COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

THE APPLICATION OF COLUMBIA GAS OF KENTUCKY, INC. FOR AN ADJUSTMENT OF RATES, APPROVAL OF DEPRECIATION STUDY, APPROVAL OF TARIFF REVISIONS; AND OTHER RELIEF	**)** **)** **)** **)** **)**	Case No. 2026-00099

DIRECT TESTIMONY

AND EXHIBITS OF

AARON L. ROTHSCHILD

ON BEHALF OF THE

OFFICE OF THE ATTORNEY GENERAL OF THE COMMONWEALTH OF KENTUCKY

August 18, 2026

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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.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION, OR OTHER STATE COMMISSIONS? IF SO, WHICH COMMISSIONS?

A. Yes. My expert witness experience also includes testifying in over 100 cost of capital proceedings before the following state commissions: California, Colorado, Connecticut,

Delaware, District of Columbia, Florida, Kentucky, New Jersey, New York, Maryland, New Hampshire, North Dakota, Pennsylvania, Rhode Island, Tennessee, Vermont, and Washington. 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 Kentucky Attorney General, Office of Rate Intervention (KY AG).

II. INTRODUCTION

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 Columbia Gas of Kentucky, Inc. (Columbia or Company) which includes the following three components:

1. **Cost of Equity:** The return investors require to provide equity capital to a utility with Columbia's specific risk profile.
2. **Cost of Debt:** The prevailing market interest rates and terms associated with the Company's debt obligations.
3. **Capital Structure:** The relative proportions of equity and debt used to fund the Company's operations.

Based on my analysis of these cost of capital components, I recommend an allowed rate of return (ROR) for ratemaking purposes, including an appropriate authorized return on equity (ROE), authorized cost of debt, and authorized capital structure. Please see Appendix A for a more detailed definition and discussion of these specific components.

Q. HOW DO YOU DEFINE YOUR ROLE IN PROVIDING THIS ANALYSIS?

A. My role is to provide the Commission a position and recommendation based on an objective analysis of the Cost of Capital. While my primary recommendation focuses exclusively on the return investors require to fund a utility with Columbia's specific risk profile, my analysis also calculates the cost of equity for the overall market (market cost of equity). I provide this market cost of equity strictly as an economic benchmark and broader market context to ensure a principled and durable decision. My approach is grounded in the following framework:

- **The Commission as the Surrogate for Competition:** Because Columbia operates as a regulated monopoly, the natural price-disciplining pressures of a competitive market are absent. In this vacuum, the Commission must act as a surrogate for the market. This is a significant and often difficult responsibility. It requires that the "price" of capital charged to ratepayers reflect its market cost, neither providing an unearned monopoly premium nor depriving the utility of the capital it needs to provide essential services.
- **Acknowledging the Weight of the Decision:** Former New York State Public Service Commission Chair Alfred Kahn reminds us in *The Economics of Regulation: Principles and Institutions* that the essence of regulation is the replacement of competition.[1] If the authorized return is disconnected from the actual cost of equity, the result is an involuntary subsidy from ratepayers to shareholders—an outcome that undermines the very purpose of regulation.

[1] Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, at 20 (MIT Press 1988).

- **Providing an Informed Path Toward Market Alignment:** In this testimony, I strive to provide objective, market-based information that balances utility financial health with ratepayer protection.

Importantly, keeping authorized ROEs in line with the market-based cost of equity is not just good for residential consumers; it is pro-business. Small businesses, industrial customers, and commercial enterprises all rely on affordable, predictable gas costs to compete and grow. Aligning Columbia's authorized ROE with its cost of equity helps businesses manage their costs, which strengthens the state's overall economy.

Q. ARE YOUR RECOMMENDATIONS CONSISTENT WITH LEGAL REQUIREMENTS?

A. 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"[2] and "sufficient to… support its credit and… raise the money necessary for the proper discharge of its public duties."[3] My recommendations fulfill the *Hope* and *Bluefield* requirements that a utility should be able to raise capital on reasonable terms.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I provide a summary of my recommendations and an overview of cost of equity concepts. Second, I provide a revenue impact analysis. Third, I provide an explanation of the various models I used in my cost of equity calculations. Fourth, I provide a cost of

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

equity analysis for the overall market (market cost of equity) as context for the appropriate ROE for Columbia. Fifth, I provide my capital structure and cost of debt recommendation. Sixth, I provide an evaluation of Columbia's rate of return testimony. And finally, I provide my conclusion.

III. SUMMARY OF RECOMMENDATIONS

Q. PLEASE PROVIDE A SUMMARY OF YOUR RECOMMENDATIONS.

A. I recommend that the Commission reject Mr. Rea's recommended ROE of 10.95% because it significantly exceeds Columbia's actual cost of equity as indicated by current market data. Instead, I recommend that the Commission calculate Columbia's rates based on the following:

- An overall cost of capital of 6.69% (6.33% - 6.71% range);
- An ROE of 8.44% (7.70% - 8.50% range);
- A capital structure containing 48.39% common equity, 50.38% long-term debt, 1.23% short-term debt, and 0.00% preferred equity; and,
- A long-term debt cost rate of 5.04%.

A summary of my cost of capital recommendations for Columbia's natural gas distribution operations is presented in Table 1 below.

TABLE 1: ALR RECOMMENDED RANGE MIDPOINT - COLUMBIA GAS OF KENTUCKY, INC.
Case No. 2026-00099

	Capital Structure Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.38%	5.04%	2.54%
Short-Term Debt	1.23%	5.00%	0.06%
Preferred Equity	0.00%	0.00%	0.00%
Common Equity	48.39%	8.44%	4.08%
Rate of Return			6.69%

Exhibit ALR-1

Q. ARE YOU RECOMMENDING A SPECIFIC ROE OF 8.44% OR AN ROE RANGE OF 7.70% TO 8.50%?

A. I recommend both a range of recommended ROEs and a specific point within that range that I consider to be the most appropriate. It is not possible to measure Columbia's cost of equity with the precision of measuring temperature with a thermometer. However, my recommended ROE range extends from the 60th to the 80th percentile (7.70% to 8.50%) of my cost of equity model results, which I derive by applying that percentile band to the complete set of my model results, without excluding any result. This provides the Commission with a range of ROEs I feel confident will allow Columbia to raise the capital it needs to provide safe and reliable service. I also recommend a specific ROE of 8.44%, which is at the 70th percentile of my overall cost of equity results.

Q. PLEASE SUMMARIZE HOW YOU DETERMINED YOUR 8.44% COST OF EQUITY RECOMMENDATION FOR COLUMBIA.

A. To arrive at my recommendation, I applied the Constant Growth[4] and Non-Constant Growth versions of the Discounted Cash Flow (DCF) and eight variations of the CAPM methodologies[5] to a proxy group of regulated utility companies (the same group used by Mr. Rea). As discussed below, I utilize capital market data and cross-reference the model results of leading financial institutions as an additional check on the reasonableness of my model results.

[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] 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.

I use a proxy group to calculate Columbia's cost of equity because Columbia does not have publicly traded stock data. Additionally, using a proxy group provides more reliable results because it is less likely to be skewed by specific circumstances or anomalies faced by any individual company during the time when I take a snapshot of the cost of equity.

As shown in Table 2, Cost of Equity Model Results, the results of my cost of equity models, including eight variations of the CAPM and six variations of the DCF, range between 5.35% and 9.61%. Applying the 60th to 80th percentile band to that complete set of results produces my recommended cost of equity range of 7.70% to 8.50%, with a recommendation of 8.44%, the 70th percentile of my results.[6]

TABLE 2: COST OF EQUITY MODEL RESULTS		
DCF	**Low**	**High**
Constant Growth - Sustainable Growth	9.57%	9.61%
Constant Growth - Option-Implied Growth	7.78%	8.44%
Non-Constant Growth	8.47%	8.53%
CAPM		
Spot (Jun. 30, 2026)		
Risk Free Rate - 3-Month T Bill	5.35%	6.99%
Risk Free Rate - 30-Yr T Bond	6.04%	7.28%
3-Mo. Weighted Average (Apr. to Jun. 2026)		
Risk Free Rate - 3-Month T Bill	5.61%	6.96%
Risk Free Rate - 30-Yr T Bond	6.36%	7.38%
Recommended Range (Based on Percentiles)	**7.70%**	**8.50%**
Midpoint of Range (Based on Percentiles)	**8.44%**	

Exhibit ALR-2

[6] I apply my recommended percentile range, between the 60th and 80th percentile, to the complete set of cost of equity model results shown in Table 2; no result is removed from the dataset at any stage. All model results are shown in Exhibit ALR-2. As discussed later in my testimony, I select a percentile range consistent with the regulatory principle of gradualism, which allows for a measured transition toward observed market-based costs of equity while ensuring the Company's financial stability is maintained during that transition.

To ensure the robustness and real-world applicability of my findings, I validated these cost of equity model results against the long-term capital market expectations of a broad cross-section of the financial community. As I explore in greater detail later in this testimony, this validation includes data from major financial institutions such as J.P. Morgan and Charles Schwab; and institutional investors, specifically the capital market assumptions of 41 major investment firms and institutional asset managers, including Bank of New York Mellon, BlackRock, and Goldman Sachs Asset Management.

As shown in Table 3 below, major financial institutions, consulting firms, fund managers, and academics inform their clients to expect returns on the overall market (S&P 500) of 5.90% to 8.65%.

TABLE 3: U.S. EQUITY RETURN EXPECTATIONS AMONG MAJOR FINANCIAL INSTITUTIONS, FUND MANAGERS, ACADEMICS, AND MAJOR CONSULTING FIRMS	
J.P. Morgan Asset Management - Equity Long-Term Returns (2026) [1]	**6.70%**
Charles Schwab - 10-year U.S. Large Cap Returns (Jan 2026) [2]	**5.90%**
Horizon Actuarial Services, LLC Survey - 20 Year Horizon (August 2025) [3]	
U.S. Equity - Large Cap (4.8-9.3%, 50% Percentile - 7.1%)	**7.10%**
U.S. Equity - Small / Mid Cap (4.8-10.0%, 50% Percentile - 7.3%)	**7.30%**
Aswath Damodaran (July 1, 2026) [4]	**8.65%**
Duff & Phelps / Kroll (April 2026) [5]	**8.50%**

Sources:
[1] J.P. Morgan Asset Management - 2026 Long-Term Capital Market Assumptions, 2025, page 12.
https://am.jpmorgan.com/content/dam/jpm-am-aem/americas/us/en/institutional/insights/portfolio-insights/ltcma-full-report.p
[2] Schwab's 2025 Long-Term Capital Market Expectations, January 3, 2025.
https://www.schwab.com/learn/story/whats-10-year-outlook-major-asset-classes
[3] Horizon Actuarial Services, LLC, Survey of Capital Market Assumptions Survey, August 2024, page 19.
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.
[4] New York University, Professor Aswath Damodaran
https://pages.stern.nyu.edu/~adamodar/
[5] 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.
Note: J.P. Morgan's 2025 Long-Term Capital Market Assumptions is an annual report.

