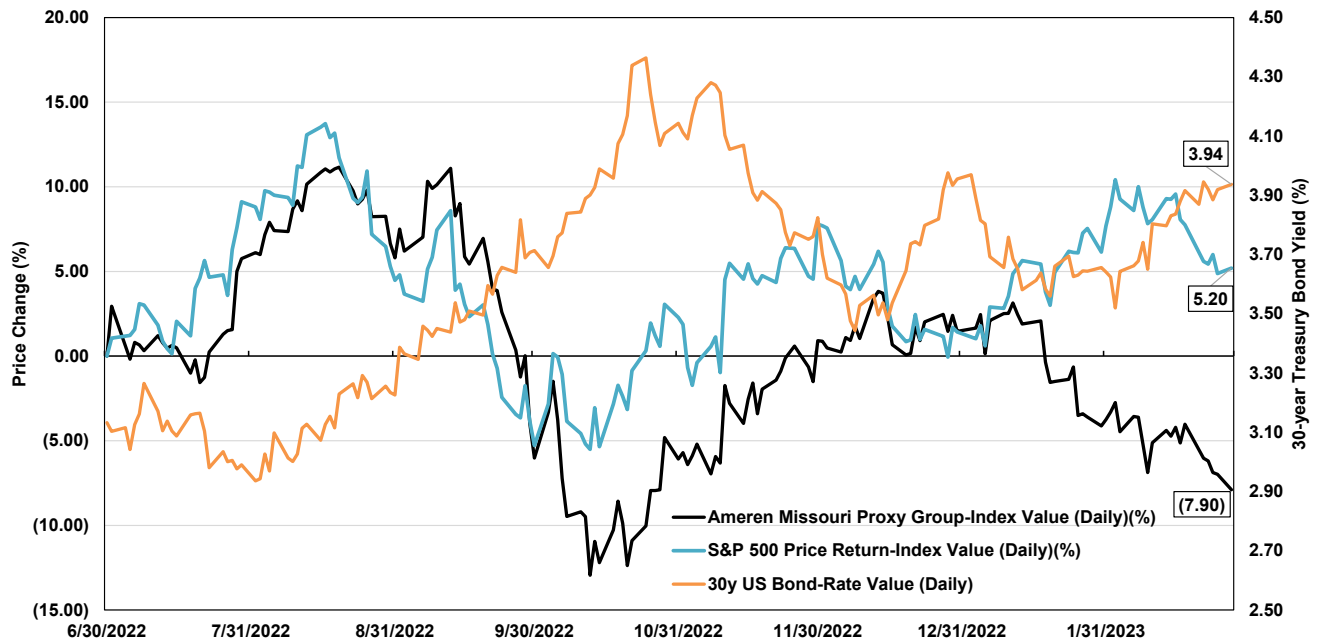
⁸ Murray Rebuttal Testimony, at 24.

⁹ Won Rebuttal Testimony, at 6.

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

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

1 **FIGURE 1: RELATIVE PERFORMANCE OF AMEREN MISSOURI'S PROXY GROUP AND THE S&P**
2 **500, JULY 2022 – FEBRUARY 2023¹⁰**



3
4 **Q: Mr. Murray contends that the P/E ratios for your proxy group have remained**
5 **relatively stable even though interest rates have increased, which indicates**
6 **that investors' required risk premia for utility stocks have declined.¹¹ Do you**
7 **agree?**

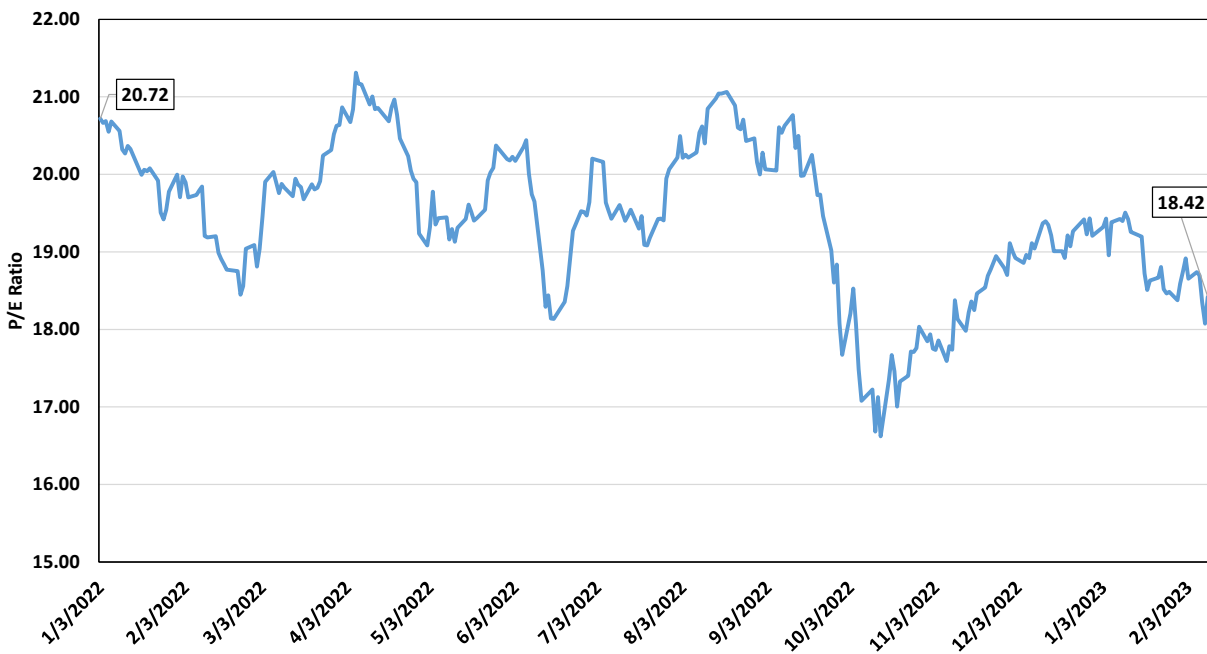
8 **A:** No, I do not. On page 27 of his rebuttal testimony, Mr. Murray reviews the P/E ratios
9 for the companies included in my proxy group and concludes that the P/E ratios
10 started 2022 slightly over 20 and ended 2022 slightly under 20, thus implying that
11 the valuations of my proxy group companies have not been affected by the recent
12 increase in interest rates. However, Mr. Murray is not correct and his conclusion is
13 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.

