BEFORE THE
NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

APPLICATION OF
LIBERTY UTILITIES (GRANITE STATE ELECTRIC) CORP.
FOR ADJUSTMENT OF RATES AND CHARGES

DOCKET NO. DE 23-039

DIRECT TESTIMONY
OF
AARON L. ROTHSCHILD

COST OF CAPITAL

ON BEHALF OF THE
NEW HAMPSHIRE OFFICE OF CONSUMER ADVOCATE

December 13, 2023

Contents

I. STATEMENT OF QUALIFICATIONS

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

A. My name is Aaron L. Rothschild. My title is President, and my business address is 15 Lake Road, Ridgefield, CT.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am President of Rothschild Financial Consulting ("RFC").

Q. PLEASE STATE YOUR EDUCATIONAL ACHIEVEMENTS AND PROFESSIONAL DESIGNATIONS.

A. I have a B.A. degree in mathematics from Clark University (1994) and an M.B.A. from Vanderbilt University (1996).

Q. PLEASE DESCRIBE YOUR BUSINESS EXPERIENCE.

A. I performed financial analysis in the telecom industry in the United States and Asia Pacific from 1996 to 2001, investment banking consulting in New York, complex systems science research regarding the power sector at an independent research institute, and I have prepared rate of return testimonies since 2002. See Appendix F for my resume.

My expert witness experience includes testifying in over 75 cost of capital proceedings before the following state commissions: California; Colorado; Connecticut; Delaware; District of Columbia; Florida; New Jersey; Maryland; North Dakota; Pennsylvania; South Carolina; Tennessee; and Vermont. See Appendix G for the list of dockets for each of my testimonies.

Q. ON WHOSE BEHALF ARE YOU PROVIDING THIS TESTIMONY?

A. I am testifying on behalf of the New Hampshire Office of Consumer Advocate ("OCA").

II. PURPOSE

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to address the cost of capital for Liberty Utilities (Granite State Electric) Corp. ("Liberty" or the "Company") which includes the following three components:

1. Cost of Equity ("COE")
2. Cost of Debt
3. Capital Structure

Based on my analysis of these cost of capital components, I recommend an allowed rate of return for ratemaking purposes, including an appropriate authorized return on equity ("ROE"), authorized cost of debt, and authorized capital structure.

Q. PLEASE DEFINE THE COE, COST OF DEBT, AND CAPITAL STRUCTURE.

A.

1. **COE:** My COE recommendation is my opinion of the return investors require to provide equity capital to Liberty based on current capital markets. Since investors must pay the market price of a stock to make an investment, investors' required returns are based on the return they expect to receive on the market price of stocks. In other words, Liberty's COE is forward-looking and "market-based." My recommendation

is consistent with the following legal standards set by the United States Supreme Court for a fair rate of return: (1) "The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks"[1] and (2) "[S]ufficient to . . . support its credit and . . . raise the money necessary for the proper discharge of its public duties."[2]

2. **Cost of Debt:** My cost of debt recommendation is based on the actual cost of debt paid by the utility to its sources of credit. For example, if a utility has issued a bond with a 3% interest rate three years ago, its authorized cost of debt should be 3%, even if interest rates are currently higher or lower than 3%.

3. **Capital Structure:** Capital structure is the percentage of equity and debt that makes up the finances of a utility. For example, if a utility raises $1 million of equity capital and $1 million of debt capital, we say it has a capital structure containing 50% equity and 50% debt. The utility has the burden of proof to demonstrate that its requested capital structure for regulatory purposes produces the lowest, reasonable overall cost of capital. My capital structure recommendation is based on my review of Liberty's justification for its requested regulatory capital structure, the capital structure ratios of other electric utility companies, and the capital structure of Liberty's ultimate parent, Algonquin. As discussed below, the reported capital structure of a regulated subsidiary is often not representative of how the regulated utility was financed. For example, the parent of a regulated utility can report funds raised through debt financing at the holding company level as equity financing on the books of its regulated utility

[1] *Fed. Power Comm'n v. Hope Nat. Gas Co.*, 320 U.S. 591, 603 (1944).
[2] *Bluefield Water Works & Improvement Co. v. Pub. Serv. Comm'n of the State of W. Va.* 262 U.S. 679, 692-693 (1923).

subsidiary. Therefore, it is important to make sure Liberty's authorized capital structure would not overcharge consumers by including a higher common equity ratio than is appropriate.[3]

Q. WHAT IS THE DIFFERENCE BETWEEN LIBERTY'S COST OF EQUITY AND ITS AUTHORIZED ROE?

A. The COE is the market-based return investors expect to earn on the market value of any given stock. In other words, the COE is the return investors expect to earn on the market price of equity. As it applies to this proceeding, it is the return investors require to provide equity capital to Liberty. The appropriate authorized ROE is based on the Commission's determination of the COE at the time of the proceeding, after reviewing the evidentiary record, which incorporates investor expectations. Once the Commission issues an authorized ROE, the market-based cost of equity will continue to fluctuate as capital markets inevitably continue to change. The authorized ROE is based on a snapshot of the COE, which is constantly changing.

Q. PLEASE DEFINE THE APPROPRIATE RATE OF RETURN.

A. The appropriate Rate of Return (ROR) is based upon the weighted overall cost of capital (WACC) of the current costs of debt and equity at the time of this proceeding. The weighted cost rate is calculated by multiplying the capital structure ratios of the sources of capital (debt, preferred equity, and common equity) times their respective cost rates.

WACC = Cost of Debt X Debt Ratio + COE X Common Equity Ratio + Cost of Preferred Equity X Preferred Equity Ratio.

[3] A higher common equity ratio, all else equal, results in higher rates for consumers because equity is more expensive than debt.

Q. CALCULATING THE COST OF EQUITY IS A HIGHLY TECHNICAL TOPIC. HOW CAN A DECISION MAKER WHO IS NOT SPECIALIZED IN FINANCE BEST USE THE CONTENT OF THIS TESTIMONY?

A. My testimony includes a thorough technical analysis, including the use of specialized mathematical models. Models are required to determine the cost of equity like a map is required to plan a road trip. Maps and models are useful because they simplify the complexity and vastness of reality into a form that is understandable and useful. A map of New Hampshire that left out no details would be the same size as the state and thus unusable. A model that included every detail of financial markets (e.g., the trading activity of every single stock investor on earth) would be unusable as well. It is critical to remember that models are simplifications of reality and there are arguably as many "models" as there are investors. My ROE recommendation is based on the best tools I am aware of to calculate Liberty's COE; however, I urge the Commission to test the reasonableness of my model results by comparing them to model results from sources that have nothing to do with this proceeding. For example, I recommend that the Commission consider the long-term equity return expectations of pension funds and leading financial institutions like the ones shown in Table 4 on page 15.

Q. HAVE YOU REVIEWED LIBERTY'S RATE CASE FILING AND DIRECT TESTIMONY?

A. Yes.

III. INTRODUCTION AND SUMMARY OF CONCLUSIONS

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I provide a summary of my recommendations, an overview of cost of equity concepts, and explanation of how current capital markets relate to my cost of equity calculations. Second, I will provide a more detailed discussion of current capital markets and how key parameters are impacting equity costs. Third, I will provide my capital structure and cost of debt recommendation. Fourth, I will provide an explanation of the various models I use in my cost of equity calculations. Fifth, I will provide a credit risk analysis to measure if and to what degree my cost of capital recommendations would impact Liberty's credit rating, cost of debt, and capability to access capital. Lastly, I will provide an evaluation of Liberty's rate of return testimony.

Q. PLEASE PROVIDE A SUMMARY OF YOUR RECOMMENDATIONS.

A. I recommend the following cost of capital for Liberty's electric distribution operations:

- An overall cost of capital of 7.15% (7.08% - 7.21%)
- An ROE of 8.45% (8.31% - 8.60%)
- A capital structure containing 46.12% common equity and 53.88% long-term debt
- A debt cost rate of 6.03%

A summary of my cost of capital recommendations for Liberty's electric distribution operations is presented in Table 1 on page 9.

TABLE 1: ALR RECOMMENDED RANGE MIDPOINT - LIBERTY UTILITIES (GRANITE STATE ELECTRIC) CORP.
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	Capital Structure Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	53.88%	6.03%	3.25%
Short-Term Debt	0.00%	0.00%	0.00%
Preferred Equity	0.00%	0.00%	0.00%
Common Equity	46.12%	8.45%	3.90%
Rate of Return			7.15%

Exhibit ALR-1

If the Commission decides to use Liberty's requested capital structure instead of my recommended capital structure, it would be appropriate to reduce Liberty's authorized ROE because it has lower financial risk. A higher common equity ratio means less debt, a lower chance of financial stress (financial risk), and therefore a lower cost of equity. On the other hand, a lower common equity ratio means more debt, a higher chance of financial stress (financial risk), and therefore a higher cost of equity. Based on a regression analysis of dozens of utility companies, I found a 0.04% reduction in the cost of equity for every 1% increase in the common equity ratio. Applying the results of this regression analysis, I determined that Liberty's authorized ROE should be reduced from 8.45% (8.31% - 8.60%) to 8.10% (7.95% - 8.24%) if their requested regulatory capital structure is used to set rates.

Q. ARE YOU RECOMMENDING A SPECIFIC ROE OF 8.45% OR AN ROE RANGE OF 8.31% TO 8.60%?

A. I recommend both a range of appropriate ROEs and a specific point within that range that I consider to be the most appropriate. It is not possible to measure Liberty's COE with the precision of measuring temperature with a thermometer. However, my recommended ROE range of 8.31% to 8.60% already eliminates the extreme ends of the results of my models

and provides the Commission with a range of ROEs I feel confident will allow Liberty to raise the capital it needs to provide safe and reliable service. I also recommend a specific point of 8.45% within that range that I feel best reflects Liberty's COE.

Q. PLEASE SUMMARIZE HOW YOU DETERMINED YOUR 8.45% COST OF EQUITY RECOMMENDATION FOR LIBERTY.

A. To arrive at my recommendations, I applied the Constant Growth form of the Discounted Cash Flow ("DCF") Model[4] to a proxy group of 17 publicly traded electric utility companies ("RFC Electric Proxy Group")[5] using data available through October 31, 2023. I also used a Capital Asset Pricing Model ("CAPM") analysis as a check on the DCF results, and to ensure the Commission is able to consider how inflation and interest rates are impacting Liberty's cost of equity. I use a proxy group to calculate Liberty's cost of equity because Liberty does not have publicly traded stock data needed for COE models. Additionally, using a proxy group provides a more reliable results because it is less likely to be skewed by specific circumstances or anomalies faced by any individual company.

As shown in Table 2 below, Cost of Equity Model Results, the high-end results of my three cost of equity models, including eight variations of the CAPM, range between 8.13% and 9.45%, with an upper quartile of 8.60%. The low-end results of my three cost of equity models, including eight variations of the CAPM, range between 8.11% and 8.67%, with a lower quartile of 8.31%.

[4] The constant growth DCF model is a variant, or version, of the single-stage DCF model that uses a consistent, never-changing growth rate component in perpetuity.
[5] Rothschild Financial Consulting (RFC).

TABLE 2: COST OF EQUITY MODEL RESULTS		
DCF	**Low**	**High**
Constant Growth - Sustainable Growth	8.32%	8.58%
Constant Growth - Option-Implied Growth	8.67%	9.45%
Non-Constant Growth	8.42%	8.87%
CAPM		
Spot (Oct. 31, 2023)		
Risk Free Rate - 3-Month T Bill	8.52%	8.52%
Risk Free Rate - 30-Yr T Bond	8.40%	8.40%
3-Mo. Weighted Average (Aug. to Oct. 2023)		
Risk Free Rate - 3-Month T Bill	8.30%	8.31%
Risk Free Rate - 30-Yr T Bond	8.11%	8.13%
Outer Quartile Range	**8.31%**	**8.60%**
Midpoint of Range	**8.45%**	

Exhibit ALR-2

Q. ARE YOUR COE MODELS BASED ON ESTABLISHED METHODOLOGIES?

A. Yes. My constant growth DCF model is used by major financial institutions. J.P. Morgan Chase uses the sustainable growth form of the DCF method, as I do, in its 2019 Long-Term Capital Market Assumptions publication.[6] *Principles of Corporate Finance*, a leading financial textbook used in business schools and investment banks around the world, recommends using the very same method I use to calculate the cost of equity for regulated energy utility companies.[7] As discussed in Section V - F. Capital Asset Pricing Model on page 57, my CAPM is based on methodologies used by Value Line, the Chicago Board of Options Exchange (CBOE), and published in peer-reviewed academic journals (e.g., The Review of Financial Studies). My CAPM method has also been recognized by state utility

[6] 23rd Annual Edition, Long-Term Capital Market Assumptions - Time-tested projections to build stronger portfolios, pp. 62-63.
[7] Brealey, Myers, and Allen (2017), Principles of Corporate Finance, 12th Edition, McGraw-Hill Irwin, New York, page 86-87.

commissions. On April 9, 2020, the Public Service Commission of South Carolina stated the following:

> Amongst the three witnesses, Consumer Affairs Rothschild's approach was unique in that he included the use of both historical and forward-looking, market-based data in his analysis. Based on the testimony and facts presented, the Commission therefore adopts the recommended ROE of 7.46% proposed by witness Rothschild.[8]

In California's 2017 Water Cost of Capital proceedings, a company witness acknowledged the validity of RFC's method. California Administrative Law Judge Bemesderfer stated the following:

> [O]n cross-examination Vilbert [California Water Service Company witness] admitted that Rothschild's use of the method [b x r method] was "reasonable" and that Rothschild had "implemented the methodology correctly" in arriving at his Water Proxy Group ROE of 8.25%.[9]

Q. HOW DO YOUR RECOMMENDATIONS COMPARE TO THE RECOMMENDATIONS OF LIBERTY'S WITNESS, MS. BULKLEY AND MR. WALL AND MR. PHIBBS?

A. As shown in Table 3 on page 13, my 8.45% cost of equity and capital structure recommendations result in a 7.15% overall rate of return. Ms. Bulkley and Mr. Wall's 10.35% cost of equity and capital structure recommendations result in an overall rate of return of 8.41%.

[8] Order Ruling on Application for Adjustment in Rates, Docket No. 2019-290-WS, Order No. 2020-306, April 9, 2020, page 43.
[9] Proposed Decision of ALJ Bemesderfer, p.19, Public Utility Commission of California, Application No. 17-04-001 (February 6, 2018).

TABLE 3: RECOMMENDATION COMPARISON - ROTHSCHILD VS BULKLEY AND WALL					
	Cost of Equity	Cost of Debt	Common Equity %	Debt %	Rate of Return
Rothschild [1]	8.45%	6.03%	46.12%	53.88%	7.15%
Bulkley and Wall [2]	10.35%	6.03%	55.00%	45.00%	8.41%

[1] Exhibit ALR-1
[2] Direct Testimony of K. M. Jardin and D. Dane, page 24, Table 2 (Year 1).

I recommend a different ROE[10] for Liberty than its witnesses Ms. Bulkley and Mr. Wall for many reasons.

First, we have different analytical approaches. As discussed above, my COE recommendation is market-based; I use capital market data (e.g., stock prices, bond yields, stock option prices) to calculate the cost of equity. I use capital market data because it reveals investors' expectations, including their expectations regarding future capital market conditions. Current capital markets are forward-looking. On the other hand, Ms. Bulkley and Mr. Wall reject the collective information revealed by the behavior of millions of investors participating in capital markets. They argue it is important to consider "projected market data" (e.g., economist forecasts) because investors may "not expect current market conditions to be sustained in the future."[11] But investors' expectations regarding future capital market conditions are revealed in current capital market data because when investors buy a stock or a bond they care what price they will be able to sell those securities for in the future. Ms. Bulkley and Mr. Wall's method is to prioritize the opinions of a few analysts over the expectations of millions of investors. My market-based methodology is superior to Ms. Bulkley and Mr. Wall's non market-based method because it relies on a

[10] My ROE recommendation is based on Liberty's current market-based COE. As stated previously, the authorized ROE is based on a snapshot of the COE which is constantly changing. In the context of this case my recommended COE and ROE are synonymous.
[11] Ms. Bulkley and Mr. Wall's Direct Testimony, page 13, lines 3-9.

much larger sample size of data, but also because it is based on the expectations of those who provide Liberty the capital it needs, investors.

Second, we disagree on the characteristics of current capital markets and what they mean regarding Liberty's access to financing and cost of capital. Ms. Bulkley and Mr. Wall claim that because the current dividend yields of utility companies are relatively low, it is reasonable to conclude that they will increase, supporting a cost of equity at the high end of DCF model results.[12] The dividend yield of utility stocks is determined by investors because it is based on the price investors are willing to pay for utility stocks in relation to dividends (dividend yield = dividend per share/market price of stock). The dividend yield is currently lower relative to the yield on treasury bonds than average because of decisions made by investors. They have communicated that they require a lower return (dividend yield) to invest in utility stocks than they do on average. If investors needed a higher dividend yield to invest in utility stocks the market price of utility stocks would have already fallen so that the dividend yield matched their return requirements. Ms. Bulkley and Mr. Wall, in essence, argue that Liberty' cost of equity should be increased because it is currently below average, which is extremely unfair to consumers.

Q. PLEASE PROVIDE A SUMMARY OF HOW YOUR COST OF EQUITY RECOMMENDATION COMPARES TO THE RETURN EXPECTATIONS OF MAJOR FINANCIAL INSTITUTIONS.

A. As shown in Table 4 on page 15, major financial institutions are informing their clients to expect returns on the overall market (S&P 500) of 6.4% to 9.5%. As stated above, Liberty's

[12] Ms. Bulkley and Mr. Wall's Direct Testimony, page 23, lines 5-15 and page 25, lines 4-18.

authorized ROE should be based investors' expectations as indicated by capital market data, not the opinions of small groups of people including those of major financial institutions. However, I chose to include the equity return expectations of major financial institutions to encourage the Commission consider why Ms. Bulkley and Mr. Wall's 10.35% ROE is significantly higher than financial mainstream. If there is a good reason for Liberty's COE to be hundreds of basis points higher than the equity return expectations of major financial institutions, I have not seen it.

TABLE 4: U.S. EQUITY RETURN EXPECTATIONS AMONG MAJOR FINANCIAL INSTITUTIONS

Duff & Phelps / Kroll (September 2023) [1]	**9.0%**
Horizon Actuarial Services, LLC Survey - 20 Year Horizon (August 2023) [2]	
U.S. Equity - Large Cap (5.6-10.2%, 50% Percentile - 7.3%)	**7.3%**
U.S. Equity - Small / Mid Cap (5.1-10.9%, 50% Percentile - 7.6%)	**7.6%**
J.P. Morgan Asset Management - Equity Long-Term Returns (2023) [3]	**7.9%**
Charles Schwab - 10-year U.S. Large Cap Returns (January 2023) [4]	**6.4%**

Sources:
[1] Kroll Recommended U.S. ERP and Corresponding RFR to be Used in Computing Cost of Capital: January 2008 - Present, https://www.kroll.com/en/insights/publications/cost-of-capital/recommended-us-equity-risk-premium-and-corresponding-risk-free-rates
Note: Duff & Phelps acquired Kroll in 2021 and rebranded itself as Kroll.
[2] Horizon Actuarial Services, LLC, Survey of Capital Market Assumptions Survey, August 2023, page 18.
Survey participants Include: Bank of New York Mellon, BlackRock, Goldman Sachs Asset Management, J.P. Morgan Asset Management, Merrill, Morgan Stanley Wealth Management, Royal Bank of Canada, UBS.
[3] J.P. Morgan Asset Management - 2024 Long-Term Capital Market Assumptions, 2023, page 12.
[4] Schwab's 2023 Long-Term Capital Market Expectations, January 3, 2023.
https://www.schwab.com/learn/story/schwabs-long-term-capital-market-expectations

The equity return shown in Table 4 above expectations are for the overall stock market (e.g., US Large Cap, S&P 500[13]), which should be higher than the return expectations for utility stocks because regulated monopoly utilities are lower risk than most, if not all, unregulated companies in the S&P 500, like Tesla and Amazon. Therefore, Ms. Bulkley and Mr. Wall's 10.35% ROE recommendation is even more out of line with the financial mainstream than it appears from the numbers presented in this table.

[13] The S&P 500 is a stock market index that includes 500 of the largest U.S. companies, including 11 sectors to show the health of the U.S. stock market and broader economy. The Dow Jones Industrial Average, 30 of the largest U.S. companies, is another commonly used measure of equity markets in general.

Even my cost of equity recommendation of 8.45% (8.31% to 8.60%) for Liberty is in the middle to upper part of the range of these expectations which should give the Commission more confidence that if they adopt my recommendation Liberty will be able to raise the capital it needs to provide safe and reliable service.