Market participants responsible for deploying hundreds of billions of dollars in capital provide a range of return expectations that firmly support my 8.44% ROE recommendation. Firms such as Charles Schwab (5.90%), J.P. Morgan (6.70%), and the Horizon Actuarial Survey (7.10% for large-cap) project equity returns well below 8.44%. While sources like Kroll (8.50%) and Aswath Damodaran (8.65%) report a higher cost of

equity, these figures apply to the broader overall market—comprising highly competitive, non-regulated companies such as Apple, Tesla, and Johnson & Johnson. Because a regulated utility like Columbia carries significantly lower risk than the broader market, its required return is inherently lower. Taken together, this data provides a high degree of confidence and confirms that an 8.44% ROE is sufficient for Columbia to attract equity capital.

Q. PLEASE EXPLAIN THE RATIONALE BEHIND YOUR RECOMMENDED COST OF EQUITY RANGE OF 7.70% TO 8.50%, AND YOUR SPECIFIC RECOMMENDATION OF 8.44%.

A. My recommended range of 7.70% to 8.50% extends from the 60th to the 80th percentile, and my ROE recommendation of 8.44% is at the 70th percentile of my overall cost of equity results.

A strict mathematical approach would point to the absolute 50th percentile (the median) of my results, which in this case is 7.33%. While I conclude this lower figure accurately reflects current, observable market-based realities, I am mindful that currently authorized ROEs across the utility industry remain disconnected from these lower market costs.

Rather than recommending an immediate drop to the 7.33% median, I have applied the regulatory principle of gradualism. To bridge the gap between currently authorized returns and actual market realities, I have consciously focused on the upper tail of my results. By establishing a range between the 60th and 80th percentiles, I provide a measured, transitionary ROE recommendation that protects ratepayers from artificially

inflated rates while ensuring the Company's financial stability is maintained during this market correction.

Q. IS THIS THE SAME PERCENTILE RANGE YOU USE IN ALL OF YOUR TESTIMONIES?

A. No, it is not, because the percentile range I apply is based on the distribution of results produced by my models in each case, evaluated against the same gradualism principle discussed above. For example, in my recent testimony before the Washington Utilities and Transportation Commission (the Puget Sound Energy case), I applied a 70^{th} to 90^{th} percentile range to maintain a recommendation consistent with that gradualism principle under that different data distribution.

A key difference between this case and Puget Sound Energy (PSE) is that PSE is an electric utility company. Currently, the DCF sustainable growth rate method produces a very high result (compared to other cost of equity methodologies) for gas companies; this is driven almost entirely by the growth from the sale of new common stock. Because growth from this may not be sustainable in perpetuity, I shifted my percentile range to account for this fact.

In this case, the distribution of results supports a range between the 60th and 80th percentiles, consistent with the same gradualism principle.

Q. HOW DID YOU ARRIVE AT YOUR SPECIFIC RECOMMENDATION OF 8.44%?

A. To arrive at my specific recommendation of 8.44%, I use the 70th percentile of my overall cost of equity results, the results of which come from multiple models. These results do not depend on selecting any one model or result over another. Selecting the 70th percentile

(8.44%) reflects a position within the range that is consistent with the Commission's preference for gradual rate adjustments.

Q. DO THE LONG-TERM CAPITAL MARKET EXPECTATIONS OF THE FINANCIAL COMMUNITY HIGHLIGHT WHY YOUR ROE RECOMMENDATION AND MR. REA'S ARE SO DIFFERENT?

A. Yes. A primary driver of the discrepancy is Mr. Rea's reliance on inputs that introduce an upward bias into his market return expectation. Specifically, his Constant Growth DCF model relies on analysts' consensus earnings per share (EPS) growth projections for the S&P 500, as reported by Bloomberg, to derive an expected market return, which he calculates at 12.55%.[7] Mr. Rea also calculates a DCF estimate of market return for the *Value Line* 1,700 Stock Universe of 10.88%, using *Value Line*'s projected EPS growth rates.[8] He averages both of these estimated market returns and gets an 11.72% prospective market return, which he uses to calculate the market risk premium portion of his CAPM analysis.[9] Both inputs suffer from the same fundamental defect: research and the financial community's own advisors have repeatedly documented that long-term analyst EPS growth projections, whether from sell-side consensus sources like those aggregated by Bloomberg, or from independent services like *Value Line*, are structurally inflated and unreliable proxies for growth in a DCF model.

Regarding the sell-side consensus forecasts underlying Mr. Rea's 12.55% S&P 500 estimate, a study conducted by McKinsey & Company found that "analysts have been

[7] Mr. Rea's Direct Testimony, Attachment VVR-10 at 1. The 11.30% growth rate is identified therein as the "[a]verage long-term consensus earnings growth estimates for the S&P 500 Index (11.30%) reported by Bloomberg Finance L.P."
[8] *Id.*
[9] *Id.*

persistently overoptimistic for the past 25 years, with estimates ranging from 10 to 12 percent a year, compared with actual earnings growth."[10] On average, analysts' forecasts have been almost 100% too high.[11] 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% lower than implied P/E ratios based on analyst forecasts. 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."[12] It is notable that the 11.30% consensus growth rate Mr. Rea adopts for the S&P 500 falls squarely within the 10% to 12% range that McKinsey identified as persistently overoptimistic relative to actual earnings growth.

The same problem afflicts the *Value Line* growth rates underlying Mr. Rea's 10.88% estimate. While *Value Line* is an independent subscription service and does not face the exact same investment banking conflicts as traditional "sell-side" analysts, peer-reviewed academic research demonstrates that its long-term growth projections are nonetheless structurally inflated. A comprehensive study published in the *Journal of Banking & Finance* found that *Value Line*'s three-to-five-year projections for earnings and stock returns "exhibit large positive bias." The authors isolated the root of this bias, noting that it appears to be "entirely due to the extreme upward bias in projected profit margins."[13]

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[10] Marc Goedhart, Rishi Raj and Abhishek Saxena, *Equity Analysts: Still too bullish* (April 1, 2010) at https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/equity-analysts-still-too-bullish.
[11] *Id.*
[12] David Kohn, Vartika Gupta, Tim Koller & Werner Rehm, *Do consensus estimates accurately reflect operating performance?* (May 16, 2022) at https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/the-strategy-and-corporate-finance-blog/do-consensus-estimates-accurately-reflect-operating-performance.
[13] Andrew C. Szakmary, C. Mitchell Conover, & Carol Lancaster, An examination of Value Line's long-term projections, *Journal of Banking & Finance* at 820–833.

The study found that *Value Line*'s three-to-five-year projections lack predictive power, concluding that their "extreme upward bias...calls into question the common practice of using these predictions as proxies for the cost of equity in cost-of-capital studies."[14]

Moreover, even if analysts' EPS forecasts were not upwardly biased, adding an earnings per share growth forecast 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. To my knowledge, financial publications do not recommend using EPS growth rates to calculate the cost of equity in a DCF model. Mr. Rea's market return estimates are therefore overstated twice over: the growth inputs themselves are inflated, and the model structure in which he deploys them compounds the inflation.

Mr. Rea's reliance on inflated market return expectations is not limited to his DCF-based estimates. The market risk premium in his CAPM analysis is an average of two components: the 6.85% prospective premium derived from the 11.72% DCF market return discussed above (11.72% − 4.87% risk-free rate), and a 7.37% historical market risk premium based on data for the period 1926-2025 published in the Kroll Cost of Capital Navigator, which he averages to arrive at the 7.11% market risk premium applied in his CAPM.[15] Although Mr. Rea does not state the market return underlying the 7.37%

[14] *Id.* at 833.
[15] Mr. Rea's Direct Testimony at 78:1-11 and 79:1.

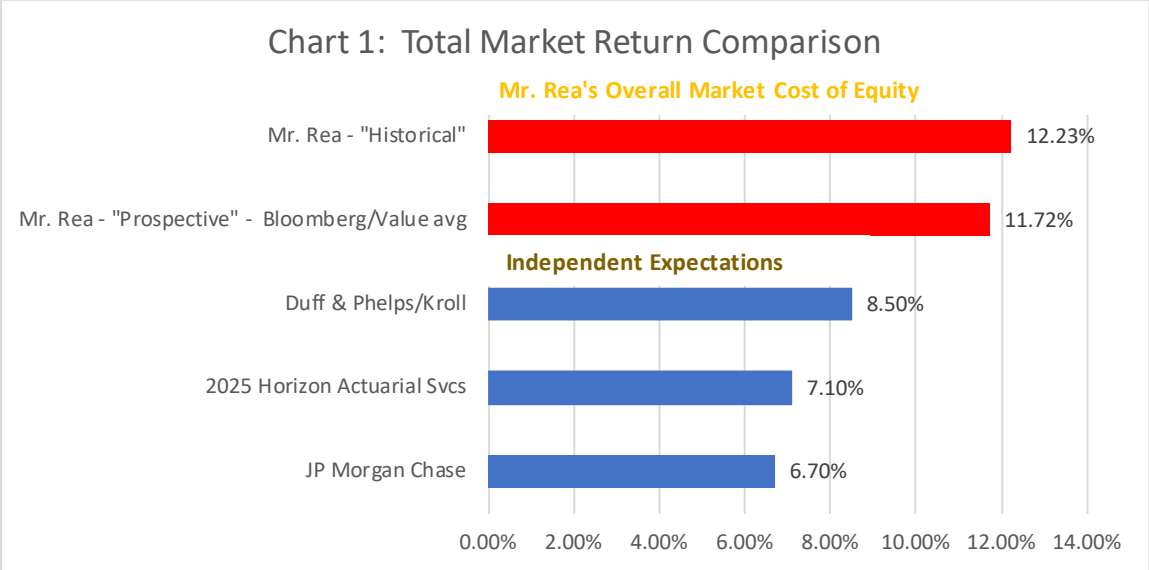
historical premium in his CAPM section, combining it with his 4.87% risk-free rate implies a market return expectation of 12.24%, even higher than his 11.72% DCF-based estimate. Indeed, elsewhere in his testimony Mr. Rea discloses that the same Kroll historical data reflect an arithmetic average annual return of 12.23% for large company stocks (S&P 500 Index) over 1926-2025.[16] In other words, both halves of Mr. Rea's CAPM market risk premium—prospective and historical alike—embed market return expectations of approximately 12%, roughly 5 percentage points above the 6.70% to 7.10% long-term return expectations published by J.P. Morgan and Horizon Actuarial Services, discussed below.

My goal is to ensure that the cost of equity estimates provided to the Commission are empirically sound and reflective of objective economic reality. Grounding the analysis in broader, observable market data ensures that my recommendation more accurately reflects the actual economic environment. Specifically, my CAPM analysis utilizes an overall market return component of 8.22% to 8.72%, which is derived directly from capital market data, including publicly traded stock and stock option prices. This range avoids the well-documented positive bias inherent in analysts' long-term earnings forecasts, whether sourced from Bloomberg consensus estimates or from Value Line.

As shown in Chart 1 below, Mr. Rea's reliance on analyst growth projections produces market return estimates of 12.55% (S&P 500) and 10.88% (Value Line 1,700), which he averages to 11.72%, while broader perspectives and benchmarks from J.P.

[16] Mr. Rea's Direct Testimony at 90:1-7 and Attachment VVR-11 at 4.

Morgan[17] (6.70%) and Horizon Actuarial Services[18] (7.10%) point to a reality that is nearly 40% below what Mr. Rea proposes.