1 companies in his chart. Therefore, I adjusted Mr. Murray's chart to include data
2 through February 10, 2023, which Mr. Murray provided in his workpapers, and to
3 change the y-axis of the chart to more clearly show the daily changes in the P/E
4 ratios over the period of January 2022 through February 2023. As shown in Figure
5 2 below, the P/E ratios for the companies in my proxy group declined 11 percent
6 from 20.72 on January 3, 2022 to 18.42 on February 10, 2023. Counter to the
7 conclusion of Mr. Murray, the valuations of my proxy group companies have
8 declined as a result of the recent increase in interest rates.

9 **FIGURE 2: AVERAGE P/E RATIOS OF AMEREN MISSOURI PROXY GROUP,
JANUARY 1, 2022 THROUGH FEBRUARY 10, 2023¹²**



10
¹² Murray workpaper "Rebuttal – Valuation Charts.xlsx."

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

2 A: Yes. The projected 30-year Treasury bond yield as reported by *Blue Chip Financial*
3 *Forecasts* for the period of Q2/2023 to Q2/2024 is 3.82 percent.¹³ The projected
4 30-year Treasury bond yield also as reported by *Blue Chip Financial Forecasts* for
5 the period of 2024 to 2028 is 3.90 percent.¹⁴ In fact, in testifying before the Senate
6 Banking Committee on March 7, 2023, Federal Reserve Chairman Powell signaled
7 that the ultimate level of interest rates is likely to be higher than previously
8 anticipated.¹⁵ Therefore, long-term Treasury bond yields are projected to remain
9 elevated for the near term.

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

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

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

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.

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

21 We have previously determined, above, that we shall utilize I&E's
22 DCF and CAPM methodologies. I&E's DCF and CAPM produce a
23 range of reasonableness for the ROE in this proceeding from 8.90%
24 [DCF] to 9.89% [CAPM]. Based upon our informed judgment, which
25 includes consideration of a variety of factors, including increasing
26 inflation leading to increases in interest rates and capital costs since
27 the rate filing, we determine that a base ROE of 9.75% is reasonable
28 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.

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

4 **IV. Proxy Group**

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

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

13 Mr. Murray suggests that I do not recognize or discuss that some of the companies
14 contained in my proxy group have "significant exposure" to unregulated
15 operations.¹⁸ Specifically, Mr. Murray notes that I have included Entergy Corp.
16 ("ETR"), NEE, OGE Energy Corporation ("OG&E"), and OTTR in my proxy group,
17 each of which has substantial unregulated operations. Mr. Murray believes that
18 companies with a higher percentage of unregulated operations have greater risk,
19 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.

1 unregulated operations when comparing the business risk of Ameren Missouri to
2 the proxy group.¹⁹