Q. DO YOU HAVE ADDITIONAL EVIDENCE THAT MS. BULKLEY AND MR. WALL'S 10.35% ROE RECOMMENDAITON IS HIGHER THAN LIBERTY'S MARKET-BASED COE?

A. Yes. The market-to-book ratios of electric utility companies show that investors expect a market return significantly less than 10.35%. The average future expected return on book equity for the 17 companies in my RFC Electric Proxy Group is 10.30%.[14] If the market price of electric utility stocks was equal to book value then investors could expect to earn a market return equal to about 10.30%. But the market price of electric utility stocks is about two times the book value, which means that investors likely expect to earn significantly less than 10.30% or 10.35%. Appendix A explains why a market-to-book ratio significantly above one means that the market-based COE is significantly less than the expected return on book equity.

Q. PLEASE COMPARE LIBERTY'S REVENUE REQUIREMENT IF YOUR RECOMMENDATIONS ARE ADOPTED INSTEAD OF MS. BULKLEY AND MR. WALL'S.

A. If my 8.45% cost of equity recommendation and capital structure recommendation are used to set rates for Liberty, the rate of return portion of the revenue requirement will be about

[14] Exhibit ALR-3, page 1. Ms. Bulkley and Mr. Wall and I use the same proxy group.

$16.9 million. On the other hand, if Ms. Bulkley and Mr. Wall's 10.35% cost of equity recommendation and capital structure recommendation are used to set rates, the rate of return portion of the annual revenue requirement will be $20.7 million. As shown in Table 5 below, if Ms. Bulkley and Mr. Wall's rate of return recommendations are adopted instead of mine, consumers will pay approximately $3.81 million more per year.

TABLE 5: ANNUAL REVENUE IMPACT VS. REQUESTED - LIBERTY UTILITIES (GRANITE STATE ELECTRIC) CORP.
($ million)

	Rate of Return Portion of Revenue Requirement	Difference Bulkley and Wall Rothschild
Rothschild	$16.93	
Bulkley and Wall	$20.74	$3.81

Source/Inputs:		
Requested Rate Base [1]	$	195.9
Federal income tax rate		21.00%
State income tax rate		7.50%
Uncollectable Expense		1.03%

[1] Direct Testimony of K. M. Jardin and D. Dane, Attachment KMJ/DSD-1.

Q. YOU RECOMMEND THAT LIBERTY SHOULD BE AUTHORIZED TO EARN AN ROE EQUAL TO ITS MARKET-BASED COST OF EQUITY OF 8.45% (8.31% TO 8.60%). PLEASE EXPLAIN MORE REGARDING THE IMPORTANCE OF DETERMINING THE MARKET-BASED COE AS ACCURATELY AS POSSIBLE.

A. As discussed above, Liberty's authorized ROE should be in line with its market-based COE. In other words, the cost of equity is the return investors expect to earn when they purchase the equity (or stock) of a company. The return investors expect can come in the form of capital gains (stock price appreciation) or dividend payments. As investors buy and sell stock in the market, they convey information about their return expectations and therefore the underlying cost of equity (companies with different risk profiles will have different costs of equity). It is impossible to determine the cost of equity based on accounting information alone (e.g., revenue, net income, equity book value, or return on

book equity) as it can only be established by capital market prices (e.g., stocks, stock options).

It is important that the cost of equity used to set rates for Liberty in this proceeding be market-based. This makes sense because investor-owned utility companies ("IOUs") raise money from investors. It is thus critical that the authorized ROE be consistent with the market return expectations of investors.

Q. DO ANY ROE WITNESSES USE A DIFFERENT DEFINITION FOR THE COST OF EQUITY?

A. All ROE witnesses I have encountered over my more than 20 years in the industry, including Ms. Bulkley and Mr. Wall, define the cost of equity as market-based somewhere in their testimony. Ms. Bulkley and Mr. Wall correctly state that "the cost of equity is market-based and, therefore, must be estimated based on observable market data."[15] However, as discussed above Ms. Bulkley and Mr. Wall's approach significantly relies on the personal opinions of equity analysts in both their CAPM and DCF analysis instead of the supply and demand of stocks and bonds as indicated by market data. Calculating the cost of equity should be an interpretive approach (i.e., using market data to measure investors' expectations as Ms. Bulkley and Mr. Wall did in some parts of their testimony) rather than a speculative one (e.g., using interest rate forecasts instead of investors' expectations as revealed in the market yield).

[15] Ms. Bulkley and Mr. Wall's Direct Testimony, page 31, lines 8-9.

Q. IS YOUR MARKET-BASED COST OF EQUITY RECOMMENDATION BASED ON YOUR OPINION OF FUTURE STOCK PRICE RETURNS?

A. No. I do not pretend to be able to predict the future. Capital markets are unpredictable and, as explained above, it is investors' expectations that matter since they are the ones providing the capital. Therefore, I provide an expert interpretation of investors' return expectations as indicated by the current market prices of stocks, bonds, and stock options, without attempting to predict future prices. This is an important topic that I will revisit throughout my testimony.

I do use Value Line and Zacks analyst forecasts to estimate the market-based cost of equity in my Discounted Cash Flow (DCF) analyses. However, I do not use them mechanically and I go to great lengths to distill the sustainable growth component to ensure it is in line with investors' long-term expectations, including using a DCF model that is based only on market data (stock option prices). My Capital Asset Pricing Model (CAPM) is based on a direct measurement of investors' expectations as indicated by market prices instead of analyst forecasts, which have proven to be unrealistic. As discussed on page 83, McKinsey & Company found that analysts have been over optimistic for decades.

Q. YOU STATED ABOVE THAT ROES AUTHORIZED IN OTHER PROCEEDINGS SHOULD NOT BE USED TO SET THE AUTHORIZED ROE IN THIS PROCEEDING. CAN YOU ELABORATE ON WHY PREVIOUS PROCEEDINGS' ROES ARE NOT AN APPROPRIATE GAUGE FOR LIBERTY'S COE?

A. Past authorized ROEs are applied to rate base, which is nearly identical to book value. In other words, they are accounting returns. We are not trying to determine what investors

expect the return on book value to be. We are trying to determine the return investors expect/require on the market price of stock.

As discussed in Appendix A, when the market to book ratio of an electric utility company is significantly above one, as it is now,[16] it indicates that their COE is lower than their authorized ROE.[17]

In his 1970 book *The Economics of Regulation: Principles and Institutions*, regulatory economist Alfred Kahn wrote on why the cost of equity is lower than authorized returns when market to book ratios are significantly above one, saying:[18]

> [T]he sharp appreciation in the prices of public utility stocks, to one and half and then two times their book value during this period, reflected ... a growing recognition that the companies in question were in fact being permitted to earn considerably more than their cost of capital. ... The source of the discrepancy between market and book value has been that commissions have been allowing r's [returns on equity] in excess of k [market cost of equity]; if instead they had set r equal to k, or proceeded at some point to do so ... the discrepancy between market and book value ... would have disappeared, or would never have arisen.

A utility company's COE should not be based on authorized ROEs, which are accounting returns. The COE is set based on what investors in the market expect for a given risk profile. In the case of a utility stock, an increasing market value results in a lower return on market for the same expected return on book, all else equal.

[16] See Exhibit ALR-3, page 1. The market to book ratios of the companies in my proxy group averaged 1.77 over the year ending October 31, 2023.
[17] An authorized ROE is applied to rate base, which is nearly identical to the return on the book value of equity; therefore, authorized ROEs are nearly identical to return on book equity.
[18] Alfred Kahn, *The Economics of Regulation: Principles and Institutions*, Mass. Inst. Tech. at 48 (fn. 69), 50 (1970).

IV. COST OF EQUITY IN TODAY'S FINANCIAL MARKETS

Q. WHY DO YOU CONSIDER CAPITAL MARKETS IN GENERAL?

A. My COE models are designed to reflect capital market conditions. However, it is important to "cross-check" the model results because capital markets are complicated. I consider capital market data in general like a ship captain might use visual landmarks, compare them with electronic navigation aids like GPS, and cross-reference with nautical charts to confirm their position. This process of cross-checking helps to identify and correct any discrepancies or errors in any single source. For example, if capital market data indicate that investors expect the cost of equity to decline over a time frame that is outside of the data that I use in my models, a downward adjustment to COE model results might be necessary.

Q. PLEASE SUMMARIZE CAPITAL MARKET DEVELOPMENTS THAT IMPACT THE COST OF EQUITY.

A. Market developments that have impacted the cost of equity include:

1. **Inflation and interest rates.** The Federal Reserve has increased short-term interest rates (the Federal Funds rate) from near 0% to 5.04% as of October 31, 2023 to fight inflation. Long-term interest rates have increased as well. However, inflation data released on November 14, 2023, indicated that inflation may finally be under control. As shown on Chart 2 on page 26, investors had already been expecting the Federal Reserve to start lowering the federal funds next year, but these expectations came down even further after the inflation data was released on November 14, 2023. Chart 2 shows that as of October 2, 2023, investors expected the Fed to reduce the Federal Funds Rate to about 4.25% by June 2026. As of November 15,

2023, after the inflation data was released, they expected the Fed to reduce this rate to about 4.0%. As shown on Chart 3 and Chart 5 starting on page 28, investors expect inflation to decrease sharply over the next few years and long-term interest rates to remain near current levels in coming decades.

2. **Stock price performance.** Electric utility stocks have been underperforming the overall market for some time, as shown in Chart 6 on page 31. All else being equal, this normally indicates an increasing COE.

3. **Stock price volatility, expected return on the overall market, and market risk premium**. As shown on Chart 9 on page 36, investors' volatility expectations for the overall market decreased considerably between October 2022 and September 2023, nearing historical lows in June and July 2023. Despite a spike in late September and early October 2023, market volatility expectations remain significantly lower than the highs of October 2022. This lower market volatility translates into lower expectations for overall market returns, and therefore a significantly lower market risk premium – considerably beyond the low levels that may have been expected due to the increasing risk-free rate. In fact, this decrease in the market risk premium more than offsets the effect of the first two factors listed above and has led to a lower cost of equity today than in late 2022.

4. **Probability of a large stock price drop (Option Implied Skewness).**[19] As shown in Chart 11 on page 39, investors' expectations regarding the chance of a large drop in utility stock prices remain significantly below those for the overall market, which

[19] Option-implied skewness represents investors' expectations regarding the asymmetry of the probability distribution for stock price movements. Option-implied skewness is further discussed in Section IV. D. Investor-Perceived Downside Risk (Option-Implied Skewness).

indicates that the relative cost of equity for electric utility companies remains low and has decreased relative to the overall market since late 2022.

5. Term Structure of COE. Despite concerns regarding inflation and increasing interest rates, market data indicate that investors expect the COE for the broader market and utility companies to remain fairly stable in the future. A stable term structure of COE is a good sign that electric utility companies, including Liberty, will be able to raise the capital they need to fund assets with long useful lives at a reasonably low cost of equity.

I elaborate on each of the points above in the following sections.

A. Inflation and Interest Rates

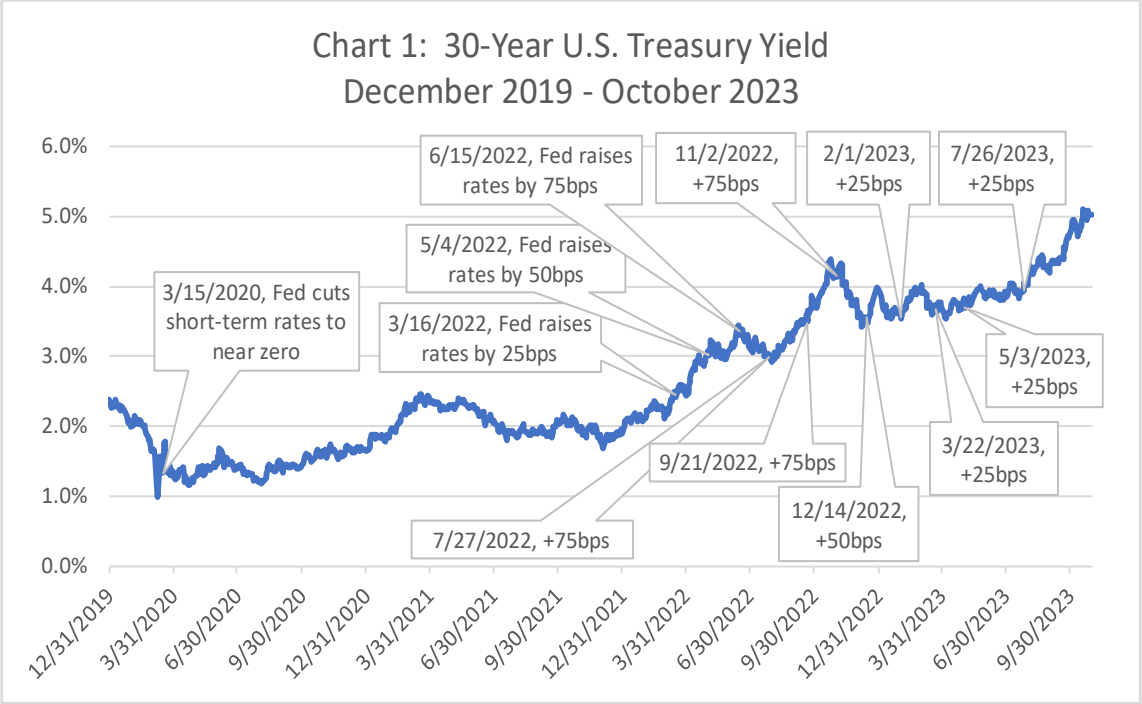
Q. PLEASE DISCUSS THE CURRENT INFLATION AND INTEREST RATE ENVIRONMENT AND WHAT IT INDICATES REGARDING THE COST OF EQUITY.

A. Starting in March 2022, the Fed has increased the benchmark federal-funds rate by a cumulative 5 percentage points (i.e., 25 basis points) to a 22-year high. As of November 30, 2023, the benchmark rate is 5.25% to 5.50%. In its last meeting in November 2023 the Fed decided to leave the federal funds target rate unchanged but explained that it was prepared to continue rate increases if risks emerge that could impede its goal of returning inflation to its 2 percent objective"[20] However, inflation data released on November 14, 2023, made it likely that inflation is finally under control and the Fed will probably start to cut interest rates in 2024. Neil Dutta, director of economic research at Renaissance Macro

[20] Federal Reserve press release, November 1, 2023.

Research LLC, told Bloomberg Television. "The data's lining up, and we're on a glide path now to a rate cut—probably by March."[21]

The Federal Funds rate is important because it can impact the cost of long-term borrowing and the cost of equity. As shown in Chart 1 below, the yield on the 30-year U.S. Treasury bond has increased along with the Federal Funds rate, increasing from 2% at the start of 2022 to 5.04% as of October 31, 2023. As discussed above, the cost of equity has increased along with the Federal Funds Rate and the yield on Treasury Bonds, but not one for one. As elaborated upon starting on page 39, market data indicate that investors expect the cost of equity to remain relatively low over the coming years.



Higher inflation can impact the cost of equity because it can impact interest rates. Higher interest rates, all else equal, generally indicate a higher cost of equity for electric

[21] After So Many False Dawns, the Market Is Convinced the Fed Will Finally Cut, December 7, 2023. https://www.bloomberg.com/news/articles/2023-12-07/traders-bet-big-on-rate-cuts-even-after-being-wrong-before?utm_campaign=news&utm_medium=bd&utm_source=applenews

utility companies because fixed income investments become relatively more attractive when they start paying a higher rate (e.g., a bond with an interest rate of 3% is more attractive to investors, all else equal, than when they are paying a 2% rate). However, as discussed above the cost of equity for utility companies has likely been decreasing because the cost of equity for the overall market has been declining. Additionally, the Commission can be confident that the 8.45% COE I calculated reflects interest rate changes because it is based on market data, including the changing market yields on government bonds.

There is a lot in the news regarding the economic consequences of high inflation, including how it could impact capital markets and the cost of equity. As explained previously in this testimony, the cost of equity should not be based on the forecasts of economists, but on investors' return expectations because investors are the ones providing the capital.

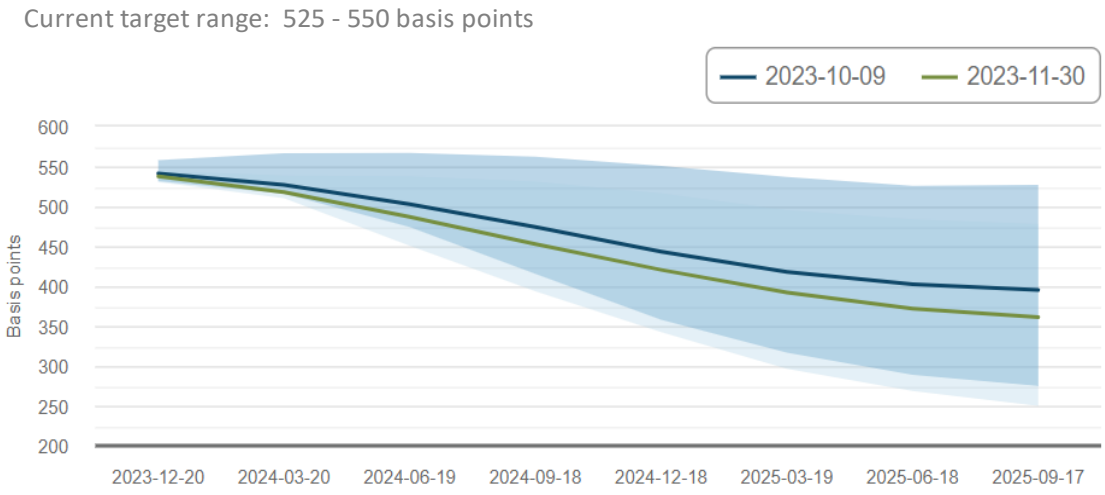
Q. WHAT DOES MARKET DATA INDICATE REGARDING INVESTORS' CURRENT INFLATION AND INTEREST RATE EXPECTATIONS?

A. As shown in Chart 2 on page 26, the Federal Reserve Bank of Atlanta estimated that as of October 2, 2023, investors expect the three-month average Federal Funds rate[22] will most likely decrease from its current range of 5.25%-5.50% to an expected value of under 4% by around Juen 2025, continuing to fall slightly through June 2026. I use the Federal Reserve Bank of Atlanta market-implied probabilities because it is based on investors' expectations as indicated by option prices, future prices, and swap spreads. As discussed considerably above, market-based expectations like those provided by the Federal Reserve

[22] The Federal Funds rate guides overnight lending among U.S. banks, but this short-term rate impacts the interest rates on debt with longer maturities.

Bank are more appropriate to consider when calculating the cost of equity than economist/analyst projects for many reasons.

Chart 2: Investors' Federal Funds Rate Expectations
Three-Month Average SOFR Path as of Nov. 30, 2023



Source: Federal Reserve Bank of Atlanta

Q. YOU STATED THAT THE FEDERAL RESERVE BANK OF ATLANTA USES MARKET DATA TO CALCULATE INVESTORS' EXPECTATIONS REGARDING THE FEDERAL FUNDS RATE. IS THERE A WAY TO MEASURE INVESTORS' INFLATION AND LONG-TERM INTEREST RATE EXPECTATIONS AS WELL?

A. Yes. Regarding inflation, it is possible to measure investors' expectations directly simply by subtracting the interest rate of nominal Treasuries and TIPS (Treasury Inflation - Protected Securities) of comparable maturities. This difference is referred to as the "breakeven inflation rate" because it represents what inflation would have to be for an investor to "break even" or make the same return on both nominal Treasuries and TIPS. For example, if the yield on a nominal 10-year Treasury is 2.5% and TIPS of the same

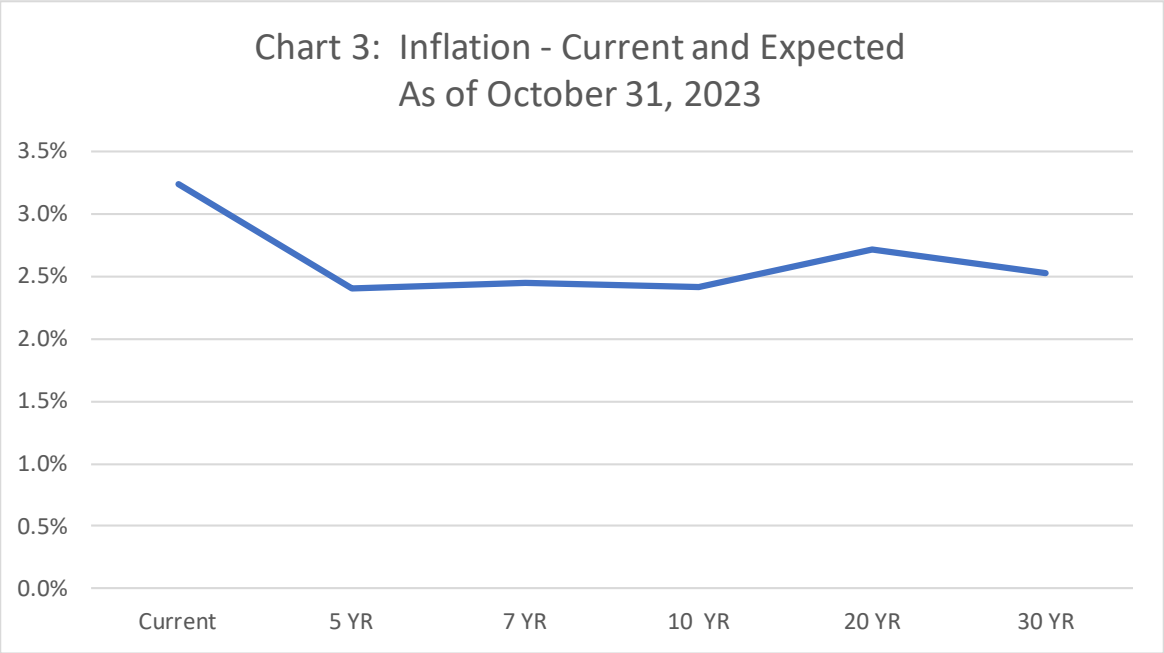
duration are 1.5%, an investor would make the same real return on both bonds if the inflation rate is 1% over the next 10 years.