IV. REVENUE IMPACT ANALYSIS

Q. PLEASE COMPARE COLUMBIA'S REVENUE REQUIREMENT IF THE COMMISSION ADOPTS YOUR RECOMMENDATIONS INSTEAD OF MR. REA'S RECOMMENDATIONS.

A. Based on the $609.7 million rate base requested by Columbia in its initial filing, the difference in the revenue requirement is substantial. If my 8.44% cost of equity and capital

[17] J.P. Morgan Asset Management is a global asset management business that annually publishes its Long-Term Capital Market Assumptions to help institutional investors and advisors inform strategic asset allocation. Now in its 30th edition for 2026, this research provides projections that establish reasonable risk and return expectations over a 10- to 15-year time frame across more than 200 asset classes.

[18] Horizon Actuarial Services is an independent consulting firm that provides actuarial services to multiemployer defined benefit pension plans. In its annual Survey of Capital Market Assumptions, now in its 2025 edition, Horizon aggregates future risk and return expectations from 41 different investment advisory firms. This research provides composite forecasts over both 10-year and 20-year horizons to help evaluate the reasonableness of long-term investment return assumptions across various asset classes.

structure recommendations are adopted, the rate of return portion of the revenue requirement would be approximately $49.04 million.

Conversely, if Mr. Rea's 10.95% cost of equity and capital structure recommendations are used, the rate of return portion of the annual revenue requirement would rise to $61.38 million. This represents an annual overcharge to consumers of $12.34 million. It is important to note that this overcharge impacts all customer classes, not just residential ratepayers.

To provide further perspective on the drivers of this difference, if my recommended 8.44% cost of equity were applied to Mr. Rea's proposed capital structure, it would result in a $1.61 million annual revenue impact. This highlights that while the cost of equity is the primary driver, the choice of capital structure also carries significant weight for ratepayers.

I must clarify that these calculations are based specifically on the Company's requested rate base as filed. Because the final rate base is subject to Commission approval, the absolute dollar impact may vary slightly when final rates are set; however, the relative magnitude of the savings remains consistent regardless of the final rate base determination.

TABLE 4: ANNUAL REVENUE IMPACT VS. ROTHSCHILD RECOMMENDATION - COLUMBIA GAS OF KENTUCKY, INC.
($ million)

	Rate of Return Portion of Revenue Requirement	Difference versus Rothschild Recommendation
Rothschild ROE & Cap Structure	$49.04	
Rothschild ROE with Rea Cap Structure	$50.65	$1.61
Rea ROE & Cap Structure	$61.38	$12.34

Source/Inputs:

Requested Rate Base [1]	$609.7
Federal income tax rate	21.00%
State income tax rate	5.00%
Uncollectable Expense	0.00%

[1] Witness Davis, Schedule B-1

V. COST OF EQUITY METHODOLOGY

A. Overview

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

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

My cost of equity recommendation reflects the return investors require to provide equity capital to Columbia 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"[19] and "sufficient to… support its credit and… raise the money necessary for the proper discharge of its public duties."[20]

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 Columbia.

[19] *Hope Nat. Gas*, 320 U.S. at 603.
[20] *Bluefield Water Works*, 262 U.S. at 692–93.

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 cost of equity based on current market prices (market-based) is superior to a cost of equity based on historical data in two respects:

1. The cost of equity that Columbia must pay investors is based on capital markets. The current state of inflation and interest rates are not a secret and therefore market-based cost of equity models will reflect investors' changing expectations.
2. Capital markets are unpredictable. Regarding capital markets' unpredictability, Warren Buffet 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."[21]

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.

Q. HAVE YOUR OVERALL METHODOLOGIES BEEN RECOGNIZED BY OTHER COMMISSIONS?

A. Yes. My CAPM method has been recognized by state utility commissions. On April 9, 2020, the South Carolina Public Service Commission stated the following:

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

> 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.[22]

In a 2024 decision, the California Public Utilities Commission (CPUC) found merit in my analysis and used my cost of equity methodology, including the CAPM and DCF methods I use in this proceeding, to determine the authorized ROEs for California's ten Independent Small Telephone Companies (ILECs).[23]

Q. HOW DID YOU ARRIVE AT YOUR COST OF EQUITY RECOMMENDATION?

A. To arrive at my recommendation, I applied the DCF model, including two Constant Growth methods and one Non-Constant Growth method, and eight variations of the CAPM analysis to a group of similar companies (Rea Gas LDC Group) using data available through June 30, 2026, as discussed below. In all my models, I use both historical averages and the most recently available spot data for the inputs wherever 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 cost of equity results that can vary over short periods of time. It may therefore be tempting to find a more stable value based on

[22] S. Carolina Pub. Serv. Comm'n, *In Re the Application of Blue Granite Water Company for Approval to Adjust Rate Schedules and Increase Rates*, Order Ruling on Application for Adjustment in Rates, Docket No. 2019-290-WS, Order No. 2020-306, at 43 (Apr. 9, 2020), https://dms.psc.sc.gov/Attachments/Order/6bc32f94-f706-4d01-bd64-7be95ae75612.

[23] CPUC, *Decision Determining the Cost of Capital for Ratemaking Purposes for California's Independent Small Telephone Companies*, Application 22-09-003, at 22 (Sept. 16, 2024), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M540/K719/540719032.PDF.

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. However, 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 historical averages and recent spot values when using market data for forward-looking

analyses. That is precisely my approach when using market data that is expected to continue to fluctuate, such as stock prices, dividend yields, betas,[24] 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 changes 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 month as the reference point for all market-based spot data. Additionally, this day serves as the cutoff for calculating 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.

[24] Beta is a component of the Capital Asset Pricing Model (CAPM) used to measure the systematic risk of a security relative to the overall market. Mathematically, it is the covariance of the return on an individual security with the return on the market portfolio, divided by the variance of the market return. In practice, Beta serves as a scaling factor: a Beta of 1.0 indicates a security that moves in tandem with the market, while a Beta below 1.0, typical for regulated utilities, indicates the security is less volatile than the broader market.

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 COLUMBIA'S COST OF EQUITY?

A. My comparable proxy group, shown on Table 5 and referred to as the Rea Gas LDC Group, consists of the following 7 publicly traded gas utility covered by Value Line. Mr. Rea's Gas LDC Group contains the same 7 companies.[25]

TABLE 5: REA GAS LDC GROUP COMPOSITION

	Company Name	Ticker
1	ATMOS ENERGY CORP.	ATO
2	NI SOURCE INC.	NI
3	NEW JERSEY RES.	NJR
4	N.W. NATURAL	NWN
5	ONE GAS, INC.	OGS
6	SPIRE INC.	SR
7	SOUTHWEST GAS	SWX

I chose this proxy group because I believe it contains companies that are relatively comparable in risk to Columbia. However, model results based on this proxy group should be viewed as a conservative estimate of Columbia's cost of equity because these companies have some unregulated natural gas operations which are riskier than natural gas distribution.

[25] Mr. Rea's Direct Testimony at 25:11-18 and 26:1-4.

In a regulated environment, Columbia operates under a regulatory framework that provides for the recovery of prudently incurred costs and a reasonable opportunity to earn a return. Conversely, unregulated operations are riskier because they are subject to competition. Because investors demand a higher return to compensate for greater uncertainty, the proxy group's cost of equity is likely higher than Columbia's cost of equity.

C. Discounted Cash Flow Models

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 9.57% and 9.61% when using a sustainable growth rate,[26] and between 7.78% and 8.44% when using an option-implied growth rate.[27] The results of my non-constant growth DCF method indicate a cost of equity of between 8.47% and 8.53% for the Rea Gas LDC Group.[28]

Q. WHAT IS THE DISCOUNTED CASH FLOW METHOD?

A. The DCF method is an approach to determine the cost of equity. 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

[26] Aaron L. Rothschild's Direct Testimony, Exhibit ALR-3 at 1
[27] *Id.* at 2..
[28] *Id.* at 3-4.

buyer's expectation of the 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.

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 cost of equity 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 as capital expenditures, debt payments, and new investments. These retained earnings show investors whether the company is growing, 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 the equation k= D/P + g, where:[29]

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= b x r + s x v;
b=the earnings retention rate;
r=return on common equity investment (referred to below as "book equity");

[29] Myron J. Gordon, *The Cost of Capital to a Public Utility* at 32–33 (MSU Pub. Util. Studies 1974).

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:

$$k=D/P + (b \times r + s \times v)$$

The cost of equity 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 mathematical relationship between earnings, dividends, book value and stock price must be respected.

The basic difference between the use of an analyst's earnings per share growth rate in the constant growth DCF formula and using the "b x r" (b (the earnings retention rate) times 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.[30]

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 + (b x r + s x v)" 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 is to annualize the current quarterly dividend and increase that amount by one-half of the expected annual growth 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.[31]

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[30] Eugene F. Brigham & Michael C. Ehrhardt, *Financial Management: Theory & Practice* (15th Ed. 2017) (discussing the constant growth model and the mathematical relationship between the retention ratio and return on equity to determine sustainable growth).

[31] 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 $1.04^{0.25}$ - 1 = 0.00985, or 0.985% 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 first quarter, $0.5251 in the second quarter, $0.5303 in the third quarter, and $0.5355 in the fourth quarter. Thus, the total dividends for the

I obtained the stock price—"P"—used in my DCF analysis from the closing prices of the stocks on June 30, 2026. I also obtained an average stock price for the 12 months ending June 30, 2026 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. This computation incorporated these other inputs as well, including the earned return on equity consistent with analysts' consensus earnings growth rate expectations and actual earned returns on equity, as detailed in Rothschild, Exhibit ALR-3.[32] 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.

Since the stock prices for the comparative companies are currently 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. Much like a rental property whose market value doubles, causing the percentage return on that new market price to drop even if the rent and original book value remain constant, an increasing utility stock price mathematically drives down the expected return on the market price relative to the expected return on book equity. This return on book equity expectation used in the DCF method to compute growth must *not* be confused with the cost of equity. If the market price is low relative to book value, the cost of equity will be higher than the future expected

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 fourth 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.

[32] Aaron L. Rothschild's Direct Testimony, Exhibit ALR-3.

return on book equity, and if the market price is high, then the return on book equity will be greater than the cost of equity.

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 from 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. As explained more in Rothschild, Exhibit ALR-10, I used this formula because it represents the "sv" component of the sustainable growth equation, which captures the additional growth in book value per share that occurs when new equity is issued at a premium to book value. The results of that computation are shown on line 4 of Rothschild, 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 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 (June 30, 2026) as well as the average of the high and low stock price over the past 12 months to obtain a range of reasonable values. The DCF result based on the average of the high and low stock price for the year ending June 30, 2026 is 9.57%. As shown in Rothschild, Exhibit ALR-3, page 1, the DCF result based on the stock price as of June 30, 2026 is 9.61%. Rothschild, Exhibit ALR-3, page 1, shows more of the specifics of how I implemented the constant growth form of the DCF model for the Rea Gas LDC 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 Rothschild, 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 Rea Gas LDC Group between 2026 and 2029-31 is 10.07%. The same footnote also shows that the future expected return on equity derived from the Zacks[33] consensus forecast is 8.28%, and that the actual returns on equity earned by the Rea Gas LDC Group on average were 8.75% in 2023, 8.60% in 2024, and 9.37% in 2025. 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 9.10%[34] value of "r".