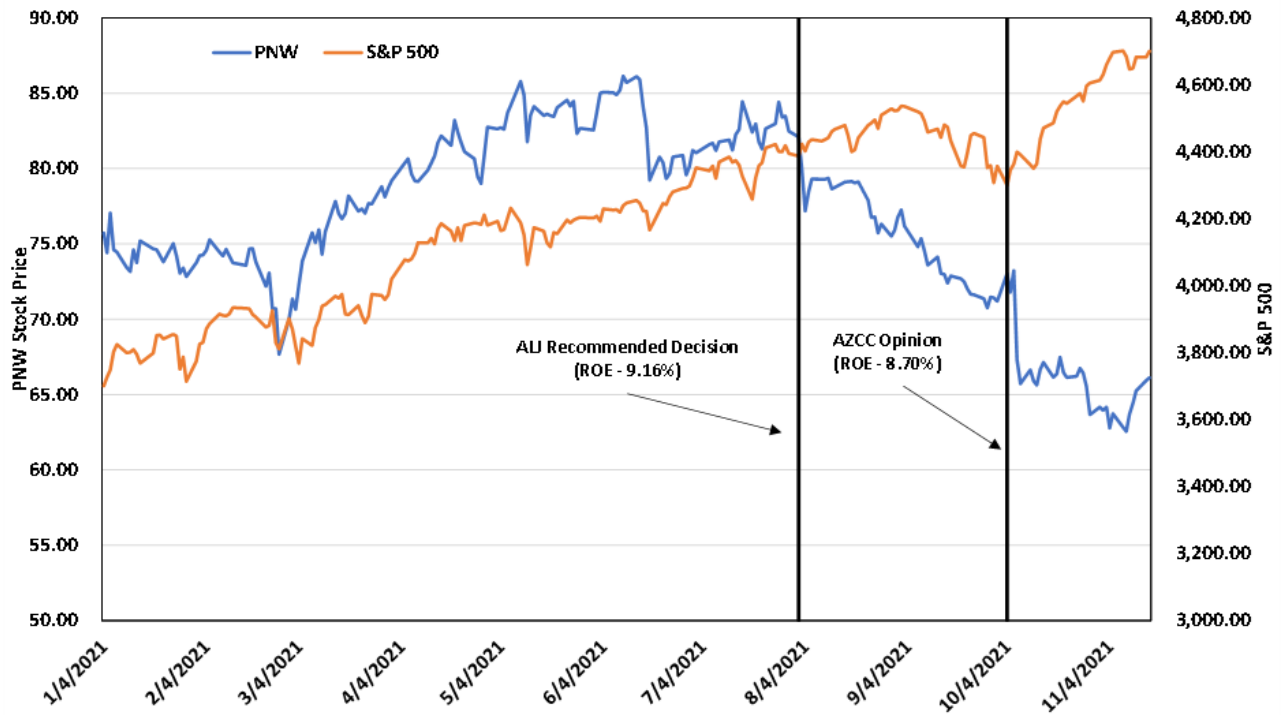
3 **Q: Is Dr. Won correct that PNW should be included in the proxy group used to**
4 **determine the ROE for Ameren Missouri?**

5 A: No, for multiple reasons. First, Dr. Won incorrectly suggests that my testimony
6 examines the prices of PNW's stock over the period from October to November
7 2021. In fact, my testimony correctly examines the period from the initial
8 Administrative Law Judge ("ALJ") decision on August 2, 2021 through when the final
9 decision was issued in the Arizona Public Service ("APS") case on November 4,
10 2021. As shown in Figure 4 of my rebuttal testimony, and provided again as Figure
11 3 below, the decline in stock price over this period was 24 percent.

¹⁹ Murray Rebuttal Testimony, at 21-22.

1

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



2

Second, as discussed in my rebuttal testimony, the financial effect of the decision in

3

APS's last rate proceeding resulted in a significant downward revision in the

4

projected EPS growth rates for PNW (e.g., the consensus projected EPS growth

5

rate estimate reported by IBES for PNW was reduced to nearly zero, while *Value*

6

Line reduced its estimate of projected EPS growth to "Nil"). Additionally, as

7

discussed in my direct testimony, for inclusion in my proxy group, I required a

8

company have positive projected EPS growth rates from at least two equity analysts.

9

As shown in Figure 4 below, PNW would not currently meet this screen as the

10

company did not have positive growth rates from two equity analysts as of

11

December 31, 2022 (*i.e.*, the end of the analytical period that I relied on in my

12

rebuttal testimony).

1 **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

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

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

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

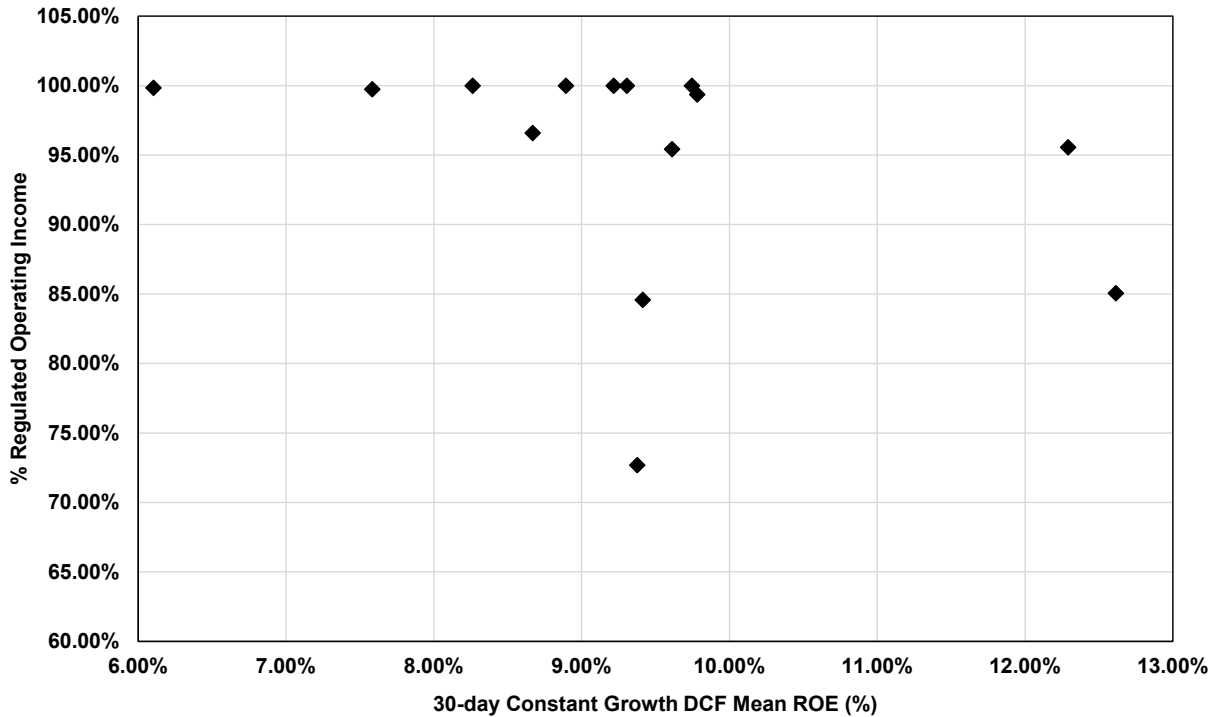
²⁰ Pinnacle West Capital Corporation NYSE: PNW FQ3 2021 Earnings Call Transcripts, November 5, 2021, at 7-8.