Nominal yield – real yield = breakeven inflation rate

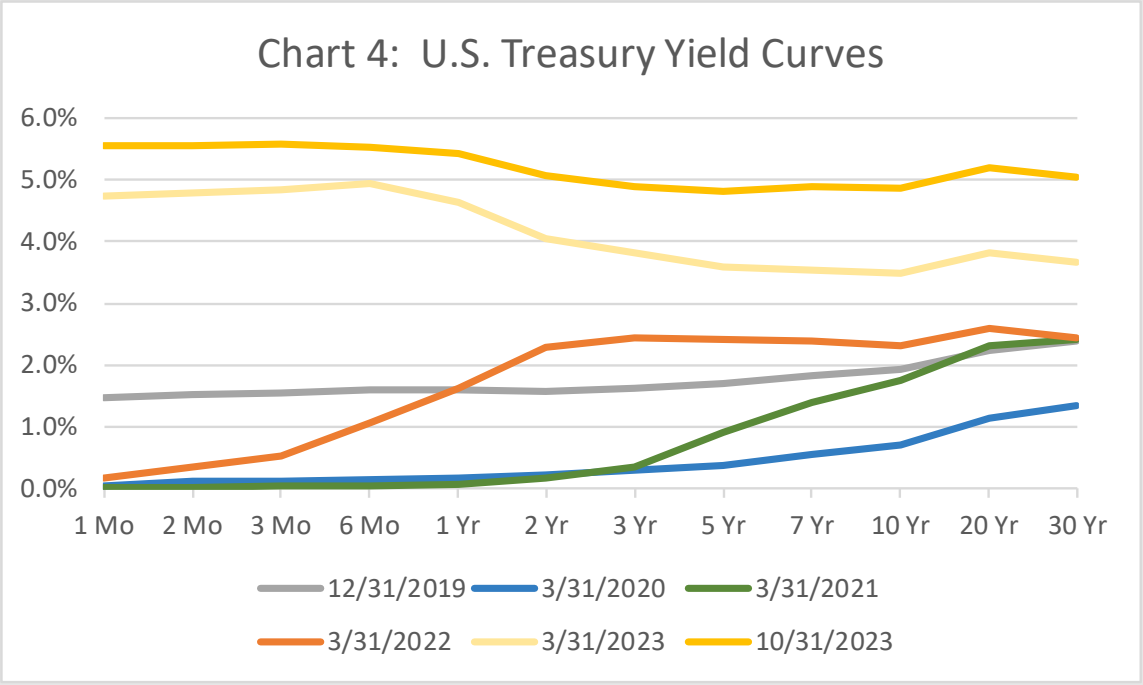
In this case, investors' breakeven inflation rate is 1% (2.5% - 1.5% = 1%).

It makes sense that investors' inflation expectation is equal to the breakeven inflation rate because if investors, on average, believed that inflation was going to be 10%, in the example above, they would buy TIPS and expect to make exceptional profits. The investor who purchases TIPS would earn 1.5% + 10% inflation = 11.5%. The investor who purchased the nominal Treasury would lose 7.5% (2.5% yield — 10% inflation rate). With such large relative returns to be made buying TIPS in this hypothetical example, investors would bid up the price of TIPS and drive down the yield until investors expect the same real return on nominal Treasuries and TIPS. And in this way, the relationship between the market yields on TIPS vs. nominal Treasury bonds is a self-balancing safe measurement of investors' expectation of inflation.

As indicated by the difference between nominal-treasuries and TIPS, Investors expect the FED's actions will reduce the inflation rate substantially in the coming years. As shown on Chart 3 on page 28, the relative market price of inflation-protected bonds as compared to regular Treasury bonds as of October 31, 2023, indicates that investors expected the inflation rate to decline from the current 3.7% to only 2.40% over the next 5 years and about 2.50% over the 30-year horizon.



Regarding interest rates, it is possible to use the yield curve to calculate investors' expectations regarding future interest rates. An upward sloping yield curve indicates investors expect higher interest rates and a downward sloping yield curve indicates investors expect lower interest rates in the future. In 2022, the yield curve went from upward sloping to mostly flat. As shown in Chart 4 on page 29, the yield curve went from being significantly upward sloping on March 31, 2021 to mostly downward sloping as of October 31, 2023.



Consistent with a declining yield curve, Chart 5 on page 30 shows that as of October 31, 2023, investors expected long-term interest rates (10-year U.S. Treasury Bond) to decline slightly over the next 20 years, increasing from 4.88% as of October 31, 2023 to 5.54% over the next ten years and then falling to 4.70% over the 20-year time frame. However, since the end of October, the yield on the 10-year Treasury Bond has declined to 4.22% as of December 1, 2023.[23]

[23] https://home.treasury.gov/resource-center/data-chart-center/interest-rates/TextView?type=daily_treasury_yield_curve&field_tdr_date_value=2023

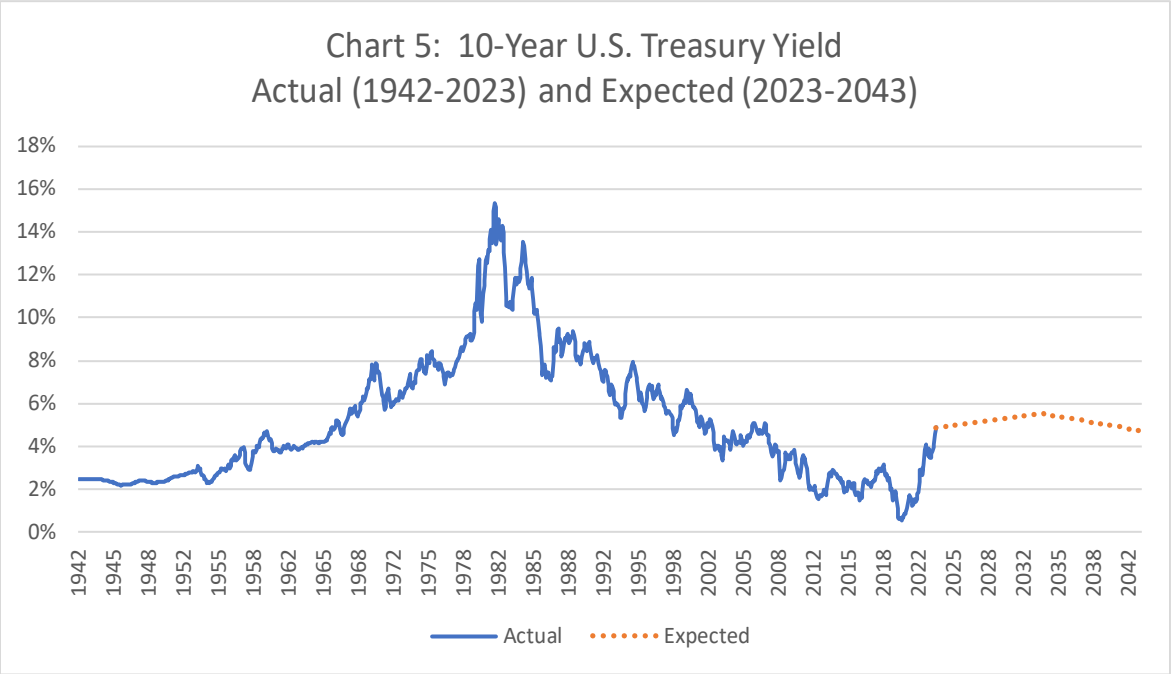


Chart 5 above also shows that although long-term interest rates have increased in recent months, they remain below interest rates from the 1970s and 1980s when the yield on the 10-year U.S. Treasury bond climbed over 14%.

Q. HOW DO YOU RESPOND TO PEOPLE WHO CLAIM THAT INTEREST RATES WILL REMAIN HIGH?

A. It is important to recognize that current long-term Treasury bond yields represent a direct observation of investor expectations and there is no need to use "experts" to determine market-based cost of equity.

Many economists and forecasters will continue to be quoted in the press prognosticating on possible developments that are truly unpredictable. The Nobel Laureate Economist Daniel Kahneman stated the following regarding forecasting:

> It is wise to take admissions of uncertainty seriously, but declarations of high confidence mainly tell you that an individual

has constructed a coherent story in his mind, not necessarily that the story is true.[24]

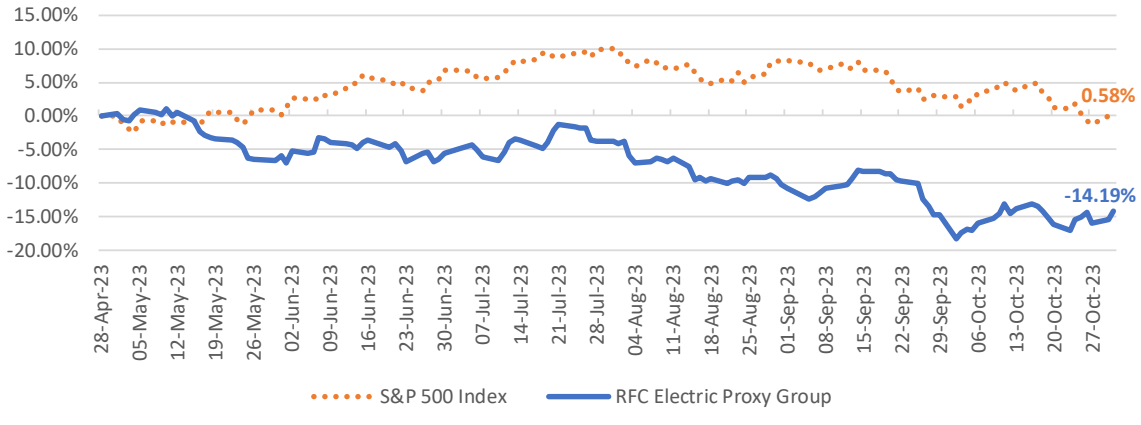
I highly recommend that the Commission consider that capital markets are highly unpredictable, and it is possible that interest rates will increase, remain the same or decrease in the future. Consumers rates should be based predominantly on investors' expectations as indicated by capital market data. While incorporating economists' opinions can be valuable to an extent, it is crucial to recognize our fallibility regarding predicting capital market behavior, including what interest rates will be next year.

B. Stock Price Performance

Q. HOW HAVE UTILITY STOCKS PERFORMED DURING THIS TIME OF HIGH INFLATION AND INCREASING INTEREST RATES?

A. As shown in Chart 6 below, as of October 31, 2023, the S&P 500 is up 0.58% for the last six months while the Utility Proxy Group is down 14.19%.

Chart 6:
RFC Electric Proxy Group Portfolio Performance vs. S&P 500 Index
April 28 to October 31, 2023



[24] DANIEL KAHNEMAN, *Thinking Fast and Slow*, p. 212 (2011).

Q. DO DECREASING ELECTRIC UTILITY STOCKS MEAN A HIGHER COST OF EQUITY?

A. All else equal, declining utility stocks can indicate an increasing cost of equity. In this case market data indicates that the cost of equity for utility stocks increased somewhat along with raising interest rates, but not nearly as much as the increase in the yields on U.S. Treasury Bonds. Additionally, market data indicates that the COE for utility companies has been mostly declining in 2023 despite the relative underperformance of utility stocks. The Wall Street Journal reported that common financial ratios (price-to-earnings ratios) indicate that utility stocks are relatively expensive. In other words, investors remain willing to receive a lower expected return on their equity investments when investing in utility stocks than for the average company in the S&P 500.

C. Volatility Expectations

Q. PLEASE DISCUSS CURRENT STOCK PRICE VOLATILITY EXPECTATIONS AND WHAT THEY INDICATE REGARDING THE COST OF EQUITY.

A. Volatility, uncertainty, and risk are synonymous. There are two primary types of volatility: "realized volatility" and "implied volatility." The former is based on historical returns, which may or may not represent future volatility. On the other hand, implied volatility is calculated from options data, which indicates investors' future expectations for volatility. As discussed below, the "term structure" of volatility indicates investors' volatility expectations over different forward-looking time periods (i.e., 1 month, 1 year, etc.).

Q. PLEASE EXPLAIN THE "TERM STRUCTURE OF VOLATILITY."

A. Investors can expect volatility to increase or decrease over time. In general (i.e., in "normal" financial markets), investors expect higher volatility for longer time horizons.

For example, investors generally expect the chance stock prices will increase or decrease by 10% in 1 year to be greater than the chance of a 10% (annualized) move over the next 30 days. This makes sense because there is more uncertainty regarding economic and stock market changes the further in the future you look out.

However, during the height of a crisis, when volatility generally tends to rise in the short-term, investors often expect volatility to decrease in coming months or years. In other words, investors expect the current capital market hurricane to pass and the winds to die down. During the peak of implied volatility in mid-March 2020, shortly after the World Health Organization declared COVID-19 a pandemic, the data indicated that investors expected stock price volatility to decrease over time. This implies that investors expected the riskiness of equity investments to decrease over time. As shown in Chart 7 on page 34, before the COVID-19 outbreak, investors expected volatility to increase from less than 15% annually at the 1-month time frame to about 20% annually at the 24-month time frame. Investors' volatility expectations peaked in March 2020. At that time, investors expected stock price volatility would decrease from over 70% at the 1-month time frame to about 38% at the 24-month time frame. Chart 7 also shows that investors' volatility expectations were higher for all time frames when Russia invaded Ukraine as compared to 2021, but as of October 31, 2023 volatility expectations have dropped back to 2021 levels.

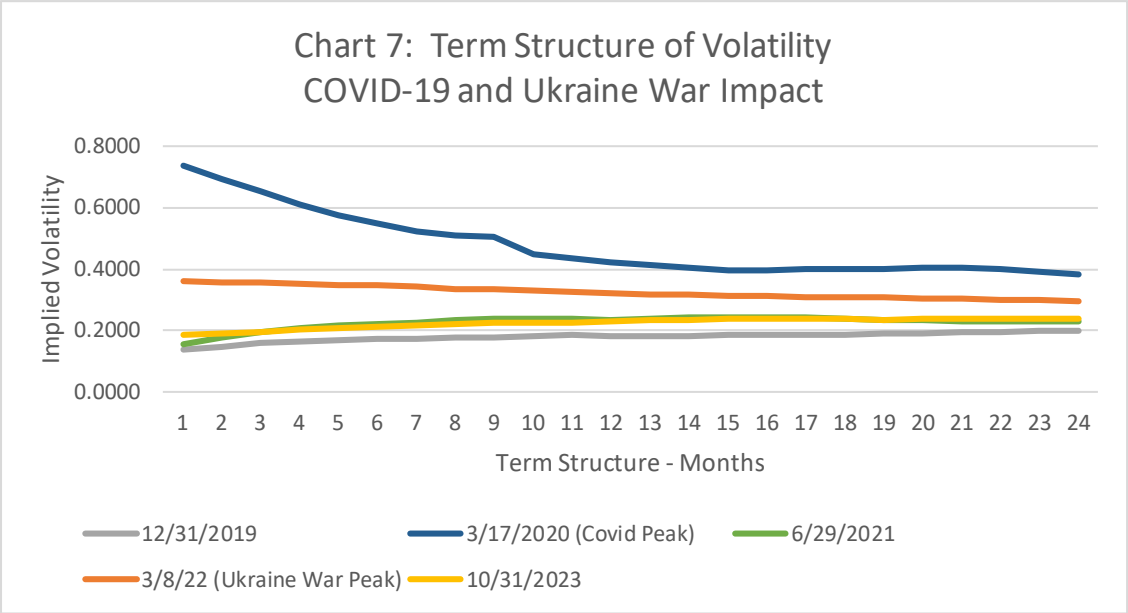
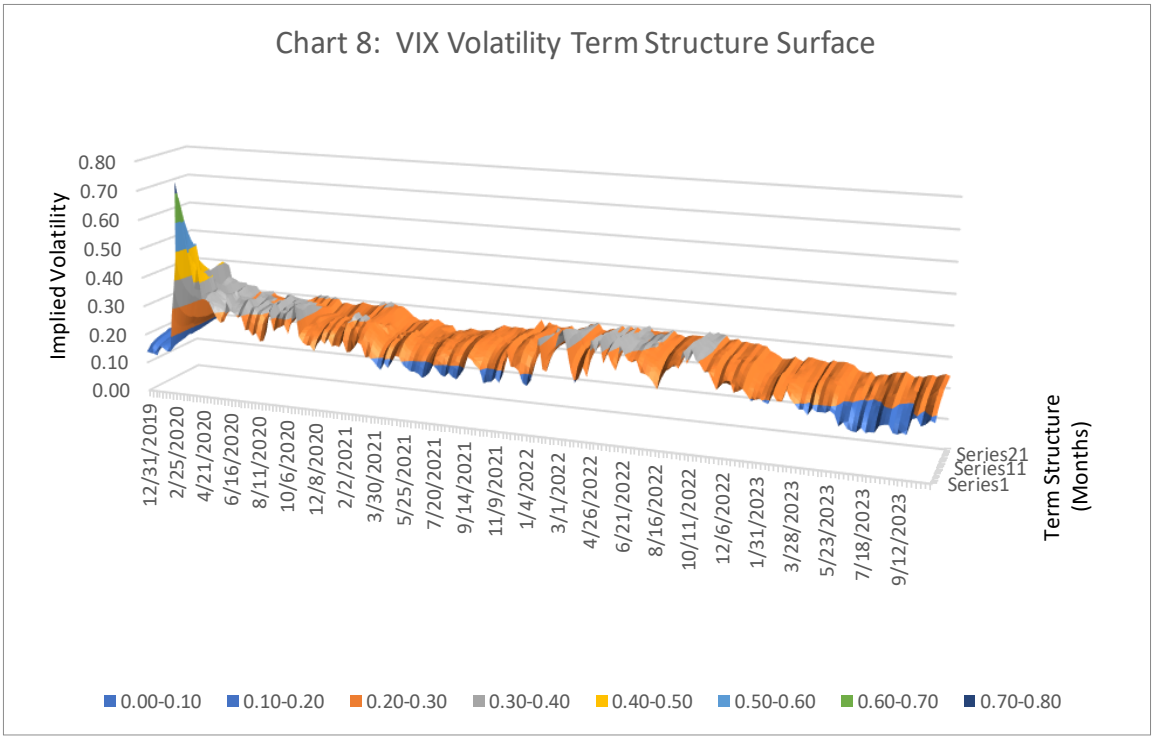


Chart 8 on page 35 provides a 3-dimensional surface[25] to show how the term structure of volatility has evolved since before the COVID-19 outbreak and how it has changed during and since the outbreak. Chart 7 above is simply five selected cross sections of the same data in the surface in Chart 8. In the surface chart, one can see that on 12/31/2019, the term structure of volatility is almost flat, increasing slightly from the 1-month to the 24-month time frame. In mid-March 2020, the implied volatility increased over every time period in comparison to 12/31/2019, but one can see that investors expected a declining term structure of volatility. By the end of July 2020, the implied volatility for all time periods had decreased, and the declining term structure moved to a more typical structure in which investors expected higher volatility over longer time periods. As of the end of 10/31/2023, the term structure of volatility is now slightly increasing over the 24-month time frame.

[25] The X axis shows the implied volatility. The Y axis shows the data. The Z axis shows market expectation of future implied volatility of different time frames. Series1 = 1 month and Series24 = 24 months.