Q. WHAT COST OF EQUITY 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 cost of equity range of between 9.57% and 9.61% for the Rea Gas LDC Group.[35] 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

[33] Zacks is a prominent research platform that aggregates earnings estimates from independent investment analysts.
[34] I used 9.10% in consideration of historical returns, Zacks's projections, and Value Line projected returns for the Rea Gas LDC Group.
[35] Aaron L. Rothschild's Direct Testimony, Exhibit ALR-3 at 1.

method, the results should be considered as conservatively high. This is because, as previously mentioned above, analysts' forecasts of such growth have been notoriously overstated, and because, as noted, the cost of equity in general is declining.

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 (five years) will remain indefinitely.

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 Rothschild, 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 calculating the Internal Rate of Return (IRR).[36] This multi-stage DCF model produced an average indicated cost of equity of 8.47% based on the year-end stock price, and 8.53% based on average prices for the year ending June 30, 2026 for the Rea Gas LDC Group as shown on Rothschild, Exhibit ALR-3, page 3 and Exhibit ALR-3, page 4.

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 8.47% and 8.53%.[37]

[36] The IRR is the rate of return that an investment is expected to generate. On the other hand, the cost of capital is the minimum return an investment needs to make for it to be worthwhile.
[37] Aaron L. Rothschild's Direct Testimony, Exhibit ALR-3 at 3-4.

D. Capital Asset Pricing Model

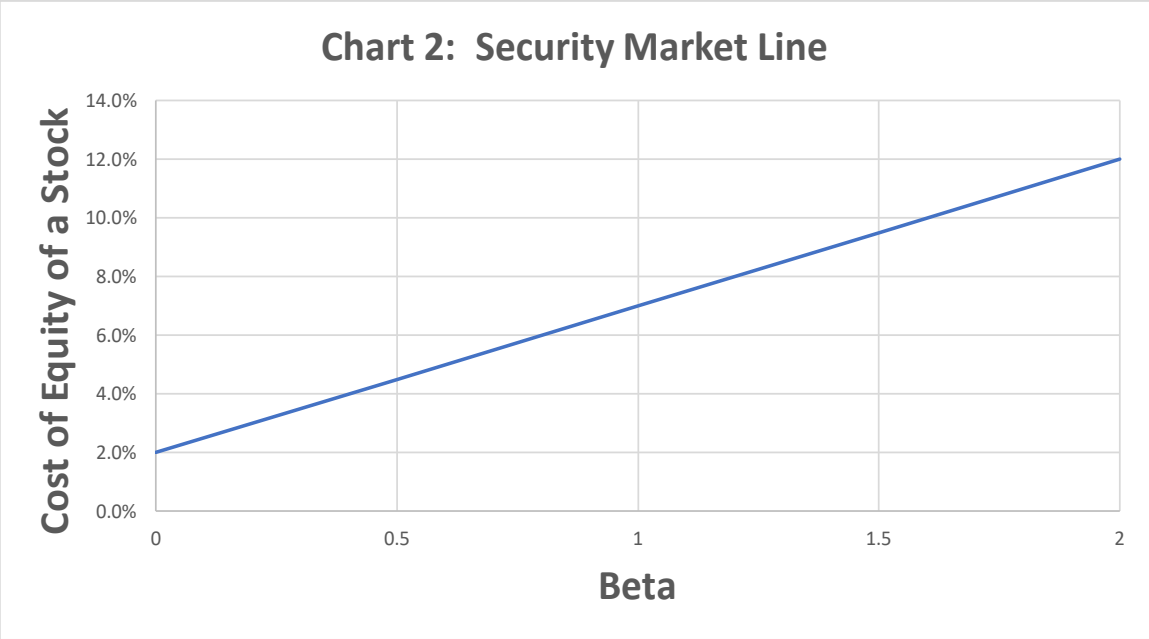
Q. PLEASE DESCRIBE THE CAPM.

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 is, 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. Since 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 one 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 one tends to be less volatile than the market.

The CAPM predicts that for a given equity security, the cost of equity has a linear relationship with 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. As shown in Chart 2, 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 specific asset's share 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 6 and Table 7 on page 48 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 securities as the risk-free rate because these assets have a beta close to zero. *Principles of Corporate Finance* states, "The CAPM… calls for a short-term interest rate."[38] I chose to use a risk-free rate based on both long- and short-term Treasury yields. It is commonplace in utility rate case proceedings to consider a risk-free rate based on long-term investments. 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 June 30, 2026 and weighted averages over the 3 months ending on that date for these two yields.

As outlined in Rothschild, Exhibit ALR-4, page 2, my spot and weighted average short-term risk-free rates are 3.87% and 3.76%, respectively. My spot and weighted average long-term risk-free rates are 4.91% and 4.95%, respectively.

[38] Richard Brealey, Stewart Myers, & Franklin Allen, *Principles of Corporate Finance* at 228 (McGraw-Hill Irwin, New York, 12th ed. 2017).

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 is their 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 my testimony, a CAPM analysis that uses a risk-free rate based only on long-term interest rates may overstate the cost of equity 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" beta is based on historical return data over six-month, two-year, and five-year periods.

Most published betas are based exclusively on historical return data. For example, *Value Line* publishes a five-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[39] 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 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.

[39] $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.

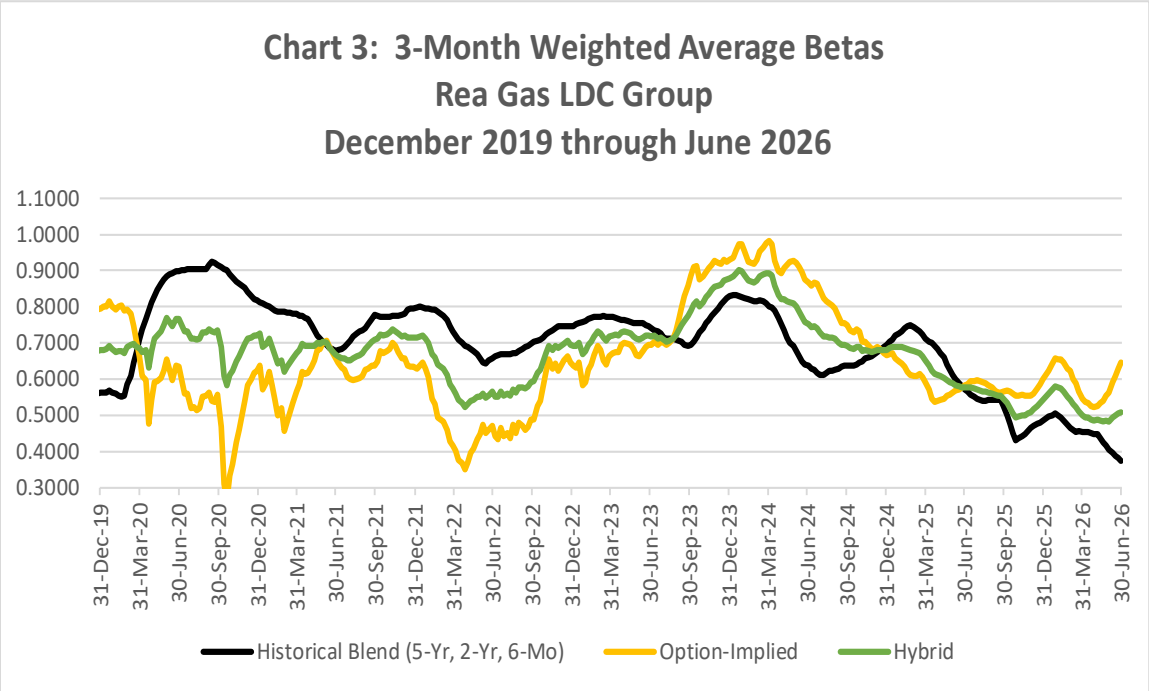
The market prices of put options and call options provide information regarding the probability distribution of future stock prices expected by investors. Using established techniques—specifically, applying the exact calculation methodologies the Chicago Board of Options Exchange (CBOE) uses for its VIX and SKEW indices, combined with peer-reviewed formulas for option-implied beta—I am able to use price data for the stock options of the Rea Gas LDC Group companies and the S&P 500 Index to determine investors' return expectations, including the relationship (covariance) between the return expectations for individual Rea Gas LDC Group companies and those for the overall market (S&P 500). This covariance between the expected returns for the Rea Gas LDC 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.[40] Because the cost of equity is fundamentally a forward-

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

looking, market-based concept, incorporating these option-implied expectations yields CAPM results that are much closer to Columbia's true market-based cost of equity. Consequently, it ensures that any ROE recommendation based on this method accurately reflects the real-time requirements of the broader market rather than relying solely on backward-looking data.



As shown in Figure 3 above, stock option prices indicate that investors likely expect lower betas for the Rea Gas LDC Group in the future.

Rothschild, Exhibit ALR-4, page 3 contains the last three months of data used in creating Figure 3 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 SIX MONTHS, TWO YEARS, AND FIVE YEARS FOR YOUR HISTORICAL BETA CALCULATIONS, AS OPPOSED TO RELYING EXCLUSIVELY ON THE FIVE-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 the Rea Gas LDC Group and those of the S&P 500 Index has changed in the last two years or six months. Using a five-year period exclusively tends to make recent changes in the correlation more difficult to identify because of the weight of five years of data.

Q. WOULD YOU AGREE THAT CHANGES IN MARKET DYNAMICS WILL HAVE A LARGER EFFECT ON SIX-MONTH HISTORICAL BETAS THAN THEY WILL ON TWO-YEAR OR FIVE-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 SIX-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 near-term 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 five or ten years ago. The weight of ten years of data makes a beta coefficient react extremely slowly to market developments. Even pronounced

permanent market changes can take more than six 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* six-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 six-month, two-year, and five-year historical betas.

Q. DO YOU THINK IT IS A GOOD IDEA TO RELY ON SIX-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 six-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 SIX-MONTH HISTORICAL BETAS, CAN THEY STILL BE CONSIDERED STATISTICALLY SIGNIFICANT? HOW MANY DATA POINT PAIRS ARE USED IN THE CALCULATION OF YOUR SIX-MONTH HISTORICAL BETA COEFFICIENTS?

A. A six-month historical beta based on weekly returns, calculated weekly, incorporates 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 by 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 six-month historical betas, instead of relying on 25 return pairs, my 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[41] and skewness[42] following exactly the same methodology used by the Chicago Board of Options Exchange (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

[41] Michael Mollet & John White, *Cboe Interest Rate Swap Volatility Index (SRVIX) White Paper*, CBOE Applied Academics (2018), 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 three years.
[42] *The CBOE SKEW Index White Paper*, CBOE (2010), 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 three years.

information reflected in the prices of all eligible options." Finally, I calculate the option implied betas using the following formula developed by Christoffersen, Chang, Jacobs and Vainberg (2011):[43]

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

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: $variance\ of\ security$;
VAR_m: $variance\ of\ overall\ market\ (S\&P\ 500)$.