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

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

²¹ Bulkley Direct Testimony, at 34.

1 **FIGURE 5: COMPARISON OF 30-DAY CONSTANT GROWTH DCF RESULTS AND PERCENTAGE**
2 **OF REGULATED OPERATING INCOME²²**



3 Third, neither Dr. Won nor Mr. Murray have conducted any analysis to support their
4 conclusions that the companies with a higher percentage of unregulated operations
5 in my proxy group have greater risk than Ameren Missouri. As discussed in my
6 direct testimony, I compared the business and financial risk of Ameren Missouri to
7 the proxy group,²³ and based on these analyses, I concluded that Ameren Missouri
8 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.

1 **V. DCF Analysis**

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

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

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

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

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.

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

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

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

²⁸ Bulkley Direct Testimony, at 15, Figure 2.

²⁹ Bulkley Direct Testimony, at 34-35.

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

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

5 A: Yes. In support of the use of a GDP growth rate in the DCF model, Dr. Won
6 referenced Dr. Roger A. Morin's *New Regulatory Finance* where Dr. Morin noted
7 that all growth rates eventually converge to a level consistent with the growth in
8 GDP.³⁰ However, Dr. Won fails to discuss and chooses not to rely on the
9 methodology that Dr. Morin employs to estimate the long-term growth in GDP that
10 Dr. Won advocates using in his multi-stage DCF analysis. Dr. Morin estimates the
11 long-term growth rate in nominal GDP by first calculating the growth in real GDP
12 and then adding the expected inflation rate.³¹ The growth rate in real GDP is
13 estimated by calculating the compound annual growth rate in real GDP from 1929
14 through the present. The expected inflation rate is estimated as the difference
15 between the yield on the 20-year Treasury bond and the yield on the 20-year
16 Treasury Inflation Protected bond. As Dr. Morin noted in *New Regulatory Finance*,
17 this resulted in a long-term GDP growth rate of 6.5 percent in 2006.³²
18 In contrast, Dr. Won relied on the projected GDP growth rate of 3.90 percent
19 reported by the Congressional Budget Office ("CBO") for the period of 2027-2032

³⁰ Won Rebuttal Testimony, at 10.

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

³² *Id.*

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

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

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

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

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

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

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.

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

3 A: Yes, I have. As shown in Schedule AEB-S1, Attachment 1, I estimated a long-term
4 nominal GDP growth rate of 5.50 percent using the methodology outlined by Dr.
5 Morin and *Morningstar*. The long-term nominal GDP growth rate is based on the
6 real GDP growth rate of 3.16 percent from 1929 through 2022, and a projected
7 inflation rate of 2.27 percent. The projected rate of inflation is based on three
8 measures: (1) the average long-term projected growth rate in the Consumer Price
9 Index (“CPI”) of 2.20 percent, as reported by *Blue Chip Financial Forecasts*;³⁶ (2)
10 the compound annual growth rate of the CPI for all urban consumers for 2033-2050
11 of 2.36 percent as projected by the Energy Information Administration (“EIA”) in the
12 Annual Energy Outlook 2022; and (3) the compound annual growth rate of the GDP
13 chain-type price index for 2033-2050 of 2.26 percent, also reported by the EIA in
14 the Annual Energy Outlook 2022.³⁷

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

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

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.

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

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

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

³⁸ Murray Rebuttal Testimony, at 30.

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

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

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

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

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

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

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

9 **VI. CAPM Analysis**

10 **Q: What is Dr. Won’s position regarding your CAPM analyses?**

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

³⁹ Won Rebuttal Testimony, at 13-14.

⁴⁰ *Id.*, at 14.

⁴¹ *Id.*

1 3.74 percent and a market risk premium of 5.50 percent, my average CAPM result
2 would be 8.51 percent.⁴²

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

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

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

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

⁴² *Id.*, at 16.

⁴³ Murray Rebuttal Testimony, at 31.

⁴⁴ *Id.*, at 32.

⁴⁵ *Id.*

⁴⁶ *Id.*, at 33.