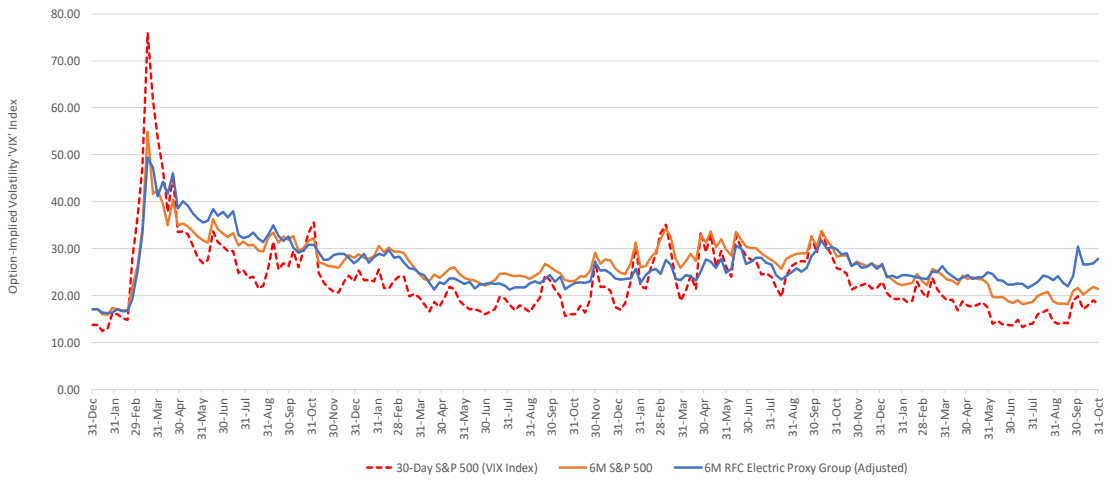


Q. HOW HAVE VOLATILITY EXPECTATIONS FOR ELECTRIC UTILITY COMPANIES COMPARED TO VOLATILITY EXPECTATIONS FOR THE S&P 500?

A. The solid orange line in Chart 9 on page 36 shows investors' stock price volatility expectations for the overall market (S&P 500) increased significantly as COVID-19 infections spread to the U.S. and continued to grow exponentially around the world. The solid orange line shows volatility expectations over the next 6 months. On 12/31/2019, investors expected an annualized change of 13.78% over the next 30 days. In mid-March 2020, investors' volatility expectations peaked at over 80% (on March 16, 2020, a point not actually shown on the chart, which has weekly data on Tuesdays). As of the end of 10/31/2023, investors expect an annualized change of 18.14%.

The blue line in Chart 9 shows that investors' adjusted[26] 6-month volatility expectations for my RFC Electric Proxy Group, as indicated by their stock option prices, increased along with the market in mid-March 2020, but to a significantly lesser degree. Investors' 6-month adjusted volatility expectations for electric utility companies were higher than for the S&P 500 for the most part from May through August 2020, remained very comparable through March 2020, and have increased about the expectations for the market since then through the end of 10/31/2023.

Chart 9: RFC Electric Proxy Group 6-Month 'VIX' Index Equivalent
December 2019 through October 2023



As discussed above, changes in implied volatility do not paint the full cost of equity picture. We must consider implied covariance, or how much investors expect the volatility of returns for electric utility companies to correlate with the overall market (e.g., S&P 500 Index).

[26] The implied volatility for individual stocks and small groups of stocks is almost always higher than the overall market because of the effects of diversification, even when the underlying stocks in the smaller portfolio are less risky, as is the case with electric utility companies. As a result, Chart 9 adjusts the 6-month expected volatility for the RFC Electric Proxy Group by the difference with the 6-month expected volatility for the S&P 500 Index on 12/31/2019 to facilitate the comparison throughout the chart.

D. Investor-Perceived Downside Risk (Option-Implied Skewness)

Q. YOU EXPLAINED EARLIER THAT ELECTRIC UTILITY STOCKS OUTPERFORMED THE OVERALL MARKET IN 2022. DO STOCK OPTION DATA SHOW THAT INVESTORS MAY FIND ELECTRIC UTILITY STOCKS RELATIVELY ATTRACTIVE BECAUSE INVESTORS BELIEVE THERE IS A LOWER RISK OF A LARGE DROP IN THE SHARE PRICE OF ELECTRIC UTILITY STOCKS THAN THE OVERALL MARKET?

A. Yes. Stock option prices provide considerable information regarding investors' expectations. The most well-known measure of investors' expectations as measured by stock option prices is the VIX Index (or Volatility Index). The VIX Index is a measure of investors' volatility expectations and is referred to as the "fear index" because, all else equal, higher volatility expectations indicate higher uncertainty, risk, and scared investors.[27] However, volatility expectations are only one piece of a multi-dimensional puzzle that reveals the market-based cost of equity. After volatility expectations, the next dimension to explore (referred to as the "third moment" in statistics) is skewness. Option-Implied skewness reflects investors' expectations regarding the asymmetry of the probability distribution.

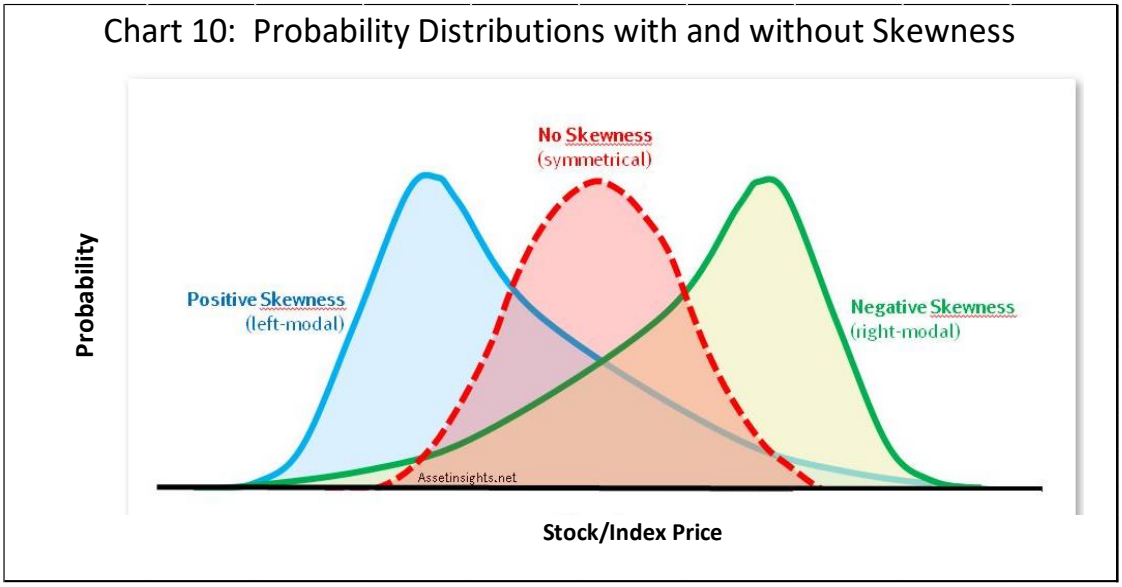
Option-implied probability distributions are almost always negatively skewed for stock market indexes (e.g., S&P 500) and individual stocks, which means that investors almost always think there is a greater chance of a large decrease in stock prices than large

[27] Some investors like high volatility because it provides the opportunity to earn a lot of money quickly if the market moves in their favor. For example, an investor that shorts Microsoft, will make a lot of money if the stock drops by a large amount. However, investors who buy utility stocks generally prefer low volatility and low risk.

increases. The Chicago Board of Options Exchange ("CBOE") also publishes an index based on option-implied skewness referred to as the SKEW Index.

As shown in Chart 10 below, the probability distribution that is negatively skewed has a tail that is longer on the left. A probability distribution with positive skewness has a longer tail on the right. The right and left tails of a probability distribution with no skewness are symmetrical. If the option-implied skewness looked like the red probability distribution in Chart 10 below it would mean that investors believed there was an equal chance that stock prices would move up or down by a certain amount.

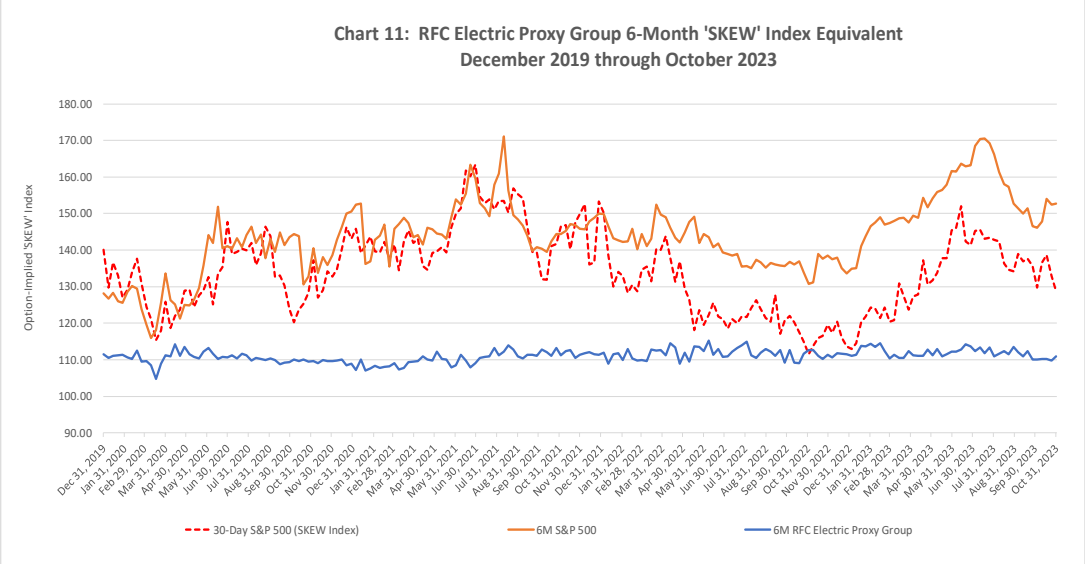
Chart 10: Probability Distributions with and without Skewness



Q. WHAT DOES THE SKEW INDEX REVEAL REGARDING THE IMPACT OF THE COVID PANDEMIC AND THE WAR IN UKRAINE ON LIBERTY'S COST OF EQUITY?

A. As shown in Chart 11 on page 39, comparing the SKEW Index to an equivalent metric based on electric utility company stock options indicates that as 2023 comes to a close, investors have expected the chance of electric utility stocks suffering from a large drop in investment is much lower than their expectations the overall market will experience a large

drop. This indicates the cost of equity for electric utility companies has likely remained significantly lower relative to the overall market as interest rates have increased.



E. Term Structure of Beta Coefficients and COE

Q. ON PAGE 14, LINES 7-8 OF THEIR DIRECT TESTIMONY, MS. BULKLEY AND MR. WALL ARGUE IS REASONABLE TO EXPECT THAT INVESTORS' REQUIRED RETURN FO UTILITY COMPANIES WILL ALSO CONTINUE TO INCREASE.. PLEASE RESPOND.

A. As discussed above, I would agree that the COE for electric utility companies has increased since November 2021. However, capital market data show that their COE has been declining in recent months and investors expect the COE to remain relatively stable in the future.

Q. PLEASE EXPLAIN HOW YOU DETERMINED THAT INVESTORS EXPECT THE COE FOR ELECTRIC UTILITY COMPANIES TO REMAIN RELATIVELY FLAT IN THE FUTURE.

A. Investors can expect the cost of capital (both, debt and equity) to increase or decrease over time. How the cost of capital changes based on different investment horizons is referred to as its "term structure." This fundamental concept is easy to understand by thinking about mortgage interest rates. Any homeowner knows that the interest rate on a 30-year mortgage will almost always be higher than that of a 10-year mortgage. Along the same lines, rate of return witnesses sometimes make two cost of debt recommendations, one for short-term debt and one for long-term debt.

The same logic applies to the cost of equity. However, in regulatory proceedings, rate of return witnesses generally calculate a single COE to make a single ROE recommendation, rarely if ever addressing the term structure of the COE. Even if Ms. Bulkley and Mr. Wall are correct that the COE for electric utility stocks has increased, as they stated on page 14 of their direct testimony, the term-structure of COE analysis indicates that investors expect the COE for electric utility stocks to remain relatively stable in the future.

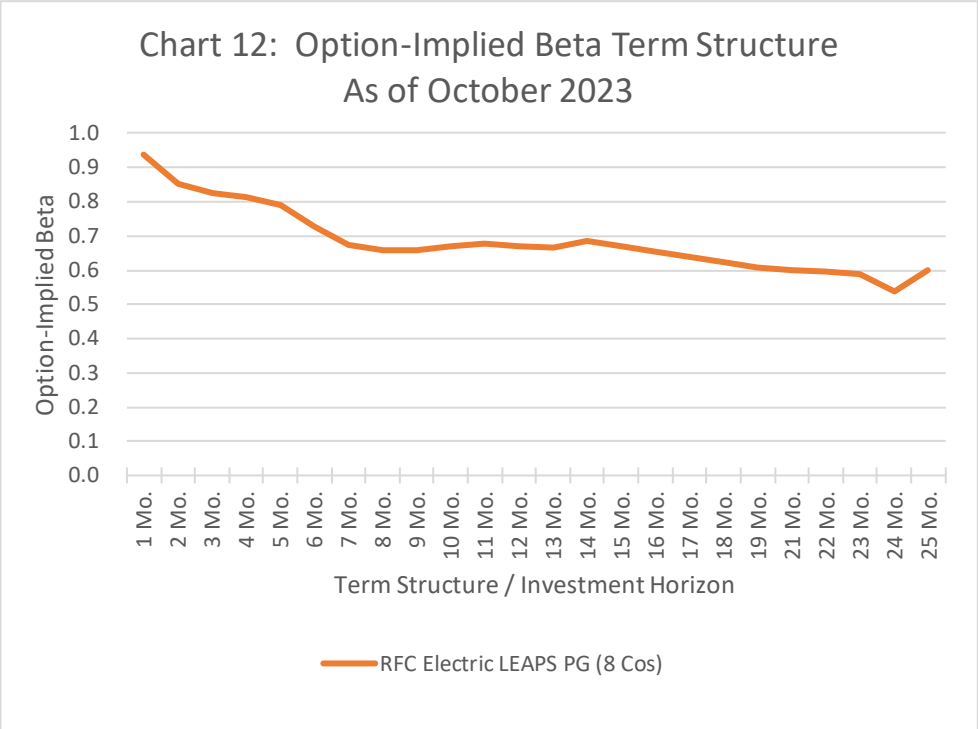
Standard COE models used in utility proceedings do not have the capacity to measure the COE over different time periods. However, stock options do allow us to measure the COE over different time periods because there are many stock option contracts that expire over different time periods. Option contracts for each expiration period allow

us to calculate option-implied beta coefficients[28], market risk premia, and thus the resulting COE for each investment horizon. Unfortunately, option contracts for electric utility companies only go out five to nine months into the future, but there are a number of electric utility stocks that trade options that often go out to almost two years or beyond. In addition, investors trade options on the S&P 500 with expirations approaching or sometimes beyond five years. Using these data, we can construct the term structure of beta, the market risk premium, and the COE for these electric utilities, which are indicative of the term structure of these parameters for electric utility companies.

The resulting term structures for the beta coefficients and the COE of the eight electric utility companies currently trading options with expirations over 12 months[29] are presented in Chart 12 and Chart 13 on page 42. Chart 12 shows that option-implied betas for these electric utilities are relatively stable when looking at investment horizons from 7 to 25 months, even dropping gradually from roughly 0.67 to 0.60, which means that investors expect the risk of investing in these electric utilities to be stable or decrease over longer investment horizons. Chart 13 shows that the COE for these electric utilities also decreases gradually from 8.2% at the 14-month horizon to 7.2% at the 5-year horizon.

[28] As described in more details below, a historical beta is a measure of the covariation of the return on an individual security with the return on the market portfolio. Most published betas are based exclusively on historical return data. However, I also calculate option-implied betas based on investors' expectations of the probability distribution of future returns.

[29] The eight electric utility companies AEP, D, DUK, EXC, FE, NEE, PPL, and SO are defined as the RFC Electric LEAPS Proxy Group, which I use in this testimony to calculate the term structure of COE. HE also trades options with expirations over 12 months but was excluded from this group because of the recent fires in Hawaii. SRE trades options with expirations barely above 12 months and has been excluded to allow consistency in this proxy group if this analysis is updated in subsequent months.



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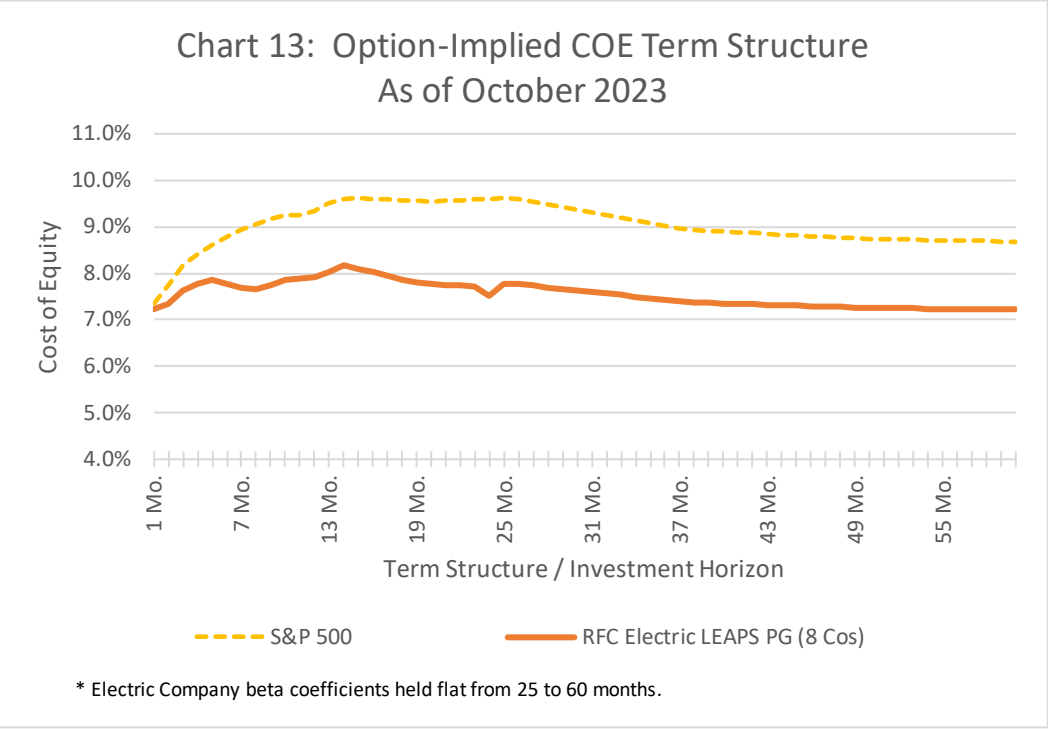

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3 Despite Ms. Bulkley and Mr. Wall's assertion that the current capital market
4 environment points to an increase in the cost of equity for utility companies, an
5 examination of capital market data suggests otherwise. While the cost of equity for electric

utility companies did increase between November 2021 and November 2022, market data indicate a considerably lower cost of equity today than a year ago and that investors anticipate that it will be flat to decreasing over the next five years.

V. COST OF EQUITY CALCULATION

A. Overview

Q. PLEASE PROVIDE AN OVERVIEW OF YOUR PERSPECTIVE REGARDING HOW CAPITAL MARKETS RELATE TO THE COE AND THE OVERALL COST OF CAPITAL.

A. The cost of capital is the return investors require to provide capital to Liberty based on current capital markets. To measure the cost of equity accurately, it is critical to use current market data because it increases that chance that the authorized ROE will match Liberty's market-based COE when it needs to raise equity capital.

As discussed above, my COE recommendation is my opinion of the return investors require to provide equity capital to Liberty based on current capital markets. My recommendation is consistent with the following legal standards set by the United States Supreme Court for a fair rate of return: "[t]he return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks"[30] and "sufficient to… support its credit and… raise the money necessary for the proper discharge of its public duties."[31]

[30] *Fed. Power Comm'n v. Hope Nat. Gas Co.* v. Hope Nat. Gas Co., 320 U.S. 591, 603 (1944).
[31] *Bluefield Water Works & Improvement Co. v. Pub. Serv. Comm'n of the State of W. Va*, 262 U.S. 679, 692-693 (1923).

Because the cost of equity is not a published figure like a bond yield, some interpretation is required to determine the appropriate market price. My cost of equity recommendation is based on my computation of what the market indicates investors require (return on investment) to provide capital to companies with comparable risk to Liberty.

As explained below, I use current market prices (e.g., stocks, bonds, options), which measure investors' expectations directly, instead of relying solely on historical data and analyst forecasts.

A COE based on current market prices (market-based) is superior to a COE based on historical data (non-market-based) for two reasons:

1. The COE that Liberty has to pay investors is based on capital markets. Recent high inflation and increases in interest rates are not a secret and therefore market-based COE models will reflect investors' changing expectations.
2. Capital markets are unpredictable. Regarding capital markets' unpredictability, investment guru Warren Buffet recently gave the following advice to investors: "[t]hey should not listen to a lot of the jabbering about what the market is going to do tomorrow, or next week or next month because nobody knows."[32]

Current capital markets are our best source of investors' expectations regarding future capital markets. Current market prices of stocks and bonds reflect investors' forecasts for long-term interest rates and capital markets in general.