Q. YOU CALCULATE YOUR OPTION-IMPLIED BETAS BASED ON A SIX-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,"[44] 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 two or

[43] Bo-Young Chang, Peter Christoffersen, Kris Jacobs & Gregory Vainberg, *Option-Implied Measures of Equity Risk*, *Review of Finance* at 385–428 (Vol. 16, Iss. 2, April 2012), https://academic.oup.com/rof/article/16/2/385/1584560.
[44] Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, *Forward-Looking Betas* at 24 (April 25, 2008) at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=891467.

three years into the future. As evidenced by the exhaustive option data in my workpapers, the maximum expiration period for the options of the companies in the Rea Gas LDC Group is approximately eight months. None of the 7 companies ever trade options with expiration periods of more than eight months. New options are issued roughly every three months for all of these companies, so the maximum expiration period on any given trading day is somewhere between five and eight months. For consistency across companies in the Rea Gas LDC Group and across dates within the three-month period on which my analysis is focused (April through June 2026), I chose to use six 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 six months, I use the maximum expiration period as an approximation for the target six-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 six-month horizon, it does not mean that a six-month option-implied beta is of no relevance or cannot be used. That would be tantamount to saying you cannot use a one-year *Value Line* Earnings Per Share estimate, or that the minimum relevant forecast is two or three years. In fact, for purposes of option-implied betas, it would be difficult to say if a time horizon of one year, for instance, is necessarily always better than a time horizon of six months. An option-implied forward-looking beta, even with a time horizon of less than six months, is still a useful tool in interpreting the current expectations of investors at any given time. This is why it is one of the many tools I consider when arriving at my recommendations.

A final strong argument in support of using six-month option-implied betas in a cost of capital calculation looking years into the future is that the authors of the paper[45] on which I based my option-implied betas concluded that their predictive powers are not limited to six months into the future. In fact, they conclude that six-month option-implied betas have stronger predictive power than six-month, one-year, or five-year historical betas when attempting to forecast betas one or two 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 may not reflect current investor expectations. For instance, extensive research by McKinsey & Company has demonstrated that equity analysts have been persistently overoptimistic for decades and are typically slow to revise their forecasts to reflect new economic conditions. In contrast, actual capital markets representing the true expectations of investors with capital at risk, are "notably less giddy in their predictions" than the analysts forecasting their growth.[46] 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.

[45] *Id.*

[46] Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, *Equity analysts: Still too bullish*, McKinsey & Co. (Apr. 1, 2010), https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/equity-analysts-still-too-bullish.

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,[47] as described in detail in the Beta section on page 41. The volatility and skewness calculated in this way describe a probability distribution representing the possible trajectories for the S&P 500 implied by the options market. The resulting skewed probability distribution can be closely approximated by a log-normal distribution 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-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 Rothschild, Exhibit ALR-4, page 4 – 6. In line with my Spot and Weighted Average CAPM approaches, I use both spot values as of June 30, 2026 and weighted averages over the three 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 four 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

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

rates are 4.95% and 3.76%, respectively. The market risk premia I use in my Spot CAPM analysis with short- and long-term risk-free rates are 4.35% and 3.31%, respectively.

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 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. Briefly, skewness measures the asymmetry of the market's return expectations, specifically indicating whether investors perceive a greater probability of extreme downside losses compared to outsized gains. 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,[48] interpolating where necessary, and giving the most weight to the option expiration period of 12 months.

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

CAPM Results

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR CAPM.

A. Table 6 and Table 7 below show the results of my Weighted Average CAPM and Spot CAPM Analyses, respectively.

TABLE 6: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY
WEIGHTED - All Inputs Weighted From April to June 2026

	3-Month Treasury Bill		30-Year Treasury Bond	
	Historical Blended Beta	Forward Beta	Historical Blended Beta	Forward Beta
Risk-Free Rate	3.76%	3.76%	4.95%	4.95%
Beta	0.37	0.65	0.37	0.65
Risk Premium	4.95%	4.95%	3.76%	3.76%
CAPM	5.61%	6.96%	6.36%	7.38%

Source: Exhibit ALR-4, page 1

TABLE 7: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY (SPOT)
SPOT - All Inputs Based on Last Available Data as of June 30, 2026

	3-Month Treasury Bill		30-Year Treasury Bond	
	Historical Blended Beta	Forward Beta	Historical Blended Beta	Forward Beta
Risk-Free Rate	3.87%	3.87%	4.91%	4.91%
Beta	0.34	0.72	0.34	0.72
Risk Premium	4.35%	4.35%	3.31%	3.31%
CAPM	5.35%	6.99%	6.04%	7.28%

Source: Exhibit ALR-4, page 5

As shown in Rothschild, Exhibit ALR-12, the results of my CAPM analysis applied to the Rea Gas LDC Group demonstrate how the cost of equity has evolved since the onset of the COVID-19 pandemic. The cost of equity briefly spiked in early 2020 but then declined as markets stabilized. Most importantly, since peaking at about 8.76% in November 2022, the CAPM-implied cost of equity for the proxy group has been on a clear downward trend, falling to under 7% by early to mid-2025.

As detailed earlier in my testimony, my primary ROE recommendation of 8.44% for Columbia is derived directly from applying the DCF and CAPM methodologies to a proxy group of comparable regulated utility companies. Specifically, the Constant and Non-Constant Growth DCF models, alongside eight variations of the CAPM, produced an initial range of 5.35% to 9.61%. Applying my recommended percentile band to my cost of equity model results produces a cost of equity band of 7.70% to 8.50%. While this proxy group analysis forms the basis for my 8.44% recommendation, the following section evaluates the cost of equity for the overall market. This broader market analysis is not used to calculate Columbia's specific rate, rather it provides essential economic context and serves as a benchmark for reasonableness, reinforcing the fundamental financial principle that a regulated monopoly like Columbia carries inherently lower risk, and therefore requires a lower return, than the competitive companies comprising the broader market.

VI. MARKET COST OF EQUITY (S&P 500 CONTEXT)

Q. HOW DOES YOUR COST OF EQUITY CALCULATION FOR THE OVERALL MARKET RELATE TO YOUR 8.44% ROE RECOMMENDATION?

A. My cost of equity for the overall market serves as context for the appropriate ROE for Columbia. To ensure a clear distinction throughout this section, I will refer to the cost of equity for the overall market (represented by the S&P 500) as the "market cost of equity." My 8.44% ROE recommendation is grounded in a fundamental economic boundary: a low-risk, regulated monopoly utility cannot logically require a higher return than the riskier overall stock market.

Using forward-looking options data, I calculated the cost of equity for the S&P 500 to be between 7.46% and 9.34%, with a midpoint of 8.40%. I provide this analysis to offer direct insight into what current capital markets are indicating regarding the cost of equity for the market as a whole. It is critical to emphasize that this market cost of equity should not be interpreted as the cost of equity applicable to Columbia or any utility company. Rather, it establishes the essential economic context proving that my 8.44% utility-specific recommendation appropriately reflects Columbia's lower risk profile.

Q. HOW DID YOU CALCULATE MARKET COST OF EQUITY?

A. I calculated the cost of equity for the S&P 500 by using a DCF model. I used the prices of stock options traded on the S&P 500 to derive an option-implied growth rate. As discussed above, a stock option is a financial contract giving the holder the right to buy or sell a security at a specified price within a set timeframe, and they are useful for calculating the cost of equity because their market prices reflect the probability distribution of future stock prices, allowing for the derivation of investors' expectations. Please see Rothschild, Exhibit ALR-14 for a discussion of how I calculated the option-implied growth rates.

Q. WHAT OPTION-IMPLIED MARKET GROWTH RATES DID YOU CALCULATE?

A. I calculated investors' market growth expectations over three different investment time horizons—one year, three years, and five years—based on stock option prices. Because stock options are traded with various expiration dates, they allow us to analyze the term structure of the cost of equity. This concept recognizes that the return investors require can vary depending on the time horizon of the investment.

The resulting option-implied growth rates can be summarized as follows:

- 1-Year Horizon: 7.66% to 8.15%
- 3-Year Horizon: 7.71% to 7.72%
- 5-Year Horizon: 6.40% to 6.77%

To move from the "term structure" of market growth to the term structure of the cost of equity, I added the dividend yield of the S&P 500, which was approximately 1.1% for the three-month period upon which the analysis was based. This results in the cost of equity for the overall market.

Q. WHAT ARE THE RESULTS OF YOUR DCF COST OF EQUITY ANALYSIS?

A. The results of these DCF models applied to the S&P 500 range between 7.46% and 9.34%. To properly interpret these results, it is critical to understand that they vary across two distinct dimensions: the investment horizon, or the time period over which the return is measured, and the date of analysis, which in this case comprises the market conditions averaged over the three-month period April through June 2026.

Q. PLEASE EXPLAIN HOW THE COST OF EQUITY RESULTS VARY ACROSS THESE DIMENSIONS.

A. My analysis reveals a dynamic term structure where cost of equity expectations shift depending on how far into the future we look.

The resulting option-implied cost of equity can be summarized as follows:

- 1-Year Horizon: 8.72% to 9.34%
- 3-Year Horizon: 8.78% to 8.90%
- 5-Year Horizon: 7.46% to 7.96%

Generally speaking, there is a declining trend as one goes out from short-term to longer-term horizons.

Q. WHY DIDN'T YOU CALCULATE THE COST OF EQUITY BEYOND THE FIVE-YEAR TIME FRAME?

A. It is not possible to calculate an option-implied cost of equity beyond the five-year horizon because a consistent market for such options does not exist. Publicly traded index options occasionally trade out to six years for a brief period but are only available consistently out to about five years.

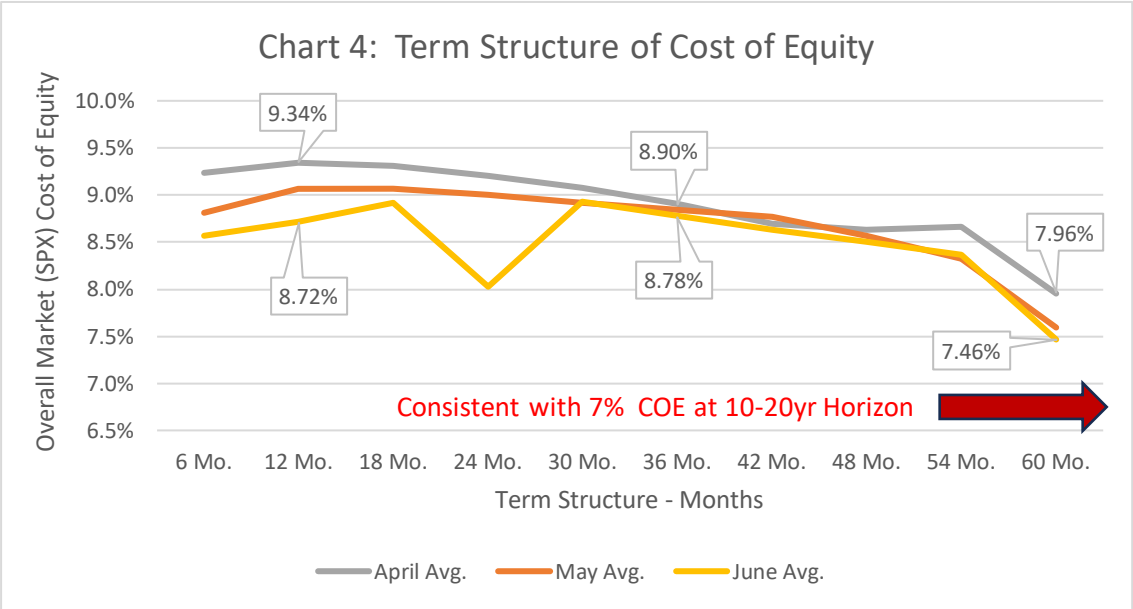
Q. WHAT CONCLUSION DO YOU DRAW FROM THIS DECLINING TREND?