- 1 • The entire data set for the S&P 500 on which Dr. Won bases his 9.57
2 percent market return is incorrect for this proceeding and outdated.
3 Specifically, as shown on Dr. Won’s rebuttal testimony workpaper “5 –
4 Market Return,” in columns AR through BG, Dr. Won incorrectly relies on
5 the data for the S&P 500 as of December 2020 that was used in my direct
6 testimony in the rate proceeding for Evergy Missouri West in Docket No.
7 ER-2022-0129-30. This error can be seen on Dr. Won’s rebuttal testimony
8 workpaper “5 – Market Return,” in the formulas shown in column BZ that is
9 referencing data from the Evergy Missouri West in Docket No. ER-2022-
10 0129-30.
- 11 • Also as shown on Dr. Won’s rebuttal testimony workpaper “5 – Market
12 Return,” in his calculation of his claimed 9.57 percent market return, Dr.
13 Won has incorrectly used the same weighted average dividend yield for the
14 S&P 500 as in my direct testimony (*i.e.*, 1.56 percent). However, since Dr.
15 Won’s position is that non-dividend paying companies should be excluded
16 from the calculation of the market return, he cannot simply rely on the same
17 weighted average dividend yield for the S&P 500 as in my direct testimony.
18 Rather, the weighted average dividend yield would increase because the
19 non-dividend paying companies have been excluded from the weighting.
- 20 • In “correcting” my CAPM analyses, Dr. Won appears to be attempting to
21 calculate the market return consistent with the FERC’s methodology.
22 However, Dr. Won’s approach for estimating the growth rates is not
23 consistent with FERC’s DCF methodology. The FERC does not weight the
24 projected EPS growth rates and a GDP growth rate in the calculation of the
25 market return such as Dr. Won has done.

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

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

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

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

18 The US State Court of Appeals for the District of Columbia recently addressed this
19 issue in its review of FERC Opinion No. 569-B. In the Court’s decision, it
20 acknowledged that the FERC has relied on the use of EPS growth rates in the
21 calculation of the market return on the S&P 500 because the S&P 500 is regularly
22 updated to include companies with high market capitalization and it includes
23 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).

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

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

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

13 Specifically, as shown on Schedule AEB-S1, Attachment 2, the market return as
14 filed in my direct testimony was 12.94 percent, and when non-dividend paying
15 companies are excluded, the market return is 12.87 percent. As shown on Schedule
16 AEB-S1, Attachment 5, the long-term historical market return from 1926 through
17 2021 is 12.34 percent, which is generally consistent with the level of the market
18 return that I relied on in my direct testimony, as well as the market return of 12.63
19 percent reflected in my rebuttal testimony based on the most recent data. As
20 discussed in my rebuttal testimony, while I do not agree that the use of a historical
21 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.

1 nonetheless indicates that my projected market return, and resulting costs of equity
2 from the CAPM and ECAPM analyses, is not an “extreme outlier” as suggested by
3 Dr. Won.⁴⁹

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

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

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

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

⁴⁹ Won Rebuttal Testimony, at 15.

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

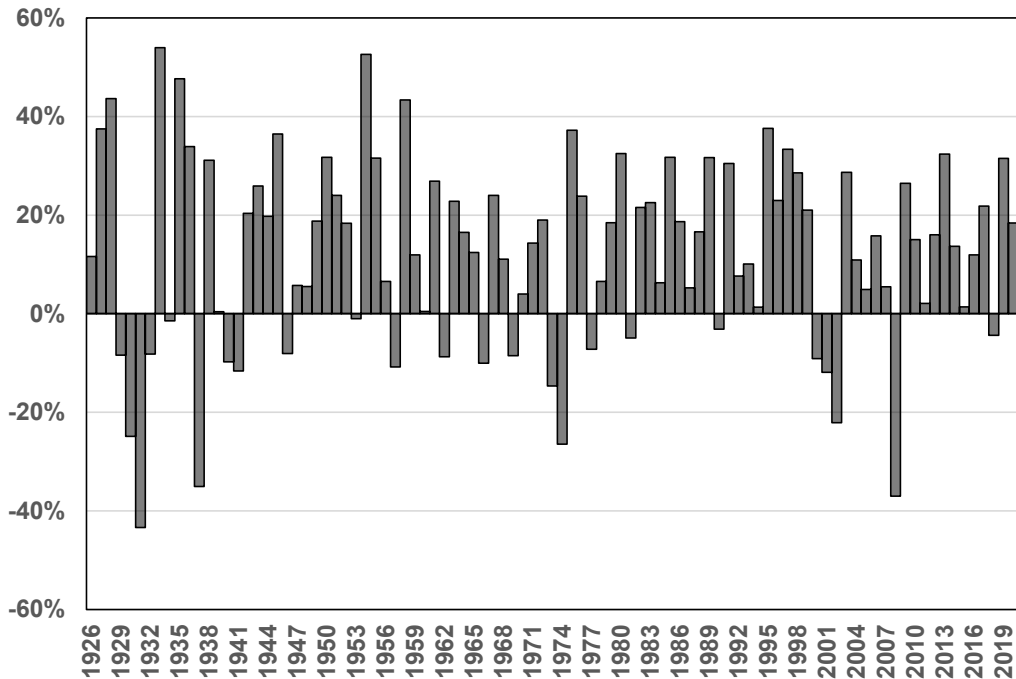
8 In addition, a market risk premium of 5.50 percent is certainly not supported by Dr.
9 Won's erroneous "correction" to my CAPM analysis as just discussed. Lastly, Dr.
10 Won cannot suggest a CAPM result of 8.51 percent is reasonable given that that he
11 concludes that Mr. Murray's recommended ROE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

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

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

1

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



2

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.