[32] PBS News Hour, June 26, 2017, Part 1 – America should stand for more than just wealth, says Warren Buffett available at www.pbs.org/newshour/show/pbs-newshour-full-episode-june-26-2017.

Q. HOW DID YOU ARRIVE AT YOUR COE RECOMMENDATION?

A. To arrive at my recommendation, I applied the DCF, including a Constant Growth and a Non-Constant Growth method and a CAPM analysis to a group of similar companies ("RFC Electric Proxy Group") using data available through October 31, 2023, as discussed below. In all of my models, I use both historical averages and the most recently available spot data for the inputs wherever it is possible and applicable.

Q. CONSIDERING THAT STOCK AND OPTION PRICES AND BOND YIELDS CHANGE DAILY, WOULD IT NOT BE BETTER TO USE HISTORICAL AVERAGES EXCLUSIVELY FOR THE INPUTS IN YOUR MODELS?

A. Not necessarily. Most people would agree that the use of spot market data, the value of a particular input on a particular day, can lead to COE results that can vary over short periods of time. It may therefore be tempting to find a more stable value based on historical averages that are not overly influenced by short-term fluctuations in capital markets. When doing a forward-looking analysis, however, it is equally important to look at the most recent market data as an indication of trends and where a given value is more likely to be in the future. This is a broad and generally accepted principle, as made clear in the following example.

As a simple example using historical stock prices to make the point clear, if Company A's stock price were to go up linearly over the course of one year from $50 to $100, its average stock price over that year would be $75. If Company B's stock price declined linearly from $100 to $50 over the same year, it would have the same exact average stock price of $75. But most people would agree that predicting both stock prices at $75 over the near future would be overly simplistic and leave readily accessible data

unused. Without relying on any additional data, at the very least, it would stand to reason that in the near future, Company A's stock price is more likely to be between $75 and $100 than Company B's stock price, and that Company B's stock price is more likely to be between $50 and $75 than Company A's stock price. These observations cannot be made by looking at the yearly averages alone and must take the most recent data into special consideration.

This does not eliminate concerns regarding the effect of daily fluctuations in market data, especially during periods of volatility. As a result, it is important to consider both averages and recent spot values when using market data for forward-looking analyses. That is precisely my approach when using market data that are expected to continue to fluctuate, such as stock prices, dividend yields, betas, and market risk premia.

Q. CAN A DIFFERENCE OF ONE DAY IN THE SELECTION OF SPOT DATA HAVE A SIGNIFICANT POSITIVE OR NEGATIVE EFFECT ON ROE RESULTS? IF SO, HOW DO YOU GO ABOUT CHOOSING WHICH DAY TO USE FOR MARKET-BASED SPOT DATA?

A. Daily fluctuations in stock prices, resulting dividend yields, betas, etc., all have an impact on resulting ROE calculations, especially when using recent spot values for market data. Such is the nature of market data, which change from day to day. This is rightfully noted as a potential risk of using spot data, but given the stated benefits of using recent spot data for forward-looking analyses, there are ways to address such potential pitfalls.

For this reason, it is very important to establish consistent methodologies that eliminate the possibility of personal bias, especially when using spot market data. I consistently use the last trading day of the last full calendar month before my schedule

preparations for all market-based spot data and as the last day for all historical market-data averages.

It is important to keep in mind that even averages fluctuate over time, and all responsible data analysts must find a consistent and reproducible way to "freeze time" to work with such fluctuations while eliminating bias.

It is also important to point out once again that I use recent spot market data to establish one benchmark for market-based inputs, which are balanced by the use of historical averages, as stated previously.

B. Proxy Group Selection

Q. WHAT PROXY GROUPS DID YOU USE TO CALCULATE DEP'S COE?

A. My comparable proxy group, shown on Table 6 on page 48 and referred to as the RFC Electric Proxy Group, is the same as the group used by Liberty witnesses Ms. Bulkley and Mr. Wall and consists of the following 17 publicly traded electric utility companies covered by Value Line:

TABLE 6: RFC ELECTRIC PROXY GROUP COMPOSITION

	Company Name	Ticker
1	ALLETE	ALE
2	ALLIANT ENERGY	LNT
3	AMEREN	AEE
4	AMERICAN ELEC. PWR.	AEP
5	AVISTA CORP.	AVA
6	DUKE ENERGY	DUK
7	EDISON INTERNAT'L	EIX
8	ENTERGY CORP.	ETR
9	EVERSOURCE ENERGY	ES
10	EVERGY, INC.	EVRG
11	IDA CORP, INC.	IDA
12	NEXTERA ENERGY	NEE
13	NORTHWESTERN	NWE
14	OGE ENERGY CORP.	OGE
15	OTTERTAIL CORP.	OTTR
16	PORTLAND GENERAL	POR
17	XCEL ENERGY	XEL

I chose to use the same proxy group that Ms. Bulkley and Mr. Wall used in their Direct Testimony because I believe it contains companies that are comparable in risk to Liberty.

C. Discounted Cash Flow

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR DCF MODELS.

A. I used both the constant growth form of the DCF method, which determines growth based on the sustainable retention growth procedure, and a non-constant growth DCF method. The results of my constant growth DCF model range between 8.32% and 8.58% when using a sustainable growth rate and between 8.67% and 9.45% when using an option-

implied growth rate.[33] The results of my non-constant growth DCF method indicate a COE of between 8.42% and 8.87% for the RFC Electric Proxy Group.[34]

Q. WHAT IS THE DISCOUNTED CASH FLOW METHOD?

A. The DCF method is an approach to determine the COE. The method recognizes that investors purchase common stock to receive future cash payments. These payments come from: (a) current and future dividends, and (b) proceeds from selling stock. A rational investor will buy stock to receive dividends and ultimately to sell the stock to another investor at a gain. The price the new owner is willing to pay for stock is related to that buyer's expectation of future flow of dividends and the future expected selling price. The value of the stock is the discounted value of all future dividends until the stock is sold plus the value of proceeds from the sale of the stock.

D. Constant Growth Form of the DCF Model

Q. YOU STATE YOU USED THE CONSTANT GROWTH FORM OF THE DCF MODEL. WHAT IS THE CONSTANT GROWTH FORM OF THE DCF MODEL?

A. The constant growth form of the DCF model is a form of the DCF method that can be used in determining the COE when investors can reasonably expect that the growth of retained earnings and dividends will be constant.

Retained earnings are funds that a company keeps in its treasury, so that they are available for future needs, such aa capital expenditures, debt payments, and new investments. These retained earnings show investors whether the company is growing,

[33] Exhibit ALR-3, page 1.
[34] Exhibit ALR-3, page 3 and Exhibit ALR-3, page 4.

which, in turn, is a measure of the future indicator of dividends and the value of a company's stock.

Q. DESCRIBE HOW THE CONSTANT GROWTH MODEL WORKS.

A. The constant growth model is described by this equation k= D/P + g, where: [35]

k= cost of equity (COE);
D=Dividend; and
P=Market price of stock at time of the analysis

and where:

g=the growth rate, where g= br + sv;
b=the earnings retention rate;
r=return on common equity investment (referred to below as "book equity");
v=the fraction of funds raised by the sale of stock that increases the book value of the existing shareholders' common equity; and
s=the rate of continuous new stock financing

The constant growth model is therefore correctly recognized to be:

k=D/P + (br +sv)

The COE demanded by investors is the sum of two factors. The first factor is the dividend yield. The second factor is growth (dividends and stock price). The logical relationship among these factors is as follows: the dividend yield is calculated based on current dividend payments while growth indicates what dividends and stock price will be in the future.

Q. WHAT OTHER FACTORS IMPACT HOW ONE USES THE CONSTANT GROWTH FORM OF THE DCF MODEL?

A. Sufficient care must be taken to be sure that the growth rate "g" is representative of the constant sustainable growth. To obtain an accurate constant growth DCF result, the

[35] M. GORDON, *Cost of Capital to a Public Utility*, p. 32-33 (MSU Public Utility Studies 1974).

mathematical relationship between earnings, dividends, book value and stock price must be respected.

The basic difference between the use of an analysts' earnings per share growth rate in the constant growth DCF formula and using the "br" (b (the earnings retention rate) X r (rate of return on common equity investment)) approach is that the "br" form, if properly applied, eliminates the mathematical error caused by an inconsistency between the expectations for earnings per share growth and dividends per share growth. Because it eliminates that error, the results of a properly applied "br" approach will be superior to the answer obtained from other approaches to the constant growth form of the DCF model. This is not to say that even a properly applied "br" approach will be perfect. The self-correcting nature of a properly applied "br" to forecasted differences in earnings per share and dividends per share growth rates helps to mitigate the resultant error but should not be viewed as the perfect way to quantify the impact of expected non-constant growth rates.

Q. HOW HAVE YOU IMPLEMENTED THE CONSTANT GROWTH FORM OF THE DCF MODEL IN THIS CASE?

A. I have applied the constant growth form of the DCF model by staying true to the mathematically derived "k=D/P + (br + sv)" form of the DCF model. I have also taken care to fully allocate all future expected earnings to either future cash flow in the form of dividends ("D") or to retained earnings (the retention rate, "b"). This extra accuracy is obtained only when the retention rate "b" is derived from the values used for "D" and "r," rather than independently.

Q. PLEASE EXPLAIN HOW YOU OBTAINED THE VALUES YOU USED IN THE CONSTANT GROWTH FORM OF THE DCF METHOD.

A. The DCF model generally calls for the use of the dividend expected over the next year. A reasonable way to estimate next year's dividend rate is to increase the quarterly dividend rate by half of the current actual quarterly dividend rate. This is a good approximation of the rate that would be obtained if the full prior year's dividend were escalated by the entire growth rate.[36]

I obtained the stock price—"P"—used in my DCF analysis from the closing prices of the stocks on October 31, 2023. I also obtained an average stock price for the 12 months ending October 31, 2023 by averaging the high and low stock prices for the year.

I based the value of the future expected return on equity— "r" —on the average return on book equity expected by Value Line, adjusted in consideration of recent returns. I also made a computation that was based on a review of both the earned return on equity consistent with analysts' consensus earnings growth rate expectations and on the actual earned returns on equity. For a stable industry such as utility companies, investors will typically look at actual earned returns on equity as one meaningful input into what can be expected for future earned returns on book equity. See Exhibit ALR-3, page 1.

[36] For example, assume a company paid a dividend of $0.50 in the first quarter a year ago, and has a dividend growth rate of 4 % per year. This dividend growth rate equals (1.04)^4-1=0.00985 % per quarter. Thus, the dividend is $0.5049 in the second quarter, $0.5099 in the third quarter, and $0.5149 in the fourth quarter. If that 4 % per annum growth continues into the following year, then the dividend would be $0.5199 in the 1st quarter, $0.5251 in the 2nd quarter, $0.5303 in the 3rd quarter, and $0.5355 in the 4th quarter. Thus, the total dividends for the following year equal $2.111 (0.5199 + 0.5251 + 0.5303 + 0.5355). I computed the dividend yield by taking the current quarter (the $0.5149 in the 4th quarter in this example) and multiplying it by 4 to get an annual rate of $2.06. I then escalated this $2.06 by half the 4 % growth rate, which means it is increased by 2 %. $2.06 x 1.02= $2.101, which is within one cent of the $2.111 obtained in the example.

This return on book equity expectation used in the DCF method to compute growth must *not* be confused with the COE. Since the stock prices for the comparative companies are substantially higher than their book value, the return investors expect to receive on their market price investment is considerably less than the anticipated return on book value. If the market price is low relative to book value, the COE will be higher than the future expected return on book equity, and if the market price is high, then the return on book equity will be less than the COE.

In addition to growing through the retention of earnings, utility companies also grow by selling new common stock. Selling new common stock increases a company's growth. I quantified this growth caused by the sale of new common stock by multiplying the amount that the actual market-to-book ratio exceeds 1.0, by the compound annual growth rate of stock that Value Line forecasts. The results of that computation are shown on line 4 of Exhibit ALR-3, page 1.

Pure financial theory prefers concentrating on the results from the most current price because investors cannot purchase stock at historical prices. There is a legitimate concern, however, about the potential distortion of using just a single price. I present DCF results based on the most recent stock pricing data (October 31, 2023) as well as the average of the high and low stock price over the past 12 months to obtain a range of reasonable values. As shown in Exhibit ALR-3, page 1, the DCF result based on the average of the high and low stock price for the year ending October 31, 2023 is 8.32%. The DCF result based on the stock price as of October 31, 2023 is 8.58%. Exhibit ALR-3, page 1, shows more of the specifics of how I implemented the constant growth form of the DCF model for the RFC Electric Proxy Group.

Q. PLEASE EXPLAIN HOW YOU DETERMINED WHAT VALUE TO USE FOR "r" WHEN COMPUTING GROWTH IN YOUR CONSTANT GROWTH FORM OF THE DCF MODEL.

A. The inputs I considered are shown in Footnote [C] of Exhibit ALR-3, page 1. The value of "r" that is appropriate to use in the DCF formula is the value anticipated by investors to be maintained on average in the future. This Exhibit shows that the average future return on equity forecasted by Value Line for the RFC Electric Proxy Group between 2023 and 2026-28 is 10.38%. The same footnote also shows that the future expected return on equity derived from the Zacks consensus forecast is 10.44%, and that the actual returns on equity earned by the RFC Electric Proxy Group on average were 9.92% in 2020, 10.71% in 2021, and 10.75% in 2022. Based on the combination of the forecasted return on equity derived from the Zacks consensus, the recent historical actual earned returns, and Value Line's forecast, I made the DCF growth computation using a 10.30%[37] value of "r".

Q. WHAT COE IS INDICATED BY THE CONSTANT GROWTH FORM OF THE DCF METHOD THAT YOU RELY ON FOR YOUR RECOMMENDATION?

A. The result of my DCF analysis using the Constant Growth form of the DCF indicates a COE range of between 8.32% and 8.58% for the RFC Electric Proxy Group.[38] Since these DCF findings use analysts' forecasts to derive sustainable growth (in part) and on analysts' forecasts of dividend growth and book value growth in the non-constant form of the DCF method, the results should be considered as conservatively high. This is because, as

[37] I used 10.30% in consideration of historical returns, Zacks's projections, and Value Line projected returns for the RFC Electric Proxy Group.
[38] Exhibit ALR-3, page 1.

previously mentioned above, analysts' forecasts of such growth have been notoriously overstated.

My results are not as influenced by overly-optimistic analysts' forecasts as would have been the case had I merely used analysts' five-year earnings growth rate forecasts as a proxy for long-term growth. This is because the DCF methods I use compute sustainable growth rates, rather than growth rates that can exaggerate the growth rate due to assuming that a relatively short-term forecast (5 years) will remain indefinitely.

E. Non-Constant Growth Form of the DCF Model

Q. PLEASE EXPLAIN HOW YOU IMPLEMENTED THE NON-CONSTANT GROWTH FORM OF THE DCF MODEL.

A. The non-constant growth form of the DCF model determines the return on investment expected by investors based on an estimate of each separate annual cash flow the investor expects to receive. For the purpose of this computation, I have incorporated Value Line's detailed annual forecasts to arrive at the specific non-constant growth expectations that an investor who trusts Value Line would expect. This implementation is shown on Exhibit ALR-3, page 3 and Exhibit ALR-3, page 4. In the first stage, cash flow entry is the cash outflow an investor would experience when buying a share of stock at the market price. The subsequent years of cash flow are equal to the dividends per share that Value Line forecasts. For the intermediate years of the forecast period in which Value Line does not provide a specific dividend, the annual dividends were obtained by estimating that dividend growth would persist at a compound annual rate. The cash flow at the end of the forecast period consists of both the last year's dividend forecast by Value Line, and the proceeds

from the sale of the stock. The stock price used to determine the proceeds from selling the stock was obtained by estimating that the stock price would grow at the same rate at which Value Line forecasts book value to grow.

Q. WHY DID YOU USE BOOK VALUE GROWTH TO PROVIDE THE ESTIMATE OF THE FUTURE STOCK PRICE?

A. For any given earned return on book equity, earnings are directly proportional to the book value. Furthermore, book value growth is the net result after the company produces earnings, pays a dividend and also, perhaps, either sells new common stock at market price or repurchases its own common stock at market price.

Once these cash flows are entered into an Excel spreadsheet, the compound annual return an investor would achieve as a result of making this investment was obtained by using the Internal Rate of Return (IRR) function built into the spreadsheet. As shown on Exhibit ALR-3, page 3 and Exhibit ALR-3, page 4, this multi-stage DCF model produced an average indicated COE of 8.87% based on the year-end stock price, and 8.42% based on average prices for the year ending October 31, 2023 for the RFC Electric Proxy Group.

Q. WHAT COST OF EQUITY DOES YOUR NON-CONSTANT GROWTH DCF METHOD INDICATE?

A. My non-constant growth DCF method indicates a cost of equity of between 8.42% and 8.87%.[39]

[39] Exhibit ALR-3, page 3 and Exhibit ALR-3, page 4.

F. Capital Asset Pricing Model

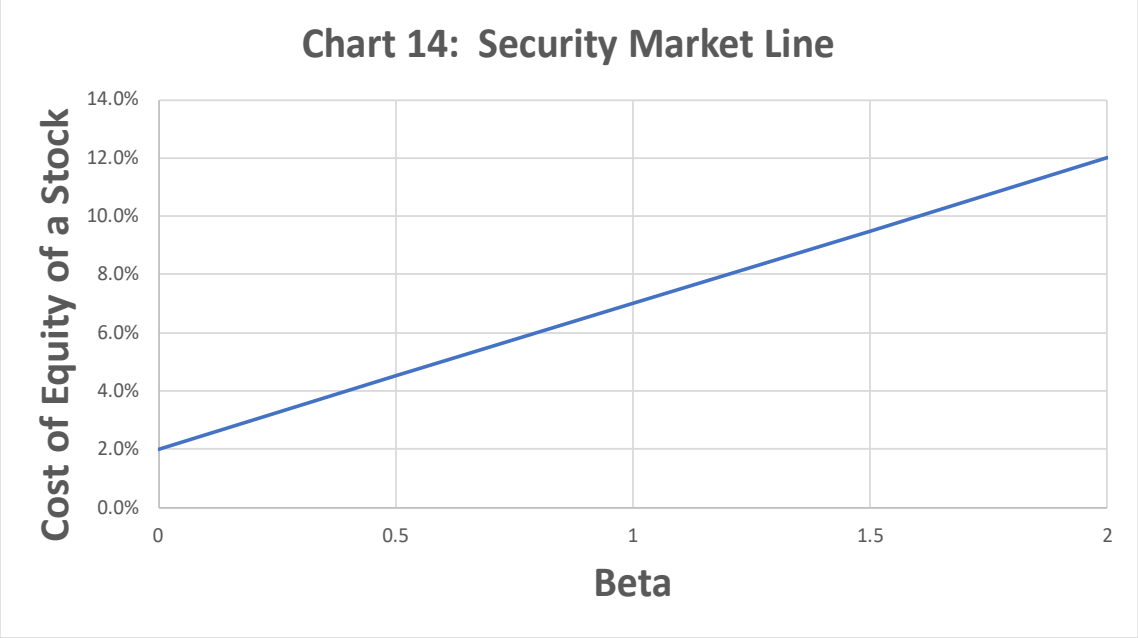
Q. PLEASE DESCRIBE THE CAPM.

A. CAPM stands for "Capital Asset Pricing Model." The CAPM relates return to risk; specifically, it relates the expected return on an investment in a security to the risk of investing in that security. The riskier the investment, the greater the expected return (i.e., the cost of equity) investors require to make that investment.

Investors in a firm's equity face two types of risks: (1) firm-specific risk and (2) market risk (financial analysts refer to this market risk as systematic risk). Firm-specific risk refers to risks unique to the firm, such as management performance and losing market share to a new competitor. Investors can reduce firm-specific risk by purchasing stocks as part of a diverse portfolio of companies if they construct the portfolio to cause the firm-specific risk of individual companies to balance out. Market-related risk refers to potential impacts from the overall market, such as a recession or interest rate changes. This risk cannot be removed by diversification, so the investor must bear it no matter what. Because the investor has no option but to bear market risk, the investor's cost of equity will reflect that risk.

The price of a stock with a beta of 1 tends to move with the market. If the market increases by 1%, the stock is also expected to increase by about 1%, and vice versa. The price of a stock with a beta greater than 1 tends to be more volatile than the market. For example, a stock with a beta of 1.5 will on average be 50% more volatile than the market. If the market rises by 1%, the price of a stock with a beta of 1.5 is expected to rise by 1.5%, and if the market falls by 1%, the stock price is expected to decrease by 1.5%. The price of a stock with a beta less than 1 tends to be less volatile than the market.