A. The data indicates that while short-term market expectations have risen in recent months, longer-term expectations remain anchored at lower levels.

This is significant because, for utility ratemaking purposes, the longer horizons are arguably the most relevant. While rates are set periodically, the cost of equity represents the return required to attract capital for long-lived assets. Because the primary investors in this sector, such as pension funds, match their investments to long-term liabilities, they price these securities based on a multi-decade horizon rather than shorter investment horizons.

As shown in Figure 4 below, as the timeline is extended out to five years, the cost of equity indicated by my stock option analysis is consistent with the longer-term forecasts of major financial institutions. Specifically, even the highest cost of equity results in Chart 4 decline from 8.72% to 9.34% at the one-year horizon to 7.46% to 7.96% at the five-year horizon, trending directly toward the 10-to-20-year forecasts from firms like J.P. Morgan (6.7%) and the Horizon Actuarial Survey (approximately 7.0%), as shown in Table 3 on

page 8. As discussed above, the Horizon survey is a significant industry benchmark that aggregates the capital market assumptions of 41 different investment advisory firms, including the Bank of New York Mellon, BlackRock, and Goldman Sachs.



While this market-wide cost of equity analysis does not serve as my specific ROE recommendation for Columbia, it provides essential context for the broader financial landscape. The fundamental premise of utility regulation is that a monopoly provider—insulated by captive customers and ratepayer-funded cost-recovery mechanisms—is inherently less risky than the competitive, diversified companies that make up the S&P 500. Therefore, the cost of equity for a regulated utility like Columbia must necessarily fall below the return required by the broader market. Figure 4 above demonstrates that near-term market expectations for the S&P 500 center around a midpoint of 8.40%, stretching up to as high as 9.34%, before trending toward 7% over longer horizons. My primary recommendation of 8.44% properly reflects Columbia's reduced risk profile by falling below the higher end of this market benchmark. Conversely, a request of 10.95% defies

this foundational financial principle by demanding a return far above what investors require for the riskier, competitive market.

VII. CAPITAL STRUCTURE AND COST OF DEBT

Q. IS COLUMBIA'S REQUESTED CAPITAL STRUCTURE CONSISTING OF 52.64% COMMON EQUITY APPROPRIATE?

A. No. Columbia's requested capital structure is not appropriate for setting rates in this proceeding because its 52.64% common equity ratio is significantly higher than how capital is actually raised in the market by the companies Mr. Rea himself selected as his proxy group. Mr. Rea recommends a thirteen-month average capital structure through the fully forecasted test period ending December 31, 2027, consisting of 46.13% long-term debt, 1.23% short-term debt, and 52.64% common equity.[49]

Columbia is a wholly-owned subsidiary of NiSource Inc. and does not have publicly traded securities of its own. Accordingly, we must look to the holding company level of the companies in the proxy group to determine the true market standard. At the holding company level, which provides a direct view into how these entities actually raise capital, the seven companies comprising Mr. Rea's Gas LDC Group have an average common equity ratio of only 44.8% including short-term debt, and 48.39% excluding short-term debt. These figures are drawn from the most recent Value Line company reports for each proxy group company and are presented in Exhibit ALR-5, pages 4-5.

[49] Mr. Rea's Direct Testimony, Attachment VVR-5.

Mr. Rea's own workpapers corroborate this. At pages 30 and 31 of his testimony, and on pages 3 and 4 of his Attachment VVR-3, he reports that the Gas LDC Group's five-year average common equity ratio is 47.5% based on permanent capitalization and 42.6% based on total capitalization. Whether measured on the most recent Value Line data or on Mr. Rea's five-year historical averages, the answer is the same: the market capitalizes these companies with materially less equity than Columbia requests.

Therefore, I recommend a capital structure with a 48.39% common equity ratio, based on the proxy group average at the holding company level excluding short-term debt, as shown in Exhibit ALR-5, pages 4-5.

I note that this recommendation is conservative and resolves the basis question in the Company's favor. Mr. Rea's requested 52.64% ratio is measured on a total capitalization basis and includes short-term debt, as he confirms at page 31 of his testimony. The directly comparable proxy group figure on that same basis is 44.8%. Had I recommended the proxy group average measured consistently with the Company's own presentation, my recommendation would be 44.8% rather than 48.39%, a full 3.59 percentage points lower. My recommendation therefore affords Columbia a substantial cushion above what a strict like-for-like comparison would support, while still protecting ratepayers from the excess costs associated with the Company's inflated 52.64% request.

Q. WHY IS IT APPROPRIATE TO RELY ON THE CAPITAL STRUCTURE AT THE HOLDING COMPANY LEVEL RATHER THAN THE OPERATING SUBSIDIARY LEVEL?

A. Looking at the holding company level is the most economically sound approach because it reflects how capital is actually secured in the financial markets. Investors purchase the

equity and debt of the consolidated holding company, making it the true indicator of market-demanded capital proportions.

Furthermore, relying on holding company data ensures methodological consistency, a standard Mr. Rea fails to meet. Throughout his testimony, Mr. Rea relies entirely on holding company market data (stock prices, dividend yields, growth rate forecasts, and betas) to calculate his cost of equity models, because operating subsidiaries do not trade publicly. His entire DCF, CAPM, and risk premium analyses are performed on the seven publicly traded parent companies comprising the Gas LDC Group. Yet when justifying Columbia's capital structure, he abandons that same holding company data and relies on regulated operating subsidiaries to support a higher equity ratio.

Mr. Rea offers no explanation for this switch. Nowhere in his testimony does he state why the holding company capitalization ratios he presents in Attachment VVR-3 are an inappropriate benchmark for setting Columbia's rate-setting capital structure, nor does he address the parent-subsidiary financing relationship, the stand-alone principle, or double leverage. His entire justification is the conclusory statement at page 53 that 52.64% "is well-within the range of what is typical and customary for other gas utility operating companies."

The inconsistency runs in a single direction. At pages 30 and 31, Mr. Rea uses the holding company ratios when they help the Company, comparing Columbia's five-year average equity ratio of 53.5% (permanent) and 51.0% (total) against the Gas LDC Group's 47.5% and 42.6%, and concluding at page 43 that Columbia has a "slightly lower investment risk profile" than the proxy group. He then discards that same comparison when it would constrain the equity ratio he proposes. Both moves favor the Company.

There is a further problem with the comparison Mr. Rea substitutes. Table VVR-6 does not present the actual capital structures of the operating subsidiaries at all. As footnote 27 to that table discloses, the figures reflect "the most recent rate case order where an equity capitalization ratio was disclosed in the final order." These are *authorized* ratios previously granted by other commissions, the products of different records, different jurisdictions, and in some cases orders issued years ago, not actual booked capitalizations. Attachment VVR-3, by contrast, reports actual book equity ratios drawn from 10-K filings, and my Exhibit ALR-5 reports actual capitalization ratios from Value Line. Mr. Rea is therefore not comparing subsidiary capital structures to holding company capital structures; he is comparing other commissions' past authorizations to Columbia's proposed actual capitalization. That comparison is circular in the same way that authorized-ROE surveys are circular: it measures what regulators have previously granted rather than what the market requires.

Even taken on its own terms, Table VVR-6 does not support the Company's request. Eight of the twenty-two listed subsidiaries show no data. Of the sixteen observations that remain, five (nearly one-third) are Atmos Energy subsidiaries, which average 58.0% equity and drive the reported 53.5% average. Excluding Atmos, the average of the remaining eleven observations has a lower common equity ratio. Most tellingly, NiSource's own five utility operating subsidiaries (Columbia Gas of Maryland, Ohio, Pennsylvania, and Virginia, and Northern Indiana Public Service) average 50.56%, with Columbia Gas of Virginia at 43.2%, the lowest figure in the table.

While it is generally the case that if holding company data dictates the cost of equity, holding company data should also inform the proportions of that equity, I recognize

that there can be exceptions. A regulated subsidiary could theoretically provide evidence to reasonably argue for a capital structure with a higher common equity ratio than its parent holding company. However, Columbia has not provided any such evidence in this case. I remain open to reviewing such evidence if it is presented, but absent that empirical justification, relying on the holding company capital structure remains the most accurate and appropriate benchmark.

Q. DOES COLUMBIA'S FINANCING ARRANGEMENT WITH NISOURCE BEAR ON WHICH BENCHMARK IS APPROPRIATE?

A. Yes. It reinforces the conclusion that the holding company capitalization is the economically meaningful measure, because Columbia does not raise capital in the financial markets at all. NiSource does, and then allocates it downward.

Three facts from Mr. Rea's own testimony establish this. First, Columbia has no credit rating of its own. Mr. Rea acknowledges at page 27 that "the credit rating agencies do not currently issue ratings for Columbia itself," and he is therefore obliged to reference the ratings of NiSource (BBB+ from Standard & Poor's and Baa2 from Moody's) as the proxy for Columbia's credit quality.

Second, the new long-term debt embedded in the Company's proposed capital structure is not a market financing. Mr. Rea states at page 53 that Columbia plans to issue $55.0 million in new long-term debt and that "these future debt issuances will be made on an intercompany basis to NiSource." Attachment VVR-6 identifies the two instruments: a $24.0 million note dated September 30, 2056 and a $21.0 million note dated March 31, 2057, each carrying an assumed 6.50% rate. NiSource is the lender.

Third, Columbia's short-term debt is likewise sourced from the parent. Mr. Rea states at page 53 and 54 that "[t]he Company obtains its short-term debt financing through the NiSource money pool, which is supported by NiSource's commercial paper program and a revolving credit facility that NiSource has in place with a syndicate of banks."

Columbia is, in short, financed entirely from within the NiSource system. Both the debt and the equity in its proposed capital structure originate with a parent that is itself capitalized with only 43.0% common equity on a permanent capitalization basis and 41.8% on a total capitalization basis as of 2025, as shown on pages 3 and 4 of Mr. Rea's Attachment VVR-3. Setting rates on the premise that Columbia is independently capitalized at 52.64% equity, when the capital is in fact raised by an entity leveraged well beyond that, requires ratepayers to fund an equity ratio that does not exist at the level where capital is actually raised.

Q. WHAT IS THE IMPACT OF ADOPTING MR. REA'S RECOMMENDED CAPITAL STRUCTURE?

A. It can be overlooked that the authorized capital structure can have a large impact on the utility company's revenue requirement.

My recommendations, including my capital structure recommendation, result in an overall rate of return of 6.69% as shown in Table 1. Mr. Rea's recommendations result in an overall rate of return of 8.15%.[50] If the Commission adopts an equity component of the capital structure ratio that is higher than I have recommended, there should be a corresponding reduction to ROE, which would result in a reduced ROR.

[50] Mr. Rea's Direct Testimony, Attachment VVR-2.