3

4

5

6

7

8

9

10

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 SBI Yearbook.

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

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

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

6 I am aware of multiple authoritative sources that have relied on the constant growth
7 DCF to estimate the market return in the CAPM. As just noted, the FERC relies on
8 the constant growth DCF model to estimate the market return, and so have the
9 Illinois Commerce Commission ("ICC"), the Pennsylvania Public Utilities
10 Commission ("PPUC"), and the Maine Public Utilities Commission ("Maine PUC").
11 As shown in Figure 7, the Staff of the ICC, the Bureau of Investigation and
12 Enforcement ("I&E") of the PPUC and the Staff of the Maine PUC have all supported
13 the forward-looking market risk premium. In each case, the market return was
14 estimated using the constant growth DCF model and analysts' earnings growth rate
15 projections, which resulted in a range of market return estimates from 11.33 percent
16 to 13.94 percent. As also shown in Figure 7, the regulatory commissions in each of
17 those cases relied on the estimated CAPM results of those parties to determine the
18 authorized ROE and did not dispute the use of the constant growth DCF model to
19 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.

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.

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

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

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.

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

12 **Q: What is your response to Mr. Murray's comparison of growth in the Wilshire**
13 **5000 Index relative to GDP?**

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

21 Further, Mr. Murray's analysis is dependent on the selection of an assumed GDP
22 growth rate of 4.00 percent. However, as shown in Schedule AEB-S1, Attachment
23 1, Mr. Murray's assumed growth rate is significantly below a long-term projected
24 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.

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

3 **VII. ECAPM Analysis**

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

5 A: Dr. Won states that my ECAPM analyses also rely on a market risk premium that is
6 too high, plus he raises an additional concern with the adjustment made in the
7 ECAPM to account for the tendency of the CAPM to underestimate the cost of equity
8 for companies with betas less than 1.00.⁶⁴ Dr. Won states that the ECAPM
9 adjustment is based on the findings of Dr. Morin who developed the model based
10 on data between 1926 and 1984, and Dr. Won asserts that there is no evidence that
11 Dr. Morin's findings would still be relevant based on data after 1984.⁶⁵ Furthermore,
12 Dr. Won contends that Dr. Morin presented other studies that produced returns
13 between -9.61 percent to 13.56 percent, which Dr. Won claims means that the
14 CAPM overestimated the return in some instances and that such findings do not
15 lend credibility to the use of the ECAPM.⁶⁶

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 $(1 + 3.16 \text{ percent}) \times (1 + 2.27 \text{ percent}) - 1$.

⁶⁴ Won Rebuttal, at 17.

⁶⁵ *Id.*

⁶⁶ *Id.*

1 **Q: Does Mr. Murray discuss your ECAPM analysis?**

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

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

7 A: No, I do not. The concept of the ECAPM and the conclusion that the risk-return
8 relationship is flatter than predicted by the CAPM is generally accepted in financial
9 literature. Dr. Morin, in *Modern Regulatory Finance*, provides a list of studies each
10 of which concludes that the CAPM understates the returns for companies with betas
11 less than 1.0 (which is typically utilities) and overstates the return for companies
12 with betas greater than 1.0.⁶⁸ It is these empirical studies referenced by Dr. Morin
13 that formed the basis of the development of alternative models such as the ECAPM
14 that would better predict the risk return-relationship observed when reviewing actual
15 market data.

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

18
$$K_e = r_f + \alpha + \beta((r_m - r_f) - \alpha) \quad K_e - r_f = \alpha + \beta(r_m - r_f)$$

19 Where:

20 K_e = the required market ROE;

21 α = a constant term;

22 β = Beta coefficient of an individual security;

⁶⁷ Murray Rebuttal, at 33.

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

1 r_f = the risk-free ROR; and
2 r_m = the required return on the market as a whole.

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

1 **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%

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

4 A: Yes. Litzenberger, Ramaswamy, and Howard (1980) studied the ability of the
5 CAPM to estimate the returns for utilities.⁷⁰ The authors found that the CAPM tends
6 to understate the return for stocks such as utilities, which have a beta less than 1.00.
7 To develop the analysis, Litzenberger, *et al.* utilized both adjusted and raw betas,
8 and in both cases, the CAPM understated the return for utilities with betas less than
9 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.

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

3 A: Dr. Won’s claim is incorrect as there has been a study published after the publication
4 of Dr. Morin’s book, New Regulatory Finance, that considered the use of the ECAPM
5 based on more recent market data. Specifically, Chretien and Coggins (2011)
6 studied the CAPM and its ability to estimate the risk premium for the utility industry
7 in particular subgroups of utilities for a data set that included market data through
8 the end of 2006.⁷¹ Chretien and Coggins considered the CAPM, the Fama-French
9 three-factor model and a model similar to the ECAPM used in my direct testimony.
10 The study shows that the ECAPM significantly outperformed the traditional CAPM
11 at predicting the observed risk premium for the various utility subgroups.

12 **Q: As he did with your CAPM analyses, Dr. Won also recalculates the results of**
13 **your ECAPM analyses.⁷² Is Dr. Won’s recalculation of your ECAPM analyses**
14 **reasonable?**

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

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.