The CAPM predicts that for a given equity security, the cost of equity has a positive linear relationship to how sensitive the stock's returns are to movements in the overall market (e.g., S&P 500). A security's market sensitivity is measured by its beta.[40] As shown in Chart 14 below, the higher the beta of a stock, the higher the company's cost of equity—the return required by the investor to invest in the stock.



Here is the standard CAPM formula:

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

Where:

K is the cost of equity;
Rf is the risk-free interest rate;
Rm is the expected return on the overall market (e.g., S&P 500);
[Rm – Rf] is the premium investors expect to earn above the risk-free rate for investing in the overall market ("equity risk premium" or "market risk premium"); and
βi (Beta) is a measure of non-diversifiable, or systematic, risk.

Q. PLEASE EXPLAIN HOW YOU IMPLEMENTED THE CAPM.

A. First, I determined appropriate values or ranges for each of the three model inputs: (a) Risk-Free Rate, (b) Beta, and (c) Equity Risk Premium. Second, I used the equation above to calculate the cost of equity implied by the model. Below I will explain how I calculated the three model inputs and summarize the CAPM cost of equity numbers resulting from those inputs. Table 7 and Table 8 on page 73 show the results of my CAPM.

Risk-Free Rate

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

A. It is generally preferable to use the market yield on short-term U.S. Treasury yields as the risk-free rate because these bonds have a beta close to zero. *Principles of Corporate Finance* states "The CAPM… calls for a short-term interest rate."[41] I chose to use a risk-free rate based on both long- and short-term Treasury yields, however, because, as indicated by the inverted yield curve,[42] investors with a longer investment horizon would likely use a lower risk-free rate as an opportunity cost for their investment decisions. It is reasonable to consider a risk-free rate that would apply to both long- and short-term investors. My short-term risk-free rate is based on the yield of 3-month U.S. Treasury bills and my long-term risk-free rate is based on the yield of 30-year U.S. Treasury bonds. In line with my Spot and Weighted Average CAPM approaches, I use both spot values as of October 31, 2023 and weighted averages over the 3 months ending on that date for these two yields.

[41] BREALEY, MYERS, AND ALLEN, *Principles of Corporate Finance*, p. 228, (McGraw-Hill Irwin, New York, 12th ed. 2017).

[42] The yield curve on U.S. Treasury bonds relates the yield to its time to maturity. We say the current yield curve is steep because the difference in yield between short-term (near 0%) and long-term (over 1%) bonds is large in percentage terms.

As outlined in Exhibit ALR-4, page 2, my spot and weighted average short-term risk-free rates are 5.59% and 5.57%, respectively. My spot and weighted average long-term risk-free rates are 5.04% and 4.73%, respectively.

U.S. government bonds are reasonable to use as a risk-free rate because they have a negligible risk of default. The value of short-term U.S. Treasury bills has a relatively low exposure to swings in the overall market. The value of long-term U.S. Treasury bonds is relatively more exposed to the market and therefore must be used with caution.

Q. WHAT IS YOUR RESPONSE TO ANALYSTS WHO CLAIM THAT THE CAPM SHOULD BE IMPLEMENTED WITH A RISK-FREE RATE BASED ON A LONG-TERM INTEREST RATE (E.G., YIELD ON 30-YEAR TREASURY BOND) AND/OR BASED ON INTEREST RATE FORECASTS INSTEAD OF MARKET YIELDS.

A. As discussed in Appendix D, a CAPM analysis that uses a risk-free rate based only on long-term interest rates may overstate the COE because these bonds do not have a zero beta. It is not appropriate to use a risk-free rate based on interest rate forecasts because it often does not represent investors' expectations.

Beta

Q. WHAT BETA DID YOU USE IN YOUR CAPM?

A. Since the cost of equity should be based on investor expectations, I chose to use two betas. My "forward beta" is based on forward-looking investor expectations of non-diversifiable risk. My "historical blended" is based on historical return data over 6-month, 2-year, and 5-year periods.

Most published betas are based exclusively on historical return data. For example, Value Line publishes a 5-year historical beta for each of the companies it covers. However, it is also possible to calculate betas based on investors' expectations of the probability distribution of future returns. This probability distribution of future returns expected by investors can be calculated based on the market prices of stock options.

Q. WHAT IS A STOCK OPTION?

A. A stock option is the right to buy or sell a stock at a specific price for a specified amount of time. A call option is the right to buy a stock at a specified exercise or strike price on or before a maturity date. A put option is the right to sell a stock at a specified exercise or strike price on or before a maturity date. For example, a call option to purchase 100 shares of Apple Computer stock for $230 on January 17, 2020, allows the owner the option (not the obligation) to buy Apple stock for $230 on that date. At the end of July 2019, Apple stock was trading at about $215 per share. Why would anyone pay for the right to buy a stock higher than the current price? Investors who purchased those call options thought there was a chance Apple stock would be trading higher than $230 on January 17, 2020, and those options gave those investors the right to buy Apple stock for $230 and profit by selling it at the market price on that date, if it was higher. The price of Apple's stock was $317.98 at the close of trading on January 17, 2020. Therefore, the investor who purchased this call option for $635 on July 31, 2019, earned a profit of $8,163[43] at expiry on January 17, 2020. On the other hand, the investor who purchased an Apple put option with the same expiration date and strike price on July 31, 2019, would have lost the price of the

[43] $8,163 profit from exercising call option ($31,798 from selling at $317.98 market price - $23,000 cost to purchase at $230) - $635 ($6.35 X 100) option purchase price. Note: Each call option is the right to purchase 100 shares.

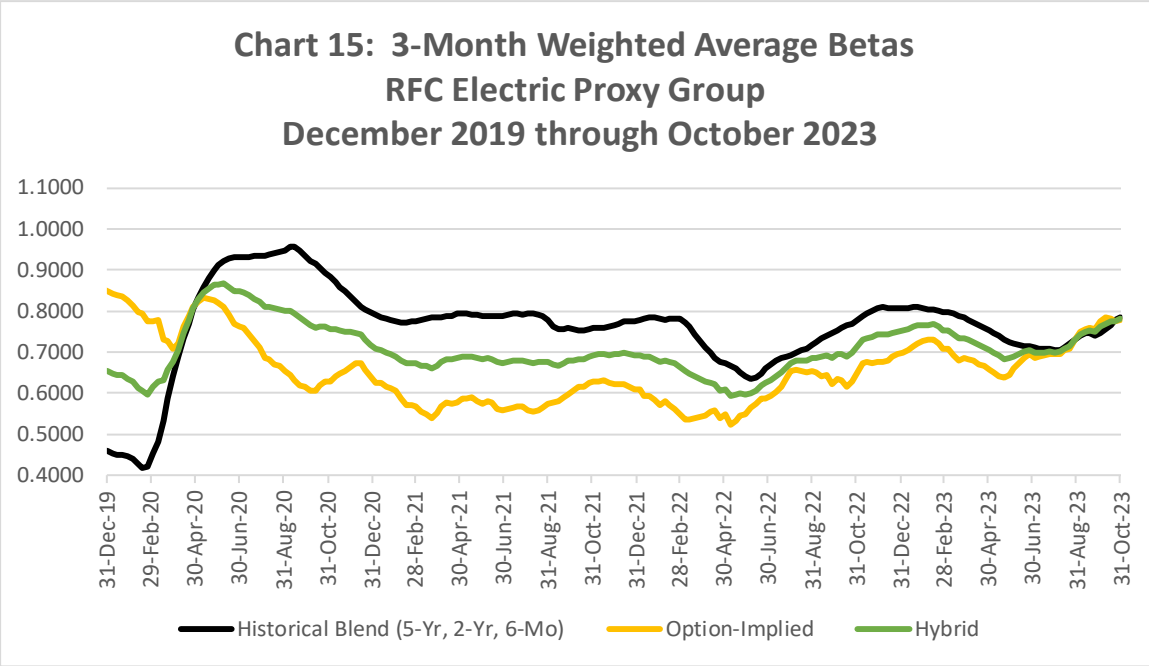
option ($2,248) and gained nothing on the expiration date because the right to sell Apple stock for $230 when the price is over $300 is worthless.

The market prices of put options and call options provide information regarding the probability distribution of future stock prices expected by investors. Using established techniques, I am able to use price data for stock options of my RFC Electric Proxy Group companies and the S&P 500 Index to determine investors' return expectations, including the relationship (covariance) between the return expectations for individual RFC Electric Proxy Group companies and those for the overall market (S&P 500). This covariance between the expected returns for my RFC Electric Proxy Group and for the S&P 500 indicates what investors expect betas will be in the future. I refer to betas based on option price calculations as "option-implied betas."

Q. PLEASE EXPLAIN HOW YOU CALCULATED THE BETAS USED IN YOUR CAPM.

A. Traditionally, the betas used in CAPM calculations are calculated from historical returns. This approach has strengths and weaknesses. An alternative way to calculate betas is to incorporate investors' return expectations by calculating option-implied betas as explained in the previous paragraph. As discussed below, I have chosen to use both historical and option-implied betas in my CAPM analysis. I chose to use option-implied betas in my CAPM analysis because, among other reasons, studies have found that betas calculated based on investor expectations (option-implied) provide information regarding future perceived risks and expectations.[44]

[44] Bo-Young Chang & Peter Christoffersen & Kris Jacobs & Gregory Vainberg. Option-Implied Measures of Equity Risk, *Review of Finance*, Vol. 16, Issue 2, pp. 385-428 (April 2012) available at https://academic.oup.com/rof/article/16/2/385/1584560.



As shown in Chart 15 above, stock option prices indicate that investors likely expect lower betas for the RFC Electric Proxy Group in the future.

Exhibit ALR-4, page 3 contains the last three months of data used in creating Chart 15 above, which is what I use in my CAPM analysis. Specifically, I use the following two betas in my CAPM analysis:

1. **Historical Blend:** 50% (6 months) + 30% (2 years) + 20% (5 years).
2. **Forward Beta:** 100% Option-Implied Beta (6 months).

Q. WHY DO YOU USE PERIODS OF 6 MONTHS, 2 YEARS, AND 5 YEARS FOR YOUR HISTORICAL BETA CALCULATIONS, AS OPPOSED TO RELYING EXCLUSIVELY ON THE 5-YEAR PERIOD USED BY VALUE LINE?

A. Using shorter periods for the return regression analysis portion of the historical beta calculation allows me to see if the correlation between the returns of each of the companies in my RFC Electric Proxy Group and those of the S&P 500 Index has changed in the last

2 years or 6 months. Using a 5-year period exclusively tends to make recent changes in the correlation more difficult to identify because of the weight of 5 years of data.

Q. WOULD YOU AGREE THAT CHANGES IN MARKET DYNAMICS WILL HAVE A LARGER EFFECT ON 6-MONTH HISTORICAL BETAS THAN THEY WILL ON 2-YEAR OR 5-YEAR HISTORICAL BETAS?

A. Yes. As with other historical metrics based on a given time period, say, average stock prices, the longer the time horizon under consideration, the more data points are considered, and the smaller the effect of any one given change in the data set.

Q. IS THIS LARGER EFFECT ON 6-MONTH HISTORICAL BETAS FROM CHANGES IN MARKET DYNAMICS A GOOD OR A BAD THING?

A. The answer depends on what the beta will be used for. I would argue that in any attempt to forecast the beta coefficient of a company for any forward-looking analysis such as the cost of capital calculations in this proceeding, more recent historical data should be given more relevance than data from 5 or 10 years ago. The weight of 10 years of data makes a beta coefficient react extremely slowly to market developments. Even pronounced permanent market changes can take more than 6 months to have a detectable effect on a 10-year beta.

As with using spot values and averages of historical market data, I believe the right answer is not to use *either* 6-month historical betas or historical betas with longer horizons, but to consider *both*. For this reason, I have created my historical blended betas, which take into consideration 6-month, 2-year, and 5-year historical betas.

Q. DO YOU THINK IT IS A GOOD IDEA TO RELY ON 6-MONTH HISTORICAL BETAS DESPITE MARKET DEVELOPMENTS IN THE PAST YEAR THAT SOME WOULD CALL "MARKET DISLOCATIONS?"

A. Financial markets are constantly in flux due to the influence of countless factors. So-called "market dislocations," are just some of the numerous factors that are constantly affecting markets. To attempt to separate any one specific factor from "real" underlying market dynamics would be an exercise in futility.

Furthermore, predicting the duration and impact of any single influencing factor on financial markets is extremely challenging, if not impossible. In 2008, when interest rates plummeted to unprecedented lows, numerous analysts deemed this a temporary anomaly. Contrary to these expectations, rates not only persisted at these low levels for more than ten years but dropped even further in response to the unforeseen COVID-19 pandemic, which significantly affected the global economy and financial markets.

So, in response, yes, I think it is a good idea to use 6-month historical betas to measure recent and current market dynamics regardless of recent developments. I use them as part of my historical blended betas in conjunction with longer-term historical betas and forward-looking, option-implied betas to achieve the most reasonable result.

Q. GIVEN THE SHORTER PERIOD COVERED BY 6-MONTH HISTORICAL BETAS, CAN THEY STILL BE CONSIDERED STATISTICALLY SIGNIFICANT? HOW MANY DATA POINT PAIRS ARE USED IN THE CALCULATION OF YOUR 6-MONTH HISTORICAL BETA COEFFICIENTS?

A. A 6-month historical beta based on weekly returns calculated weekly is calculated using 26 closing price points for a company and for its corresponding market index, in this case

the S&P 500 Index. This translates into 25 pairs of return data that are then used in the regression analysis. This is most certainly enough data to achieve statistical significance as addressed further below.

Furthermore, as stated above, the recent improvement in my calculation of historical betas of using weekly returns on every day of the week as opposed to using only one day of the week, as Value Line does, has the added benefit of providing significantly more data pairs to be used in the regression analysis used to calculate beta. For 6-month historical betas, instead of relying on 25 return pairs, the regression is performed on 117 return pairs.

Q. PLEASE EXPLAIN HOW YOU CALCULATED OPTION-IMPLIED BETAS.

A. Calculating option-implied betas of a company requires (1) obtaining stock option data for that company and a market index, (2) filtering the stock option data, (3) calculating the option-implied volatility for the company and for the index, (4) calculating the option-implied skewness for the company and for the index, and (5) calculating option-implied betas for the company based on implied volatility and skewness for the company and for the index. There are various ways one could choose to perform the steps above, but I chose to filter stock option data and calculate option-implied volatility[45] and skewness[46] following exactly the same methodology used by the Chicago Board of Options Exchange

[45] CBOE Volatility Index White Paper (2018) available at https://cdn.cboe.com/resources/indices/srvix-white-paper.pdf. Please note that the cover page says, "proprietary information." However, this document has been in the public domain for over 3 years.
[46] The CBOE SKEW Index (2010) available at: https://cdn.cboe.com/resources/indices/documents/SKEWwhitepaperjan2011.pdf. Please note that the cover page says, "proprietary information." However, this document has been in the public domain for over 3 years.

(CBOE) in the calculation of their widely-used VIX (or Volatility Index) and SKEW Index, respectively.

I start my process with publicly available trading information for all the options for a given security (company or index) for a complete trading day. I then filter the option data as described by the CBOE using the following guidelines:

1. Use the mid-quote or mark (average of bid and ask) as the option price.
2. Use only out-of-the-money call and put options.
    - Determine the "moneyness" threshold where absolute difference between call and put prices is smallest (using CBOE "Forward Index Price" formula).
    - Include "at-the-money" call and put options and use average of call and put prices as price for "blended" option.
3. Exclude all zero bids.
4. Exclude remaining (more out-of-the-money) options when two sequential zero bids are found.

I then apply the series of formulas clearly described in both of the CBOE's white papers to the remaining options to calculate Option-Implied Volatility and Option-Implied Skewness. In the words of the CBOE, each of its two indices is "an amalgam of the information reflected in the prices of all of the selected options." To be clear, Implied Volatility is not exactly the same as the VIX Index, and Implied Skewness is not exactly the same as the SKEW Index, but both indices are directly based on their corresponding statistical value.

Option-Implied Volatility reflects investors' expectations regarding future stock price movements. Option-Implied Skewness reflects investors' expectations regarding how implied volatility changes for strike prices that are closer and further to the current value of the underlying stock price.

The CBOE calculates Times to Expiration by the minute—as do I. The Time to Expiration of traded options cannot be changed and varies from day to day. For the sake of consistency, the CBOE calculates the VIX and SKEW indices on a "30-day" basis by interpolating for two sets of options with Times to Expiration closest to the 30-day mark. I prefer to focus on as long of a time horizon as possible for forecasting purposes. Option Times to Expiration vary significantly for various stocks but can consistently be found to go out to 6 months (180 days) for utility companies. Therefore, for the sake of consistency, I have chosen to calculate 6-month volatility and skewness where possible. Occasionally, Times to Expiration for a given stock do not go out to 180 days. If the greatest Time to Expiration available is 171 days (95%) or greater, I use the volatility and skewness for that group of options as a proxy for the 180-day volatility and skewness, respectively.

Finally, once I have calculated the option-implied volatility and skewness for each company and index using the methodology described above, I calculate option-implied betas using the following formula developed by Christoffersen, Chang, Jacobs and Vainberg (2011): [47]

$$\beta_i = \left(\frac{SKEW_i}{SKEW_m}\right)^{1/3} \quad \left(\frac{VAR_i}{VAR_m}\right)^{1/2}$$

[47] Bo-Young Chang & Peter Christoffersen & Kris Jacobs & Gregory Vainberg, Option-Implied Measures of Equity Risk, *Review of Finance* Volume 16, Issue 2, pp. 385-428 (April 2012) available at https://academic.oup.com/rof/article/16/2/385/1584560.

Where:

β_i: $option-implied\ beta\ of\ security\ (e.g. stock, fund)$;
$SKEW_i$: $skewness\ of\ security$;
$SKEW_m$: $skewness\ of\ overall\ market\ (S\&P\ 500)$;
VAR_i: $variance\ of\ company$;
VAR_m: $variance\ of\ overall\ market\ (S\&P\ 500)$.

Q. YOU CALCULATE YOUR OPTION-IMPLIED BETAS BASED ON A 6-MONTH HORIZON. WOULD IT NOT BE BETTER TO USE A LONGER FORECASTING HORIZON?

A. The methodology I use to calculate my option-implied betas "allows for the computation of a complete term structure of beta for each company so long as the options data are available,"[48] so there is nothing inherent in the methodology that limits it to a certain time horizon.

For many applications, including cost of capital, one could argue that the longer the time horizon for the option-implied betas, the better. However, the limitation on the forecasting horizon is always set by the longest expiration period of the options currently traded in the market. Some companies trade options with expiration periods up to 2 or 3 years into the future. As evidenced by the exhaustive option data in my working papers, the maximum expiration period for the options of the companies in my RFC Electric Proxy Group is approximately 8 months. None of the 17 companies ever trade options with expiration periods of more than 8 months. New options are issued roughly every 3 months for all of these companies, so the maximum expiration period on any given trading day is somewhere between 5 and 8 months. For consistency across companies in my proxy group and across dates within the 3-month period on which my analysis is focused (August

[48] Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Forward-Looking Betas*, p. 24 (April 25, 2008) available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=891467.

through October 2023), I chose to use 6 months for the time horizon of my option-implied betas. If the maximum expiration period for the options of a given company on a given day is less than 6 months, I use the maximum expiration period as an approximation for the target 6-month horizon.

Simply because some may argue that it may be preferable to use longer time horizons in place of or in addition to a 6-month horizon, it does not mean that a 6-month option-implied beta is of no relevance or cannot be used. That would be tantamount to saying you cannot use a 1-year Value Line Earnings Per Share estimate, or that the minimum relevant forecast is 2 or 3 years. In fact, for purposes of option-implied betas, it would be difficult to say if a time horizon of 1 year, for instance, is necessarily always better than a time horizon of 6 months. An option-implied forward-looking beta, even with a time horizon of less than 6 months, is still a useful tool in interpreting the current expectations of investors at any given time.

A final strong argument in support of using 6-month option-implied betas in a cost of capital calculation looking years into the future is that, as expanded upon starting on page 122, the authors of the paper on which I based my option-implied betas concluded that their predictive powers are not limited to 6 months into the future. In fact, they conclude that 6-month option-implied betas have stronger predictive power than 6-month, 1-year, or 5-year historical betas when attempting to forecast betas 1 or 2 years into the future.

Market Risk Premium

Q. PLEASE EXPLAIN HOW YOU CALCULATED THE EQUITY RISK PREMIUM USED IN YOUR CAPM.

A. Traditionally, the risk premium used in CAPM calculations is derived from historical returns and/or equity analyst projections. The former approach is historically accurate but does not take into account investors' expectations for future market risks and returns. The latter approach is based on analyst projections, which are not appropriate since they do not reflect current investor expectations. A superior market-based way to calculate the equity risk premium is to use option-implied return expectations, which is the approach I have used.