If the Company witness's capital structure recommendation is adopted, it is important to make an adjustment to the overall ROR to account for the financial risk difference between his capital structure recommendation and that of the companies in the Gas LDC Group, which have a significantly lower average common equity ratio (44.8% including short-term debt, as shown in Exhibit ALR-5, pages 4-5) than the common equity ratio recommended by Mr. Rea. 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 COE results from 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. Applying that relationship here, Mr. Rea's 52.64 percent equity ratio exceeds the proxy group's comparable 44.8 percent average by 7.84 percentage points, indicating a downward ROE adjustment of approximately 0.31 percent.

If my 8.44% ROE recommendation is combined with Mr. Rea's requested 52.64% capital structure, rather than my recommended 48.39% capital structure, Columbia's revenue requirement would be approximately $1.61 million higher than under my primary recommendation. This figure isolates the excessive cost burden placed on consumers strictly by Mr. Rea's inflated equity ratio.

Q. WHAT COST OF DEBT DO YOU RECOMMEND?

A. I recommend adopting Columbia's requested cost of debt of 5.04%.

VIII. EVALUATION OF COLUMBIA'S RATE OF RETURN TESTIMONY

Q. PLEASE SUMMARIZE THE TESTIMONY OF MR. REA.

A. Mr. Rea supports an authorized ROE of 10.95% for Columbia based on a recommended range of 10.55% to 11.05%,[51] and supports Columbia's proposed capital structure containing 52.64% common equity.[52]

Mr. Rea arrived at his recommendation based on the results of his:

- Constant Growth Discounted Cash Flow (DCF) Model,
- Capital Asset Pricing Model (CAPM),
- CAPM with a size premium adjustment,
- Empirical Capital Asset Pricing Model (ECAPM), and
- Risk Premium Method (RPM).[53]

[51] Mr. Rea's Direct Testimony at 3:9-15 and 4:1.
[52] *Id.* at 31:9-12.
[53] *Id.* at 5:10-16.

TABLE 8: MR. REA'S COST OF EQUITY RESULTS	
METHOD	**Model Results**
DCF Method	11.04%
Traditional CAPM	10.52%
CAPM (w/size adj.)	10.89%
ECAPM	10.90%
Risk Premium Method	11.00%
Mr. Rea's Recommend Range	**10.52% - 11.04%**

[1] Mr. Rea's Direct Testimony, Page 11

Mr. Rea discusses company-specific risk (compared to the companies in his proxy group). Notably, however, he does not make any specific adjustments to his ROE recommendation based on any of these factors and states, "based on this evaluation I have concluded that the cost of equity estimates for the Gas LDC Group provide a fair representation of Columbia's cost of equity in the current market environment, without the need for any further risk adjustments."[54]

Mr. Rea's testimony emphasizes that no single model should be relied upon exclusively to determine the ROE, quoting the Commission's statement in Case No. 2024-00092 that it is "appropriate for utilities to present, and for the Commission to evaluate, multiple methodologies to estimate ROEs."[55] And he characterizes His 10.95% recommendation as "an appropriate point estimate of Columbia's cost of equity."[56]

Mr. Rea also discusses Columbia's capital structure, comparing it to the capital structure ratios of the utility operating subsidiaries of his Gas LDC Group, but he does not propose any explicit changes to the Company's proposed 52.64% equity ratio, and states

[54] *Id.* at 55:4-7.
[55] *Id.* at 57:6-14.
[56] *Id*. at 101:8-9.

that it, "is well-within the range of what is typical and customary for other gas utility operating companies, and particularly the utility operating subsidiaries constituting the Gas LDC Group."[57]

My evaluation does not attempt to address every disagreement I have with Mr. Rea's testimony, and the fact that I do not address a particular aspect of his testimony should not be interpreted as agreement with it.

Q. IS MR. REA'S RECOMMENDED 10.95% ROE MARKET-BASED?

A. No. Mr. Rea states that he analyzed "market-derived data and other financial information"[58] for his proxy companies, and he invokes the "semi-strong version of the Efficient Market Hypothesis" to argue that even six-to-twelve-month average stock prices would reflect "outdated market information."[59] But when applying his approaches, there are key places where he fundamentally fails to use market data

For example, the market return used in both his CAPM and his Risk Premium Method is based on analyst growth rate projections, including an 11.30% consensus long-term growth rate for the S&P 500—nearly triple the long-run growth rate of the U.S. economy—and a *Value Line* price-appreciation projection that he converts to an 8.78% annual growth rate by selecting a four-year realization horizon from a range spanning 6.96% (five-year) to 11.87% (three-year).[60] While analysts provide a respected opinion, the opinion of a forecaster is not a market.

[57] *Id.* at 53:1-4.
[58] *Id.* at 4:12-13
[59] *Id.*, Appendix A at 2:2-9.
[60] *Id.*, Attachment VVR-10 at 1-5.

His reliance on equity analyst growth forecasts is problematic because he does not rely on market data nearly as much as he could. his models are based on the speculations of individual analysts instead of the actual return expectations of the millions of investors that purchase stocks, bonds, and stock options.

In contrast, my analysis derives the expected market return directly from S&P 500 index options. This is a genuinely market-based measure because option pricing models extract the implied expected returns directly from the capital commitments of millions of investors. The S&P 500 options market is arguably the deepest, most liquid equity derivative market in the world. It routinely executes three to five million contracts with over $1.5 to $2 trillion in notional volume in a single day—frequently exceeding the dollar trading volume of the underlying 500 stocks themselves.

The pricing of these options represents the aggregate, capital-backed consensus of global institutional investors, pension funds, and market makers. By constructing both of his market return estimates—a 12.55% (S&P 500) and 10.88% (Value Line 1,700) estimated market return, which he averages to an 11.72% prospective market[61]—from analysts' published growth projections, Mr. Rea has anchored his recommendation on a small financial island, completely divorced from the objective, capital-committed reality of the broader financial markets.

[61] Mr. Rea's Direct Testimony at 75:6-19.

Q. DO THE RESULTS OF MR. REA'S COST OF EQUITY MODELS PROVIDE A RELIABLE INDICATION OF COLUMBIA'S COST OF EQUITY?

A. No. Mr. Rea's 10.95% ROE recommendation is significantly higher than Columbia's market-based cost of equity. If his recommendation is used to set rates, consumers will be significantly overcharged.

Mr. Rea's 10.95% ROE recommendation is excessive largely because his models do not measure what he says they measure. He states that his objective is to estimate "the prospective market return expectations of investors,"[62] and he quotes Dr. Morin's, who said that the CAPM "must be applied using data that reflects the expectations of actual investors in the market."[63] his actual calculations, however, rely heavily on the subjective growth forecasts of equity analysts rather than objective, capital-backed market data. By inserting these opinion-based inputs into his models, his resulting calculations produce an inflated, artificial return rather than a genuine market-based cost of equity.

Additionally, each of his cost of equity models have specific issues that contribute to his unreasonably high results. First, I will address how his constant growth DCF method is unreliable because it mechanically uses analyst 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 explain how his CAPM overstates the cost of equity by using an equity risk premium that is not reflective of investors' expectations as indicated by market data. Third, I will explain how his Risk Premium Method rests on the same inflated market-return projections and on historical averages that do not measure investors'

[62] Mr. Rea's Direct Testimony at 74:18-20 and 75:1-2.
[63] Mr. Rea's Direct Testimony at 76:10-11.

current expectations. Finally, I will address his size premium adjustment, his use of the ECAPM, his flotation cost adjustment, his complementary proxy groups, and his capital structure recommendation.

B. Mr. Rea's DCF Method

Q. PLEASE DESCRIBE MR. REA'S DCF METHOD.

A. As noted above, one of the cost of equity models Mr. Rea used to derive his 10.95% ROE recommendation was a variation of the Constant Growth Discounted Cash Flow (DCF) model, which he applied to his Gas LDC Group as well as his two other proxy groups. his model is based on the mathematical formula:

$$k = \frac{D_1}{P_0} + \text{g}$$

Where:

k: $investors' expected\ return\ on\ common\ equity$;
P_0: $current\ market\ price\ of\ the\ stock$;
D_1: $expected\ dividends\ over\ the\ next\ year$;
g: $expected\ dividend\ growth\ rate\ into\ perpetuity$.[64]

Key Inputs and Assumptions: Mr. Rea used a composite of each company's 30-, 60-, and 90-day average closing stock prices through February 13, 2026.[65]

Dividend Yield Adjustments: He calculated each company's dividend yield using *Value Lines* estimated dividends for the next twelve months, divided by the 30/60/90 day

[64] Mr. Rea's Direct Testimony at 61:1-12.
[65] *Id.,* Appendix A at 2:18-3:9.

composite average closing stock price, producing an average dividend yield of 3.4% for the Gas LDC Group.[66]

Growth Rate Estimation: Mr. Rea developed four growth rate estimates for each company. He used projected EPS growth estimates from three sources:

- S&P Global
- Zacks, and
- Value Line.[67]

His fourth estimate is based on the average of each company's 5-year and 10-year historical EPS growth rates.[68]

Outlier Screening: Mr. Rea excluded DCF results below a low-end threshold of 7.00% and above a high-end threshold of 200% of the proxy group median (approximately 21.2%), based on the approach adopted by FERC in Opinion No. 569.[69] In practice, only low-end results were eliminated from his utility proxy groups.

DCF Model Results: The results of Mr. Rea's Constant Growth DCF model are presented in Table VVR-7 on page 66 of his testimony, showing average cost of equity estimates of 11.70% (S&P Global growth), 11.30% (Zacks), and 10.30% (Value Line), and 10.60% using historical growth. Placing "somewhat more emphasis on the forward-looking cost of equity estimates," Mr. Rea selected an unadjusted DCF estimate of 11.00%, to which he applied a flotation cost adjustment to reach his indicated DCF estimate of 11.04%

[66] *Id.,* Attachment VVR-7 at 3.
[67] *Id*. Appendix A at 6:4-9..
[68] *Id.,* Attachment VVR-7 at 2.
[69] *Id.* at 1.

for the Gas LDC Group. This result contributed to his overall ROE recommendation of 10.95%.[70]

Q. DOES MR. REA PROPERLY APPLY THE CONSTANT GROWTH DCF METHOD?

A. No. Mr. Rea acknowledges the assumptions on which the constant growth model rests—constant growth, a stable payout ratio, and a constant price-to-earnings multiple—yet his DCF method contradicts his own description of how the constant growth model should be implemented. His growth estimate relies on analyst EPS growth forecasts. 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. Major financial institutions like J.P. Morgan Chase have used the sustainable growth DCF model, as I do. The approach outlined by J.P. Morgan in its long-term capital market assumptions takes a more comprehensive view, integrating multiple interrelated financial factors to build expected returns. Their methodology is designed to "tie together complex interrelationships" and ensure consistency between expected earnings, future book value, and sustainable growth rates.[71]

Q. SHOULD THE COMMISSION ACCEPT THE OUTLIER ELIMINATIONS IN MR. REA'S DCF ANALYSIS?

A. The Commission should weigh them against its own guidance. In Columbia's last rate case, the Commission cautioned against unreasonably removing or ignoring "outlier" data due

[70] *Id.,* at 12:7-11.