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

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

9 **VIII. Risk Premium Analysis**

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

12 A: Dr. Won's primary concerns with the BYRP analysis are that: (1) the analysis relies
13 on projected interest rates; (2) the analysis is determined based on the yield on the
14 30-year Treasury bond yield; (3) the relationship between the 30-year Treasury
15 bond yield and the ROE is not constant over time; and (4) the analysis did not
16 consider a trend variable to account for the trend in authorized ROEs over time.⁷⁴
17 Dr. Won states that he agrees with the FERC that the BYRP is likely to provide a
18 less accurate current ROE estimate than the DCF or CAPM models because it relies
19 on previous ROE determinations that may not be directly determined by a market-
20 based methodology.⁷⁵

⁷⁴ Won Rebuttal Testimony, at 19.

⁷⁵ *Id.*, at 19-20.

1 **Q: What is Mr. Murray’s position regarding your BYRP analysis?**

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

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

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

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

⁷⁶ Murray Rebuttal Testimony, at 19.

⁷⁷ Won Rebuttal Testimony, at 19.

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

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

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

11 A: No. Dr. Won’s characterization of the BYRP analysis is inaccurate. As shown in
12 Schedule AEB-R1, Attachment 6 of my rebuttal testimony, when considering the
13 historical relationship between interest rates and authorized ROEs, the regression
14 statistics for the BYRP analysis demonstrate that the coefficients are significant and
15 the R² shows that there is a reasonable fit to the data, meaning the BYRP analysis
16 is a reasonable methodology to be considered in estimating the cost of equity.

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

⁷⁸ Won Rebuttal Testimony, at 19.

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

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

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

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.

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

5 A: Dr. Won’s concern is that ROE determinations may be made without respect to
6 market-based methodologies and therefore cannot be used to inform the current
7 ROE. However, this suggestion directly contradicts his use of a comparative
8 analysis leveraging off of the authorized ROE in the 2019 Empire District Electric
9 Company rate proceeding (“2019 Empire Case”)⁸¹ to set the ROE for the Company
10 in this proceeding. If Dr. Won is concerned with the use of previously authorized
11 ROEs to establish a relationship between the ROEs over differing time periods, then
12 the entire basis of his own ROE recommendation in this proceeding is unsupported.
13 In the current case, Dr. Won assumes a linear relationship between the DCF model
14 results from one period to the next. This analysis relies on a DCF model based on
15 data from 2019 and another based on data from 2022 – neither of which were used
16 by the Commission in the 2019 Empire Case given that Dr. Won developed both
17 models in the current proceeding. Thus, Dr. Won’s proposed ROE is based on the
18 assumption that there is a linear relationship between his two DCF models, even
19 though neither has been considered by the Commission, to develop an adjustment
20 to the ROE authorized in the 2019 Empire Case. Dr. Won’s suggestion that the
21 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.

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

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

7 A: No. There is a critical error with Dr. Won’s re-specification of my BYRP analysis by
8 adding a trend variable to the equation, and as a result, his cost of equity estimate
9 of 9.34 percent simply cannot be relied upon. Dr. Won acknowledges multiple times
10 in his testimony that, “[a]ll other things being equal, a higher bond yield indicates a
11 higher required cost of equity.”⁸² I agree with Dr. Won on this point. However, as
12 shown on Dr. Won’s rebuttal workpaper “6 Risk Prem,” based on his re-specification
13 of my BYRP analysis, as the bond yield increases from 3.18 percent to 3.74 percent
14 to 3.80 percent, Dr. Won’s estimated cost of equity stays the same at 9.34 percent.
15 This clearly highlights the error with Dr. Won’s change to the BYRP analysis.
16 In addition, in calculating the risk premium component of the BYRP, Dr. Won also
17 incorrectly calculates the trend variable. As shown on Dr. Won’s rebuttal workpaper
18 “6 Risk Prem,” there are 121 observations of quarterly authorized ROEs and 30-
19 year Treasury bond yields from 1992 through mid-2022 in my BYRP analysis. For
20 purposes of calculating his trend variable, Dr. Won assumes that the first quarterly
21 observation (*i.e.*, Q1/1992) is designated as 0, and each quarterly observation

⁸² Won Rebuttal Testimony, at 28-29.

1 thereafter is consecutively numbered until the last observation (*i.e.*, Q2/2022), which
2 is designated as 121. Then, to calculate the risk premium based on the current
3 Treasury bond yield and applying the trend variable from his re-specified BYRP
4 equation, Dr. Won assumes that the current Treasury bond yield represents the
5 122nd observation.

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

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

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

3 **IX. Authorized Returns**

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

5 A: Dr. Won states that the Company's requested ROE of 10.20 percent is much higher
6 than the average authorized ROE in electric utility cases completed in the first three
7 quarters of 2022.⁸³

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

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

⁸³ Won Rebuttal Testimony, at 22.

⁸⁴ Bulkley Rebuttal Testimony, at 8-14.

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

8 **X. Business Risk Factors**

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

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

⁸⁵ Won Rebuttal Testimony, at 25.

⁸⁶ Won Rebuttal Testimony, at 23-25.