My equity risk premium is the expected return on the S&P 500 minus the risk-free rate. I calculate an expected return on the S&P 500 by using stock options traded on this index. To begin with, I use exactly the same methodology used by the Chicago Board of Options Exchange to filter stock option data and calculate option-implied volatility and skewness,[49] as described in detail in the Beta section on page 66. The volatility and skewness calculated in this way describe a probability function representing the possible trajectories for the S&P 500 implied by the options market. The resulting skewed probability function can be closely approximated by a log-normal function using established statistical formulas, which then make it straightforward to calculate the expected growth for the S&P 500 for any given cumulative probability. A cumulative probability of 50% represents the median of the probability distribution, or the option-

[49] As used in the calculation of their widely-used VIX (or Volatility Index) and SKEW Index, respectively.

implied market consensus, which is how I arrive at my calculation of expected market growth.

Once the option-implied growth rate of the S&P 500 has been estimated as described above, I add the dividend yield and subtract the risk-free rate to arrive at the market risk premium, as laid out in Exhibit ALR-4, page 4 and Exhibit ALR-4, page 6. In line with my Spot and Weighted Average CAPM approaches, I use both spot values as of October 31, 2023 and weighted averages over the 3 months ending on that date for option-implied growth, dividend yields, and short- and long-term risk-free rates in these calculations to arrive at a total of 4 estimated values for the market risk premium. The market risk premia I use in my Weighted Average CAPM analysis with short- and long-term risk-free rates are 3.50% and 4.34%, respectively. The market risk premia I use in my Spot CAPM analysis with short- and long-term risk-free rates are 3.67% and 4.22%, respectively.[50]

Q. DID YOU TAKE INTO CONSIDERATION THE DIFFERENCE IN VOLATILITIES ACROSS EXPIRATION PERIODS IN THE OPTIONS TRADED ON THE S&P 500?

A. Yes. The volatility implied by the options market changes over time as investors' perception of risk changes. For example, during a crisis, implied volatility generally increases as investors expect that stock market prices have a greater chance of large swings compared to times when there is no crisis. As discussed earlier, investors also often have different volatility expectations over different time periods. For example, on any given

[50] Both market risk premia happen to be the same because short- and long-term risk free rates happen to be the same as of October 31, 2023.

day, investors might expect volatility to be relatively high over the next 30 days and to decrease over the next year or longer. The same holds true for skewness, even though it is less intuitive to understand changes in skewness than in volatility. Because of these changes across option expiration periods, I take a weighted average of the entire term structure of the option-implied volatility and skewness, which for the S&P 500 typically goes out to 54 to 61 months[51], interpolating where necessary, and giving the most weight to the option expiration period of 12 months.

CAPM Results

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR CAPM.

A. Table 7 and Table 8 below show the results of my Weighted Average CAPM and Spot CAPM Analyses, respectively.

Weighted Average CAPM

TABLE 7: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY
WEIGHTED - All Inputs Weighted From August to October 2023

	3-Month Treasury Bill		30-Year Treasury Bond	
	Historical Blended Beta	Forward Beta	Historical Blended Beta	Forward Beta
Risk-Free Rate	5.57%	5.57%	4.73%	4.73%
Beta	0.78	0.78	0.78	0.78
Risk Premium	3.50%	3.50%	4.34%	4.34%
CAPM	8.31%	8.30%	8.13%	8.11%

Source: Exhibit ALR-4, page 1

[51] Prior to November 2021, the longest expiration period for stock options traded on the S&P 500 was 36 months.

Spot CAPM

TABLE 8: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY (SPOT)
SPOT - All Inputs Based on Last Available Data as of October 31, 2023

	3-Month Treasury Bill		30-Year Treasury Bond	
	Historical Blended Beta	Forward Beta	Historical Blended Beta	Forward Beta
Risk-Free Rate	5.59%	5.59%	5.04%	5.04%
Beta	0.80	0.80	0.80	0.80
Risk Premium	3.67%	3.67%	4.22%	4.22%
CAPM	8.52%	8.52%	8.40%	8.40%

Source: Exhibit ALR-4, page 5

Please see Appendix E for a chart showing how the results of my CAPM analysis applied to the RFC Electric Proxy Group have changed over time since the onset of the Covid pandemic.

VI. CAPITAL STRUCTURE AND COST OF DEBT

Q. IS LIBERTY REQUESTIED A CAPITAL STRUCTURE OF 55.00% COMMON EQUITY AND 45.00% APPROPRIATE?

A. No. Liberty's requested capital structures are not appropriate for setting rates in this proceeding it has a significantly higher common equity ratios (55.00%) than the average common equity ratio used by other electric utility companies in the country (46.1%).[52]

[52] Exhibit ALR-5, page 5.

Q. WHAT CAPITAL STRUCTURE DO YOU RECOMMEND BE USED FOR LIBERTY'S OVERALL COST OF CAPITAL?

A. I recommend using a capital structure consisting of 46.12% equity and 53.88% debt, based on the average common equity ratios of the companies in my proxy group. Absent evidence from Liberty in support of the need for a different capital structure, using the average capital structure of the proxy group is consistent with the Commission's duty to set reasonable rates because otherwise. Authorizing a regulatory capital structure for Liberty with a common equity ratio higher than other comparable utility companies without justification will result in unreasonably high rates. As shown in Table 3 on page 13, my recommendations, including my capital structure recommendation, result in an overall rate of return of 7.15%. Ms. Bulkley and Mr. Wall's recommendations result in an overall rate of return of 8.41%. Capital structure has a major impact on revenue requirement. If the Commission adopts an equity component of the capital structure ratio that is higher than I've recommended, there should be a corresponding reduction to ROE.

It can be overlooked that the authorized capital structure can have a large impact on the utility company's revenue requirement. As stated above, if my cost of equity recommendation is applied to Ms. Bulkley and Mr. Wall's recommended capital structure it will require an approximately $3.81 million larger revenue requirement for.

If Ms. Bulkley and Mr. Wall's capital structure recommendations are adopted it is important to make an adjustment the overall ROR to account for the financial risk difference between their capital structure recommendation and that of the companies in the RFC Electric Proxy Group which have a significantly lower average common equity ratio (46.1%) than the common equity ratios recommend by Ms. Bulkley and Mr. Wall. A higher

common equity ratio means less debt, a lower chance of financial stress (financial risk), and therefore a lower COE. On the other hand, a lower common equity ratio means more debt, a higher chance of financial stress (financial risk), and therefore a higher COE. Based on a regression analysis of dozens of utility companies, I found a 0.04% reduction in the cost of equity results for every 1% increase in the common equity ratio. Therefore, if the Commission authorizes a capital structure with a higher common equity ratio for a specific applicant, then the authorized ROE for that applicant should be reduced by 0.04% for every 1% its authorized common equity ratio exceeds that of the proxy group.[53]

Q. WHAT COST OF DEBT DO YOU RECOMMEND?

A. I recommend adopting Liberty's requested cost of debt of 6.03%.

VII. EVALUATION OF LIBERTY'S RATE OF RETURN TESTIMONY

Q. PLEASE SUMMARIZE THE TESTIMONY OF MS. BULKLEY AND MR. WALL.

A. Ms. Bulkley and Mr. Wall concluded that a reasonable range of ROE estimates for Liberty is from 9.90% to 11.00% based on the results of applying their own modified versions of the following COE models to a proxy group of 17 electric utility companies[54]: 1) DCF model, 2) CAPM, 3) ECAPM and 4) Bond Yield Risk Premium ("BYRP").[55] As outlined in Table 9 on page 77, Ms. Bulkley and Mr. Wall's COE models provide equity cost rate estimates between 7.39% and 11.69%.

[53] Earlier in testimony I provide the specific adjustments required if Ms. Bulkley and Mr. Wall's capital structure recommendation is used to set rates.
[54] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 30, Figure 6.
[55] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 5, lines 13-16 and Page 6, Figure 1.

Ms. Bulkley and Mr. Wall claim that Liberty's requested ROE of 10.35% "is reasonable" after considering the results of their quantitative and qualitative analyses and the business risks faced by Liberty.[56]

TABLE 9: MS. BULKLEY AND MR. WALL'S COST OF EQUITY RESULTS	
METHOD	**Model Results**
Constant Growth DCF - Earnings Growh	8.09% - 10.48%
Constant Growth DCF - Retention Growh	7.39% - 10.48%
CAPM	10.41% - 11.43%
ECAPM	10.93% - 11.69%
Bond Yield Risk Premium	10.12% - 10.21%
Ms. Bulkley and Mr. Wall's Average Cost of Equity Model Results	**7.39% - 11.69%**

[1] Ms. Bulkley and Mr. Wall's Direct Testimony, Attachment AEB/CMW-2

Q. IS THEIR CONCLUSION BASED ON INVESTORS' EQUITY RETURN EXPECTATIONS AS INDICATED BY MARKET DATA?

A. No. Ms. Bulkley and Mr. Wall state that the cost of equity is market-based[57] and Liberty's authorized ROE should be a forward-looking estimate.[58] They states that the "key consideration" in calculating the cost of equity is to "ensure that the methodologies employed reasonably reflect investors' views…"[59] However, when applying their approaches, there are key places where they use analyst forecasts (non-market-based) instead of market-based data (e.g., stock and stock option prices) and/or uses backward looking data. For example, the risk premium component of their CAPM analysis, which is based on analyst forecasts, includes a higher expected return on the overall market

[56] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 78, lines 9-12.
[57] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 31, lines 7-9.
[58] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 5, lines 1-6.
[59] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 31, line 15 and Page 32, lines 1-3.

(12.50%) than my market-based analysis indicates.[60] As shown on Chart 13 on page 42, a market-based analysis shows that the COE for the overall market is about 8.2% at the 14-month horizon to 7.2% at the 5-year horizon.

The forecasts of individual analysts, even from respected sources like Bloomberg, may or may not reflect investors' views on the market because, if for no other reasons, the analyst who covers a particular stock could be on vacation. Therefore, I believe it is preferable to use market data as much as possible to best measure investors' expectations and the cost of equity for utility companies.

Q. DOES MS. BULKLEY AND MR. WALL'S SOURCES CONTRADICT THEIR OWN CONCLUSIONS?

Yes. Ms. Bulkley and Mr. Wall's approach to determining, and justifying, the equity risk premium component of their CAPM analysis involve using isolated data from their sources contradict the big picture conclusions made by their own sources. For instance, they use Bloomberg's forecasted earnings per share growth rate data to calculate an equity risk premium of nearly 9%.[61] This figure significantly differs from Bloomberg's published equity risk premium of 5.5%. The latter was utilized by Ms. Bulkley and Mr. Wall's Brattle Group colleague in a cost of capital proceeding I was involved in earlier this year.[62] The difference between their equity risk premium and Bloomberg's reveals a selective, or fragmented, approach to data selection, showing a tendency to favor information that

[60] Ms. Bulkley and Mr. Wall's Direct Testimony, 45, lines 5-13.
[61] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 45, lines 12-13.
[62] Direct Testimony of Michael R. Tolleth, Application of Great Oaks Water Company, California Water Cost of Capital Proceeding, May 1, 2023.

reinforces an unreasonably high equity risk premium. They should not ignore Bloomberg's published equity risk premium figure of around 5.5% without good reason.

Furthermore, Ms. Bulkley and Mr. Wall use historical data from Kroll 2023 SBBI Yearbook to support their forward-looking equity return expectations and the equity risk premium component of their CAPM analysis.[63] They claim that annual equity returns over the past century indicate the current expected market return of 12.50% that they used to calculate the equity risk premium component of 8.60% to 8.79% is "not unreasonable."[64] However, their justification is flawed because they failed to consider if investors expect future returns to be different than past returns. Their own source, the Kroll SBBI Yearbook, considered if investors might consider future equity returns to be different than the past. The authors of this book looked beyond historical data and concluded that "the current [price-to-earnings] ratio is the market's best guess for the future of corporate earnings."[65] Based on this current market data, the Kroll 2023 SBBI Yearbook calculated a long-term market return of only 9.45% and a geometric supply-side equity risk premium of 4.39%."[66]

Ms. Bulkley and Mr. Wall's selective use of data form their sources raises significant doubts about the reasonableness and reliability of the equity risk premium portion of their CAPM analysis.

[63] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 45-46.
[64] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 45, lines 16-18.
[65] Kroll 2023 SBBI Yearbook, Page 199.
[66] Kroll 2023 SBBI Yearbook, Page 197-199.

Q. YOU STATED EARLIER THAT MS. BULKLEY AND MR. WALL'S CLAIM THAT THE DCF MODEL IS CURRENTLY UNDERSTATING IS NOT VALID. PLEASE EXPLAIN MORE ABOUT WHY HER CLAIM IS NOT TRUE.

A. Their claim that utility stocks are expected to underperform in the near term[67] is problematic for at least the following two reasons. First, they do not base their claim regarding future utility stock price on current investor expectations. Their claim is based on historical patterns that may or may not repeat, personal opinions and speculation. Second, they do not use a multi-stage DCF model to directly test how the COE results would be impacted if, in fact, investors expect utility stocks to underperform in the near term. The multi-stage DCF model can measure how the cost of equity is impacted by periods of utility stock price underperformance because it can account for different growth rates over different time periods. For example, in a multi-stage DCF model, it is possible to use relatively low growth rate during a period of expected underperformance, like Ms. Bulkley and Mr. Wall is claiming in this case, following by a higher growth rate. All else equal, if investors expect utility stocks to decline in value, the DCF indicated COE would be lower. This makes sense because if investors expect lower stock prices, all else equal, they are expecting to bring in less money when they sell the stocks. If they expect to sell their stock for a lower price in the future, they are expecting a lower return on their investment equity investment than they would if they expected utility stocks to overperform the overall market.

[67] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 23, lines 8-12.

Q. DO THE RESULTS OF MS. BULKLEY AND MR. WALL'S COST OF EQUITY MODELS PROVIDE A RELIABLE INDICATION OF LIBERTY'S COST OF EQUITY?

A. No. Ms. Bulkley and Mr. Wall's 10.35% ROE recommendation is significantly higher than Liberty's market-based cost of equity. If their recommendation is used to set rates, consumers will be overcharged. Ms. Bulkley and Mr. Wall's 10.35% ROE recommendation is excessive largely because: (1) their COE calculations are based on a flawed analytical approach and an inappropriate definition of the cost of equity, despite defining it correctly in considerable portions of filed testimony, (2) their interpretation of current capital markets includes unknowable and/or speculative predictions, (3) their claims regarding how current capital markets are impacting the DCF model is incorrect, and (4) their unrealistically higher equity risk premium that is based on the selective use of data that contradicts the conclusions drawn from their own cited sources.

Additionally, each of their COE models has specific issues that contribute to their unreasonably high results. First, I will address how their constant growth DCF method is unreliable because it mechanically uses analyst 5-year EPS growth rates as a proxy for growth without considering the mathematical relationship between retention rates, dividend payments, and growth. A company cannot invest and grow with money it has paid out to investors as a dividend. Second, I will discuss why I believe their CAPM/ECAPM methodologies overstate the cost of equity by using an inflated equity risk premium component.

DCF Method

Q. WHAT FORMULA DO MS. BULKLEY AND MR. WALL USE IN THEIR DCF ANALYSIS?

A. $$k = \frac{D_0(1+g)}{P_0} + \text{g}$$ [68]

Where:

k: discount rate (aka the market – required ROE);
P_0: current *stock price*;
D_0: *dividend yield*;
g: expected long – term *growth rate*.

Q. DO MS. BULKLEY AND MR. WALL PROPERLY APPLY THE SIMPLIFIED OR CONSTANT GROWTH DCF METHOD?

A. No. Ms. Bulkley and Mr. Wall explain correctly that the constant growth DCF method "assumes" a single growth rate in perpetuity and that "one must assume that the dividend payout ratio remains constant and that earnings per share, dividends per share, and book value per share all grow at the same constant rate."[69] However, their DCF method contradicts their own description of how the constant growth model should be implemented. Their growth estimate relies almost entirely on analyst five-year EPS growth forecasts.[70] The correct application of the DCF method requires that the dividend yield be computed properly, and that the growth rate used be derived from a careful study of what future *sustainable* growth in cash flow is anticipated by investors. As discussed above,

[68] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 34, lines 2-12.
[69] Ms. Bulkley and Mr. Wall's Direct Testimony, Page, 36, lines 3-6.
[70] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 36, lines 10-13.

major financial institutions like J.P. Morgan Chase do not use a growth rate based on analyst 5-year EPS growth rates as Ms. Bulkley and Mr. Wall have done. Please see Appendix B for explanation of why a future-oriented "B X R" method is superior to Ms. Bulkley and Mr. Wall's DCF method.

Q. ARE THERE ADDITIONAL REASONS WHY IT IS NOT APPROPRIATE TO USE ANALYSTS' EARNINGS GROWTH RATE PROJECTIONS AS A PROXY FOR GROWTH IN THE DCF MODEL?

A. Yes. A study conducted by McKinsey & Company in 2010 found that "analysts have been persistently over optimistic for the past 25 years with estimates ranging from 10 to 12 percent a year, compared with actual earnings growth."[71]

On average, analysts' forecasts have been almost 100 percent too high.[72] . Capital markets, on the other hand, are notably less giddy in their predictions. Except during the market bubble of 1999-2001, actual price-to-earnings (P/E) ratios have been 25 percent lower than implied P/E ratios based on analyst forecasts.

To my knowledge, financial publications do not recommend using EPS growth rates to calculate the cost of equity in a DCF model. McKinsey & Company continues to advise its clients to be cautious about the reliability of analysts' forecasts. On May 16, 2022, McKinsey stated that "analysts' near-term forecasts are often overly optimistic and don't always correctly reflect operating performance."[73]

[71] Marc H. Goedhart, Rishi Raj and Abhishek Saxena, *Equity Analysts: Still too bullish*, Spring 2010. https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/equity-analysts-still-too-bullish
[72] *Id.*.
[73] David Kohn, Vartika Gupta, Tim Koller, Werner Rehm, *Do consensus estimates accurately reflect operating performance?*, May 16, 2022.

Even if equity analysts' forecasts were not upwardly biased, as discussed in my above, adding earnings per share growth forecasts to a dividend yield without considering the retention rate produces a flawed result. Using an earnings per share growth forecast as the growth component in a DCF model is like measuring how much money you will have in your bank account by simply adding up your paychecks. This only works if you spend no money. If you do not consider what percentage of your paycheck you will retain in your account and what percentage you will spend, your calculations will be wildly optimistic and inaccurate similar to using earnings per share growth in a DCF.

Q. WHY DOES MS. BULKLEY AND MR. WALL'S DCF MODEL PRODUCE A HIGHER RESULT THAN YOUR CONSTANT GROWTH DCF METHODS?

A. The primary reason our DCF models produce different COE results is because of the growth rate component. Ms. Bulkley and Mr. Wall's DCF analysis using analyst 5-year EPS growth rate projections produces an average cost of equity result for their proxy group of 7.93% and 10.48%.[74] My sustainable growth DCF and option-implied growth DCF methods produce cost of equity results of 8.32% - 8.58% and 8.67% - 9.45% respectively.[75] Ms. Bulkley and Mr. Wall use an average growth rate components of 1.39% to % for their entire proxy group, with an average growth rate of between 1.39% and 10.50% for the individual companies in their proxy group.[76] I use and average growth rate component of 4.17% to 5.02%.[77] The low end of Ms. Bulkley and Mr. Wall's DCF results are within range of my results, lower in some cases, but the high end of their DCF results (10.48%)

[74] Ms. Bulkley and Mr. Wall's Direct Attachment AEB/CMW-4, Pages 1-3.
[75] Exhibit ALR-2.
[76] Ms. Bulkley and Mr. Wall's Direct Testimony, Attachment AEB/CMW-4, Page 1-3.
[77] Exhibit ALR-3, Page 1 and 2.

is so high because they use unsustainable growth rates as high as 10.5%. It is not appropriate to mechanically use analyst EPS growth rate projections in a constant growth DCF model, as Ms. Bulkley and Mr. Wall have done, because relatively short-term growth rate projections (5-years), even if accurate, may not be realistic to achieve in the long-term. Using unrealistically high growth rates in the constant growth DCF model can significantly inflate the cost of equity.