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

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

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

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

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

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

⁸⁷ *Id.*, at 25.

⁸⁸ Majors Rebuttal Testimony, at 2.

⁸⁹ *Id.*, at 3.

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

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

⁹⁰ Majors Rebuttal Testimony, at 9.

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

6 **Q: Has Dr. Won mischaracterized your testimony?**

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

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

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

⁹¹ *Id.*, at 14.

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

4 **Q: Does this conclude your surrebuttal testimony?**

5 **A: Yes.**

CALCULATION OF LONG-TERM GDP GROWTH RATE

Description	Notes	Years	Amount
<u>Historical GDP</u>			
Real GDP (\$ Billions) [1]	[1]	1929	\$ 1,110.2
		2022	\$ 20,018.0
Compound Annual Growth Rate			<u>3.16%</u>
<u>Projected Inflation</u>			
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	<u>5.26</u>
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	<u>2.27</u>
Compound Annual Growth Rate			2.26%
Average Inflation Forecast			<u>2.27%</u>
Projected Long-Term GDP Growth Rate			<u>5.50%</u>

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

Bulkey As-Filed Direct Testimony			Dr. Won "Adjustments" Corrected		
Estimated Weighted Average Dividend Yield:	1.83%	[1]	Estimated Weighted Average Dividend Yield:	2.12%	[12]
Estimated Weighted Average Long-Term Growth Rate:	11.02%	[2]	Estimated Weighted Average Long-Term Growth Rate:	10.64%	[13]
Estimated S&P 500 Required Market Return:	<u>12.94%</u>	[3]	Estimated S&P 500 Required Market Return:	<u>12.87%</u>	[14]
Historical Market Return (1926-2021) on Large Company Stocks: <u>12.34%</u> [15]					

Name	Ticker	[4] Shares Outstg	[5] Price	[6] Market Capitalization	Bulkey Direct Testimony As-Filed					Bulkey Direct Testimony Excluding Non-Dividend Paying Companies								
					[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.	[16] Weight in Index	[17] Estimated Dividend Yield	[18] Cap-Weighted Dividend Yield	[19] Value Line Long-Term Growth Est.	[20] 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%	0.05%				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%	0.00%				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%	0.03%				
Aptiv PLC	APTIV	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%	0.03%				
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%	0.03%				
Molina Healthcare Inc	MOH	58.70	279.61	16,413	0.06%			11.00%	0.01%				11.00%	0.01%				
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 $[(1) \times (1 + (0.5 \times [2]))] + [2]$
- [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 $[(12) \times (1 + (0.5 \times [13]))] + [13]$
- [15] Krill
- [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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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 (R_m)	Market Risk Premium ($R_m - R_f$)	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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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.	EVERG	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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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.	EVERG	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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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 (R_m)	Market Risk Premium ($R_m - R_f$)	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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[1]	[2]	[3]	[4]	[5]	[6]
		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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[1]	[2]	[3]	[4]	[5]	[6]
		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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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.	EVERG	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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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.	EVERG	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**

$$K = R_f + \beta (R_m - R_f)$$

$$K = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta \times (R_m - R_f)$$

		[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
<u>BULKLEY AS-FILED</u>			
CAPM:			
Current <i>Value Line</i> Beta	11.65%	11.73%	11.73%
Current Bloomberg Beta	11.20%	11.30%	11.31%
Long-term Avg. <i>Value Line</i> Beta	10.47%	10.61%	10.62%
ECAPM:			
Current <i>Value Line</i> Beta	11.97%	12.03%	12.03%
Current Bloomberg Beta	11.64%	11.71%	11.72%
Long-term Avg. <i>Value Line</i> Beta	11.09%	11.19%	11.20%
<u>BULKLEY AS-FILED, except EXCL. NON-DIVIDEND PAYING COMPANIES</u>			
CAPM:			
Current <i>Value Line</i> Beta	11.59%	11.66%	11.67%
Current Bloomberg Beta	11.14%	11.24%	11.25%
Long-term Avg. <i>Value Line</i> Beta	10.41%	10.55%	10.57%
ECAPM:			
Current <i>Value Line</i> Beta	11.91%	11.96%	11.97%
Current Bloomberg Beta	11.57%	11.65%	11.65%
Long-term Avg. <i>Value Line</i> 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

	[1]	[2]	[3]	[4]
Quarter	Average Authorized Electric ROE	U.S. Govt. 30-year Treasury	Trend	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

	[1]	[2]	[3]	[4]
Quarter	Average Authorized Electric ROE	U.S. Govt. 30-year Treasury	Trend	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

<i>Regression Statistics</i>	
Multiple R	0.93240
R Square	0.86937
Adjusted R Square	0.86717
Standard Error	0.00379
Observations	122

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	0.0114	0.0057	395.9789	0.0000
Residual	119	0.0017	0.0000		
Total	121	0.0131			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
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 $0.1188 + (-0.9965 \times \text{Column [4]}) + (-0.002 \times \text{Column [5]})$

[7] Equals $\text{Column [4]} + \text{Column [6]}$

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 $0.1188 + (-0.9965 \times \text{Column [4]}) + (-0.002 \times \text{Column [5]})$

[7] Equals $\text{Column [4]} + \text{Column [6]}$

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)
CITY OF BOSTON) ss
)

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