CAPM Method

Q. PLEASE DESCRIBE MS. BULKLEY AND MR. WALL'S CAPM METHOD.

A. Ms. Bulkley and Mr. Wall explain that the CAPM method "estimates the cost of equity for a given security as a function of a risk-free return plus a risk premium to compensate investors for the non-diversifiable, 'systematic' risk of that security."[78] They says that this method is defined by the following four components:

$$K_e = r_f + \beta\,(r_m - r_f)$$

Where:

K_e = the required market ROE;
β = beta coefficient of an individual security;
r_f = the risk-free rate of return; and
r_m = the required return on the market. [79]

They also consider an Empirical CAPM (ECAPM). Ms. Bulkley and Mr. Wall claim the ECAPM is necessary because academic research indicates that the risk return relationship is different than the one estimated by the CAPM.[80] This method includes the

[78] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 43, lines 6-8.
[79] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 43, lines 12-22.
[80] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 47, lines 6-12.

same four components as the CAPM, but they applies a 75% weighting to the beta coefficient and the market risk premium portion of the equation and a 25% weighting to the market risk premium, without the beta coefficient impact. ECAPM formula:

$$K_e = r_f + 0.75\beta\,(r_m - r_f) + 0.25\,(r_m - r_f)$$[81]

The specific weightings (0.75 and 0.25) in the formula above flatten the security market line to be consistent with historical return data. In other words, these weightings make the cost of equity for a company with a beta under one a higher and the cost of equity for a company with a beta above 1 lower. The effect of this adjustment is to increase the cost of equity for regulated utility companies because they almost always have a beta less than one.

Q. WHAT RISK-FREE RATE DO MS. BULKLEY AND MR. WALL USE IN THEIR CAPM?

A. They used the following three risk-free rates: (1) Current yield on 30-year Treasury bonds (3.71%), (2) Projected (Q2 2023 through Q2 2024) yield on 30-year Treasury bonds (3.82%), and (3) Projected (between 2024 and 2028) yield on 30-year Treasury bonds (3.90%).[82]

Q. WHAT BETA COEFFICIENT DO MS. BULKLEY AND MR. WALL USE IN THEIR CAPM?

A. They used the following two historical beta coefficients of each of the companies in their proxy group: (1) Bloomberg 10-year weekly return relative to the S&P 500 index, (2) Value

[81] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 46, line 10.
[82] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 44, lines 7-12.

Line 5-year historical weekly return relative to the New York stock exchange composite index, and (3) long-term averages from 2013 through 2022.[83]

Q. WHAT RISK PREMIUM DOES MS. BULKLEY AND MR. WALL USE IN THEIR CAPM?

A. The market risk premium of Ms. Bulkley and Mr. Wall's CAPM analysis is based on the difference between an implied expected equity market return (12.50%) and a risk-free rate (3.71% - 3.90%).[84] They calculated the implied expected equity market return of 12.50% by using a DCF model with a dividend yield equal to that of the current dividend yield of S&P 500 (1.75%) and a growth rate component equal to Bloomberg's published consensus annual EPS growth rate of the S&P 500 over the next five years (10.65%).[85] They estimated a market risk premium of between 8.60% and 8.79%.[86]

Q. DO MS. BULKLEY AND MR. WALL USE AN APPROPRIATE RISK-FREE RATE IN THEIR CAPM?

A. In principle, no. The risk-free rate component of Ms. Bulkley and Mr. Wall's CAPM is not appropriate because it is based considerably on economist published projections and not investors' expectations as indicated by current market yields. Interest rates have increased since Ms. Bulkley and Mr. Wall filed their testimony, and the forecasted yields they used in their CAPM are now lower than the market-based risk-free rates that I used in my CAPM analysis. As outlined in Exhibit ALR-4, page 2, my spot and weighted average short-term risk-free rates are 5.59% and 5.57%, respectively. My spot and weighted average long-

[83] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 44, lines 13-18 and Page 45, lines 1-4.
[84] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 44, lines 7-12.
[85] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 45, lines 5-13.
[86] *Id.*

term risk-free rates are 5.04% and 4.73%, respectively. These four rates average 5.23%. The risk-free rate component of Ms. Bulkley and Mr. Wall's CAPM analysis is between 3.71% for the current 30-day average market yield and 3.90% for projected yield on 30-year U.S. Treasury bonds.[87]

Ms. Bulkley and Mr. Wall's use of interest rate forecasts is wrong in principle because current market yields on U.S. Treasury bonds indicate market expectations. As discussed above, Liberty's authorized ROE should be market-based because investors provide the capital. In this case, Ms. Bulkley and Mr. Wall's use of interest rate forecasts to determine the risk-free rate component does not inflate their CAPM result. However, their CAPM method should not be used to set rates in future New Hampshire proceedings because it could produce inaccurate cost of equity results (too high or too low) in different capital market conditions.

Q. DOES MS. BULKLEY AND MR. WALL'S BETA COEFFICIENTS OVERSTATE THE COST OF EQUITY?

A. Yes. Ms. Bulkley and Mr. Wall's CAPM results are not a reliable indicator of the cost of equity because they use historical beta coefficients. The 5-year and 10-year historical betas they use in their CAPM analysis are higher than indicated by more current market data, averaging 0.88 and 0.81 respectively.[88] Ms. Bulkley and Mr. Wall also used beta coefficients based on long term averages of 0.76[89] which is in line with current market conditions. Over the past 3 months, my forward-looking option-implied betas have had a

[87] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 44, lines 7-12.
[88] Ms. Bulkley and Mr. Wall's Direct Testimony, Schedule AEB/CMW-7.
[89] Ms. Bulkley and Mr. Wall's Direct Testimony, Schedule AEB/CMW-7.

weighted average of 0.78[90] and my 6-month and 2-year historical betas for the RFC Electric Proxy Group have had a weighted average of 0.796 and 0.744, respectively, over the past 3 months.[91]

Q. UPON CLOSER EXAMINATION OF MS. BULKLEY AND MR. WALL'S SOURCES AND OTHER PROMINENT SOURCES, DO YOU BELIEVE THAT THE EQUITY RISK PREMIUM PORTION OF MS. BULKLEY AND MR. WALL'S CAPM ANALYSIS IS REASONABLE?

A. No, I believe Ms. Bulkley and Mr. Wall's equity risk premium component of between 8.60% and 8.79% is excessive and lead to inflated CAPM results of between 10.41% and 11.69%.[92] The CAPM indicates a COE averaging close to 8% using a reasonable equity risk premium component. As explained in the CAPM section starting on page 57, I determined that investors are demanding a significantly lower equity risk premium of between 3.5% and 4.34%. Closer examination shows that Ms. Bulkley and Mr. Wall's own sources (Kroll and Bloomberg) and other prominent sources arrive at substantially lower numbers than Ms. Bulkley and Mr. Wall.

Kroll

As discussed above, Ms. Bulkley and Mr. Wall cite Kroll SBBI Yearbook to justify their claim that their equity risk premium is "not unreasonable" because in 50 of the past 97 years (about 52% of observations), the realized return was 12.50% or greater.[93] Their conclusion that this analysis supports their equity risk premium of 8.60% to 8.79% is

[90]Exhibit ALR-4, page 3.
[91] Exhibit ALR-4, page 3.
[92] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 48, Figure 9.
[93] Ms. Bulkley and Mr. Wall's Direct Testimony, page 45, lines 16-19.

flawed for at least two reasons.[94] First, it is not reasonable to conclude that investors expect that equity returns will be as high in the future as in the past. Kroll calculates a supply-side equity risk premium to account for evidence that equity returns may be lower in the future than they were since 1926.[95] Ms. Bulkley and Mr. Wall's equity risk premium is inflated because they do not conduct a comprehensive analysis to consider if historical equity returns are sustainable or not. Second, Ms. Bulkley and Mr. Wall base their analysis on annual returns between 1926-2021. In other words, they on returns on a one-year timeframe, which is problematic.[96] The cost of equity should be measured over long periods, not just yearly returns. A one-year view is arbitrary and inconsistent with the long-term perspective needed, especially when juxtaposed with the 30-year treasury bonds used as a risk-free rate benchmark. Ideally, a five-year rolling return average, or better yet, a 30-year period, should be used to align with the long-term investment horizon we are trying to measure.

Bloomberg

As discussed above, if we refer to Bloomberg, which they use in their equity risk premium calculations, we see that Bloomberg determined a significantly lower equity risk premium about 5.5% recently.

Other Prominent Sources

This discrepancy is evident even when consulting other respected sources, like Professor Aswath Damodaran from NYU (who finds an equity risk premium of 4.88% as

[94] Ms. Bulkley and Mr. Wall's Direct Testimony, Exhibit AEB/CMW-7, pages 1-9.
[95] Kroll 2023 SBBI Yearbook, Page 197-202.
[96] Ms. Bulkley and Mr. Wall's Direct Testimony, page 45, lines 14-19 and Page 46, Figure 8.

of November 2023),[97] and further supports the argument that Ms. Bulkley and Mr. Wall's equity risk premium estimation is excessively high.

Additionally, based on calculations by P. Brett Hammond and Martin L. Leibowitz, which were based on a literature survey and estimates from participants in the 2001 Equity Risk Premium Forum, they found the most frequent estimate of the 10-year equity risk premium to be 4. Some attendees at the Equity Risk Premium Forum in 2012 found the following slide regarding the equity risk premium to be most memorable.

[97] Aswath Damodaran, *Implied ERP by month for previous months (September 2008-Current),* Dec. 8, 2023, https://pages.stern.nyu.edu/~adamodar/pc/implprem/ERPbymonth.xlsx.

4.

The authors of *Revisiting the Equity Risk Premium* noted "Despite radically different market environments, it is striking that the estimates in all three forums and were so similar. They tended to be in the 3%–5% range, and notably and notably, in comparison to historical returns, none of them included estimates above 7% or below zero," The three forums were in 2001, 2011, and 2021.[98]

[98] P. Brett Hammond & Martin L. Leibowitz, CFA Institute Research Foundation, Revisiting the Equity Risk Premium*, Introduction: Three Decades of Equity Risk Premium Forums, p. vi, (2023)* available at https://www.cfainstitute.org/-/media/documents/article/rf-brief/Revisiting-the-Equity-Risk-Premium.pdf.

In summary, Ms. Bulkley and Mr. Wall's CAPM results are unreasonably high, because their equity risk premium component is above current market-based indicators (my own analysis based on stock option prices, the sources they uses, which are Kroll and Bloomberg, and the conclusions of other prominent research).

Q. DO MS. BULKLEY AND MR. WALL'S CAPM RESULTS OVERSTATE THE COE BECAUSE THE MARKET RISK PREMIUM PORTION OF THEIR ANALYSIS IS HIGHER THAN INVESTORS' EXPECTATIONS?

A. Yes. Ms. Bulkley and Mr. Wall's CAPM uses a market risk premium of 8.60% to 8.79% based on an expected market return on the S&P 500 of 12.50%.[99] The equity risk premium portion of my CAPM, which is based on a directly measure of investors' expectations, is significantly lower than Ms. Bulkley and Mr. Wall's. The market risk premia I use in my Weighted Average CAPM analysis with short- and long-term risk-free rates are 3.50% and 4.34%, respectively.[100] The market risk premia I use in my Spot CAPM analysis with short- and long-term risk-free rates are 3.67% and 4.22%, respectively.[101,102]

Bond Yield Plus Risk Premium analysis

Q. PLEASE DESCRIBE MS. BULKLEY AND MR. WALL'S BOND YIELD PLUS RISK PREMIUM ANALYSIS.

A. Ms. Bulkley and Mr. Wall's Bond Yield Plus Risk Premium analysis is based on the risk premiums implied by the difference between authorized ROEs and long-term Treasury

[99] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 45, lines 5-13.
[100] Exhibit ALR-4, Page 1.
[101] Exhibit ALR-4, Page 5
[102] Both market risk premia happen to be the same because short- and long-term risk-free rates happen to be the same as of 10/31/2023.

bond yields.[103] They determined that the average difference between authorized ROEs and Long-Term Treasury bonds between 1992 and July 2022 was 6.41% based on the current 30-day average of the 30-year Treasury bond yield and 6.35% based on projected interest rates.[104] Ms. Bulkley and Mr. Wall also performed a regression analysis that they claim shows "there was a strong negative relationship between risk premia and interest rates,"[105] They say it is important to develop an analysis that reflects this inverse relationship between interest rates and the risk premia.[106] Based on their regression analysis, they find the following estimated ROEs:

1. 10.12% based on Current 30-day average of 30-year U.S. Treasury bond;
2. 10.17% based on near-term projections of U.S. Treasury bond yield; and
3. 10.21% based on longer-term (2024 – 2028) projections of U.S. Treasury bond yield.[107]

Q. SHOULD MS. BULKLEY AND MR. WALL'S BOND YIELD PLUS RISK PREMIUM ANALYSIS BE CONSIDERED?

A. No. The foundation of Ms. Bulkley and Mr. Wall's analytical methodology is flawed because it is not market-based. In their DCF and CAPM methods they at least include some market data (e.g., stock prices). In the case of their Bond Yield Plus Risk Premium analysis, they rely on limited market data. The overriding problem with Ms. Bulkley and Mr. Wall's Bond Yield Plus Risk Premium analysis is that it does not address the cost of equity at all. They simply calculate the historical relationship between authorized ROEs

[103] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 48, lines 4-12.
[104] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 51, lines 3-10.
[105] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 50, lines 2-3.
[106] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 49, lines 5-6.
[107] Ms. Bulkley and Mr. Wall's Direct Testimony, Page 51, lines 3-10.

and interest rates. Authorized ROEs are applied to book equity and, therefore, in order to determine investors' return expectations, it is required to consider the market price investors are willing to pay for the companies with these authorized ROEs.

Q. PLEASE SUMMARIZE YOUR CONCERNS WITH MS. BULKLEY AND MR. WALL'S TESTIMONY.

A. Ms. Bulkley and Mr. Wall's 10.35% ROE recommendation is significantly higher than Liberty's market-based cost of equity. Ms. Bulkley and Mr. Wall's 10.35% ROE recommendation is excessive largely because: (1) the high end of their DCF results (10.89%) is based on unsustainably high growth rates, (2) their CAPM analysis is based on excessive market risk premia that exceed the expectations of investors as indicated by stock option data, including evidence that investors expect the COE to decline in the future. If their recommendations are used to set rates, consumers will be significantly overcharged.

Q. PLEASE LIST THE ADDITIONAL FACTORS THAT MS. BULKLEY AND MR. WALL CLAIMS MUST BE TAKEN INTO CONSIDERATION WHEN DETERMINING THE COMPANY'S COST OF EQUITY.

A. Ms. Bulkley and Mr. Wall the following additional factors must be considered when determining Liberty's Cost of Equity:

A. Capital Expenditures

B. Regulatory Risk

C. Small Size Risk

D. Flotation Cost

Q. DO YOU AGREE WITH MS. BULKLEY AND MR. WALL THAT THE REGULATORY AND BUSINESS RISKS THEY CONSIDER IMPACT LIBERTY'S COE?

A. No. I do not believe that Liberty's COE is impacted by any of these factors and its authorized ROE should not be any higher.

Risks associated with capital expenditure program

Q. MS. BULKLEY AND MR. WALL CLAIMS THAT LIBERTY'S CAPITAL SPENDING PROGRAM MAY INCREASE THE COMPANY'S RISK RELATIVE TO THE PROXY COMPANIES. PLEASE RESPOND.

A. In general, a capital spending program is an opportunity for Liberty to increase its rate base and therefore its earnings. With the market-to-book ratios of electric utility companies significantly higher than one, every dollar that is invested in rate base has a market value that is significantly higher than the value it is investing. For example, if Liberty increases it's rate base by $100,000 million it would increase its market value to over $150 million because the market-to-book ratio of electric utility stocks is over 1.5 to 1. I am not convinced that such a business opportunity should in any way, make the Commission consider increasing Liberty's authorized ROE in this proceeding. Additionally, as acknowledged by Ms. Bulkley and Mr. Wall, Liberty has a capital tracking mechanism that decreases the pressure on cash flow and the risk from possibly negative impacts from regulatory lag.

Regulatory Risk

Q. DO MS. BULKLEY AND MR. WALL ADJUST THEIR ROE RECOMMENDATION TO ACCOUNT FOR REGULATORY RISK?

A. No. They state that Liberty regulatory risk is generally consistent with the proxy group.

Q. DO YOU AREE THAT NO ADJUSTMENT SHOULD BE MADE TO LIBERTY'S ROE TO ACCOUNT FOR REGULATORY RISK.

A. Yes.

Small Firm Effect

Q. PLEASE RESPOND TO MS. BULKLEY AND MR. WALL'S CLAIM THAT LIBERTY'S AUTHORIZED ROE SHOULD BE SET ABOVE THE MEAN ANALYTICAL RESULTS BECAUSE OF ITS SMALL SIZE.

A. I believe my COE models applied to Ms. Bulkley and Mr. Wall's Proxy Group reflect Liberty's COE for two reasons. First, Liberty is not a small company because it is a subsidiary of SJW Corp that has a market capitalization of over $2 billion as of November 30, 2023. Second, even if we assume Liberty is a small company, the evidence indicates that investors do not demand a higher expected return on equity to invest in small companies as compared to larger ones. The 2021 SBBI Yearbook states the following regarding the theory that investors require higher returns to invest in smaller firms:

> The size effect Is not without controversy, nor is this controversy something new. Traditionally, small companies are believed to have greater required rates of return than large companies because smaller companies are inherently riskier. It is not clear, however, whether this is due to size itself, or to other factors closely related to or correlated with size…[108]

[108] Ibbotson SBBI® 2021 Classic Yearbook, page 7-2.

Many scholars have expressed concerns with the results of older studies (1980s and 1990s) that found that smaller companies have higher required returns. Professor Aswath Damodaran said the following regarding the supposed "small cap premium:"

> Even if you believe that small cap companies are more exposed to market risk than large cap ones, this is a sloppy and lazy way of dealing with that risk, since risk ultimately has to come from something fundamental (and size is not a fundamental factor). [109]

Q. HAVE RECENT STUDIES FOUND THAT THE RELATIONSHIP BETWEEN SIZE AND EXPECTED RETURN IS WEAK?

A. Yes. A 2018 study conducted by scholars at AQR Capital Management and Yale University found that "the size effect diminished shortly after its discovery and publication." The authors of this research found that data errors plagued the early studies regarding the relationship between firm size and return. They found that the data in the earlier studies did not include delisted companies and since smaller firms are delisted more often than larger stocks, the biased data (referred as a "delisting bias") made the returns of smaller stocks look higher than reality. In light of this recent data, Ms. Bulkley and Mr. Wall's claim that Liberty's smaller size justifies an authorized ROE toward the upper end of the range of COE model results is unjustified, and should be disregarded.

Q. PLEASE SUMMARIZE YOUR CONCERNS WITH MS. BULKLEY AND MR. WALL'S TESTIMONY.

A. Ms. Bulkley and Mr. Wall's 10.35% ROE recommendation is significantly higher than Liberty's market-based cost of equity. Ms. Bulkley and Mr. Wall's 10.35% ROE

[109] Aswath Damodaran, Equity Risk Premiums (ERP): Determinates, Estimation and Implications – The 2014 Edition (paper updated, March 2015) page 42.

recommendation is excessive largely because: (1) the high end of their DCF results (10.89%) is based on unsustainably high growth rates, (2) their CAPM analysis is based on excessive market risk premia that exceed the expectations of investors as indicated by stock option data, including the equity risk premium figures published by their own sources. If their recommendations are used to set rates, consumers will be significantly overcharged.

Flotation costs

Q. PLEASE RESPOND TO MS. BULKLEY AND MR. WALL'S CLAIM THAT FLOTATION COSTS SHOULD BE CONSIDERED IN DETERMINING LIBERTY'S AUTHORIZED ROE.

A. I disagree. The common stock of electric utility companies is currently selling at a market price which is approximately 100 percent above book value.[110] As a result, when a electric utility sells new common stock, the effect is for the book value per share to increase. This makes selling new common stock a net profit center rather than a contributor to costs. Therefore, it is not necessary at this time to allow for flotation costs.

[110] Exhibit ALR-3, row 1, page 1 shows that the market-to-book ratios of the RFC Electric Group is 1.77 based on average stock prices for year ending 10/31/2023, and 1.58 based on market prices as of 10/31/2023.

VIII. CONCLUSION

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS IN THIS CASE.

A. Based on the evidence presented in my testimony, I conclude that the cost of equity allowed for Liberty should be between 8.31% to 8.60% (recommended at 8.45%). Based on my recommended common equity ratio of 46.12%, that results in an overall cost of capital of between 7.08% and 7.21% (recommended at 7.15%).

If the Commission decides to use Liberty's requested capital structure of 55.00% common equity and 45.00% debt instead of my recommended capital structure, I recommend a reduced authorized ROE of 8.10% (7.95% - 8.24%) to account for the lower financial risk of a capital structure with more equity.

My recommendations satisfy the requirements of *Hope* and *Bluefield* that regulated utility companies should have the opportunity to earn a return commensurate with returns on investments in other enterprises having corresponding risks. My recommendations are consistent with legal standards set by the United States Supreme Court and market data and will allow Liberty to raise capital on reasonable terms while fulfilling its obligation to provide safe and reliable service.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.