[71] J.P. Asset Mgmt., 2026 Long-Term Capital Market Assumptions - Time-Tested Projections to Build Stronger Portfolios at 62–63 (23rd Annual Ed.). https://am.jpmorgan.com/content/dam/jpm-am-aem/global/en/insights/ltcma-2026-us-matrix_usd.pdf

to a perception of being "too high" or "too low," and stated that "[r]esults based upon excluded data without adequate support will be given less weight in Commission determinations."[72] Every estimate Mr. Rea's screens eliminated within his two utility proxy groups was a low estimate: a negative 20.0% result for Southwest Gas Holdings in the Gas LDC Group, and results of 5.90% (Avista Corp.) and 6.80% (Consolidated Edison) in his Combination Utility Group. The single Gas LDC elimination raised his historical-earnings DCF column from 6.2% to 10.6%.[73]

C. Mr. Rea's CAPM Method

Q. WHAT FORMULA DOES MR. REA USE IN HIS CAPM ANALYSIS?

A. Mr. Rea explains that the CAPM method is a market-based, forward-looking model that recognizes that investors demand higher returns to take on more risk.[74] He says that the traditional CAPM equation is expressed as follows:

$$K = R_F + \beta\,(R_M - R_F)$$

Where:

K	=	Required rate of return for a stock;
R_F	=	Expected risk-free rate of return; and
β	=	Beta or systematic risk of a stock;
R_M	=	Expected return for the overall market.[75]

He also considers an Empirical CAPM (ECAPM). Mr. Rea claims the ECAPM is based on empirical evidence that the risk-return relationship between beta and stock returns

[72] Mr. Rea's Direct Testimony at 8:1-8.
[73] Mr. Rea's Direct Testimony, Attachment VVR-7 at 2.
[74] Mr. Rea's Direct Testimony at 70:1-6.
[75] *Id*. at 70:7-16.

is flatter than predicted by the traditional CAPM.[76] This method includes the same four components as the CAPM, but he 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:

$$K = R_F + 0.25\ (R_M - R_F) + 0.75\beta\ (R_M - R_F)$$[77]

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 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. DOES MR. REA USE AN APPROPRIATE RISK-FREE RATE IN HIS CAPM?

A. In principle, no. Mr. Rea uses a composite risk-free rate of 4.87%, derived by placing equal weight on the average implied forward rate for the 30-year Treasury bond over the 2026-2030 horizon (4.93%) and the average actual 30-year Treasury bond yield during December 2025 (4.80%).[78] When selecting a security to estimate the risk-free rate, it is important to choose one with a beta coefficient as close to zero as possible because, by definition, the risk-free rate in the CAPM model should have no correlation with market movements. This is where the 30-year Treasury bond yield falls short, as it has an established non-zero beta, meaning it does not behave as a truly risk-free asset. In contrast,

[76] Mr. Rea's Direct Testimony at 72:4-13.
[77] *Id*. at 81:16-18.
[78] *Id.* at 77:11-19 and 78:1-3.

the three-month Treasury bill yield has a considerably lower beta, making it a superior choice for estimating the risk-free rate.

Additionally, 30-year U.S. Treasury bonds are not truly risk-free. Holding a long-term Treasury bond exposes investors to interest rate risk throughout its life. The collapse of Silicon Valley Bank (SVB) in 2023 underscores this risk. As interest rates rose sharply, the market value of SVB's bond portfolio fell by over $17 billion, leaving the bank with substantial unrealized losses. When depositors attempted to withdraw $42 billion in a single day, SVB lacked the liquidity to meet these demands, in part because it could not hold its bonds to maturity without realizing those losses.

Mr. Rea's use of interest rate forecasts to determine the risk-free rate component does not inflate his CAPM result. However, his CAPM method should not be used to set rates in future Kentucky proceedings because it could produce inaccurate cost of equity results (too high or too low) in different capital market conditions.

Q. DO YOU BELIEVE MR. REA'S MARKET RISK PREMIUM PORTION OF HIS CAPM ANALYSIS IS REASONABLE?

A. No, I believe Mr. Rea's market risk premium component of 7.11% is excessive and leads to an inflated CAPM result.[79]

This conclusion is supported by prominent valuation authorities who arrive at figures substantially lower than Mr. Rea's. For example, Professor Aswath Damodaran from NYU (who finds an equity risk premium (trailing 12-month, adjusted payout) of

[79] Mr. Rea's Direct Testimony at 78:20 and 79:1.

4.30% as of August 1, 2026), and further supports the argument that Mr. Rea's equity risk premium estimation is excessively high.[80]

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 Equity Risk Premium Forum, they found the most frequent estimate of the 10-year equity risk premium to be 4%.[81]

The authors of *Revisiting the Equity Risk Premium* noted, "[d]espite radically different market environments, it is striking that the estimates in all three forums were so similar. They tended to be in the 3% to 5% range, and notably, in comparison to historical returns, none of them included estimates above 7% or below zero."[82] The three forums were in 2001, 2011, and 2021.[83] Mr. Rea's 7.11% market risk premium exceeds the entire 3% to 5% range produced by three decades of expert consensus.

Q. IS THE HISTORICAL COMPONENT OF MR. REA'S MARKET RISK PREMIUM A RELIABLE MEASURE OF INVESTORS' EXPECTATIONS?

A. No, for three reasons. First, Mr. Rea bases his analysis on a one-year timeframe, which is problematic. The ROE authorized in this case will remain in effect much longer. 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

[80] Aswath Damodaran, Damodaran Online (equity risk premium, trailing 12-month, adjusted payout, as of August 1, 2026).
[81] P. Brett Hammond & Martin L. Leibowitz, CFA Institute Research Foundation, Revisiting the Equity Risk Premium (2023) at vi. https://www.cfainstitute.org/sites/default/files/-/media/documents/article/rf-brief/Revisiting-the-Equity-Risk-Premium.pdf
[82] *Id.*
[83] *Id.*

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.

Second, his historical premiums are arithmetic mean returns, which overstate the return an investor actually earns over a long horizon. The arithmetic average of a series of single-period returns answers a single-period question: what to expect over one month or one year. Over a multi-year horizon, the return an investor actually realizes is the compound, or geometric, average, which is systematically lower than the arithmetic average for any volatile series. For example, a stock that rises 100% in year one and falls 50% in year two has an arithmetic average return of 25% per year, but the investor who held it for both years ends exactly where she started, with a realized return of zero. Mr. Rea justifies using the entire 100-year period on the ground that shorter periods would be arbitrary, quoting Dr. Morin's advice that a risk premium study "should consider the longest possible period for which data are available."[84] By that own rationale, which Mr. Rea provides, that century's returns should be measured the way a long-horizon investor experienced them, which the arithmetic mean does not do.

The importance of this distinction is reflected in federal securities regulation. When a mutual fund advertises its performance to investors, Securities Act Rule 482 requires that any quotation of performance be accompanied by the standardized "average annual total return" computed under the SEC's instructions to Form N-1A—a formula, $P(1+T)^n = ERV$, that solves for the compound annual rate connecting the beginning investment to its ending value: a geometric mean, by construction.[85] In other words, when a fund tells investors what an investment returned, securities regulators require the compound figure.

[84] Mr. Rea's Direct Testimony at 89:16-17.
[85] Securities Act Rule 482, 17 C.F.R. § 230.482(d)(3); Form N-1A, Item 26(b)(1).

I recognize that the Kroll SBBI Yearbook—a source Mr. Rea quotes for exactly this proposition—states a preference for arithmetic means in cost of capital estimation, and I do not contend that his choice violates any rule;[86] my point is that the arithmetic mean's bias over long horizons is known, one-directional, and material.

Third, Mr. Rea uses historical returns data from the Kroll *Cost of Capital Navigator* to support the equity risk premium component of his CAPM.[87] However, his justification is flawed because he failed to consider if investors expect future returns to be different than past returns. His 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."[88] 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%.[89]

Q. SHOULD THE COMMISSION ACCEPT MR. REA'S SIZE PREMIUM ADJUSTMENT?

A. No. This is an adjustment the Commission has previously rejected. Mr. Rea presented a CAPM with a size adjustment in Columbia's last rate case, and the Commission stated that it "continues to reject the use of Predictive Risk Premium Model (PRPM) methodology, flotation cost adjustments, financial risk adjustments and size adjustments in the ROE analyses."[90]

[86] Mr. Rea's Direct Testimony at 91:9-23.
[87] Mr. Rea's Direct Testimony at 74:15-17.
[88] Kroll 2023 SBBI Yearbook at 199.
[89] Kroll 2023 SBBI Yearbook at 197-199.
[90] Case No. 2024-00092, Order (Ky. PSC Dec. 30, 2024) at 43.

Q. DO YOU HAVE ANY EVIDENCE THAT SUPPORTS THE COMMISSION'S POSITION?

A. Yes. Financial research has put the size effect itself into serious question. Professor Aswath Damodaran, for example, 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 an extremely 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).[91]

And 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."[92] 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 to as a "delisting bias") made the returns of smaller stocks look higher than reality.

D. Mr. Rea's Empirical CAPM Method

Q. PLEASE RESPOND TO MR. REA'S USE OF THE ECAPM.

A. The Commission should view Mr. Rea's use of the ECAPM with significant skepticism. Under the standard CAPM, a company with a beta coefficient below 1.00 (one less risky than the overall market) receives a proportionally smaller risk premium. The ECAPM overrides part of that proportionality: it awards 25% of the full market risk premium to

[91] Aswath Damodaran, Equity Risk Premiums (ERP): Determinants, Estimation and Implications - The 2014 Edition (updated March 2015) at 42.
[92] Ron Alquist, Ronen Israel, and Tobias Moskowitz, Fact, Fiction, and the Size Effect, The Journal of Portfolio Management, Fall 2018, at 3 and 5.

every company regardless of its risk, and scales only the remaining 75% by each proxy company's beta. In effect, one quarter of the premium is granted as though each proxy company were as risky as the market as a whole. Because regulated utilities essentially always have betas below 1.00—Mr. Rea's three proxy group betas average 0.79, 0.77, and 0.76[93]—this adjustment can only raise the indicated cost of equity relative to the standard CAPM. The effect is visible in his own results: his ECAPM estimate exceeds its traditional CAPM counterpart for every proxy group; for example, 10.86% versus 10.48% for his Gas LDC Group before flotation costs, a 38 basis point increase generated entirely by the reweighting.[94]

- **Double-Counting an Existing Adjustment:** Mr. Rea's ECAPM compounds an adjustment that is already embedded in his inputs. The *Value Line* betas he uses are published on an adjusted basis—pushed upward toward 1.0 before publication. Nowhere does his testimony address this embedded adjustment. Applying the ECAPM's 75/25 weighting on top of betas that have already been adjusted toward the market average double-counts the same purported low-beta effect, and his sole authority for the model is Dr. Morin.[95]
- **Critique of "Data Mining":** Leading authorities like Professor Aswath Damodaran and the standard textbook Principles of Corporate Finance (Brealey, Myers, and Allen) have warned that these types of empirical adjustments are often the product of data mining. While certain "anomalies"

[93] Mr. Rea's Direct Testimony at 79:4-6.
[94] *Id.,* Attachment VVR-10.
[95] *Id.* at 81:16-18.

(like the low-beta bias) may appear in historical data, they often fade or disappear entirely once they are widely recognized by the market.

- **Highly Biased Academic Source**: It is instructive that the only authority Mr. Rea cites in support of the ECAPM is Dr. Roger Morin, who served as an expert witness for utility companies for decades. It is unsurprising that the model he champions consistently produces higher authorized returns for utilities. Mr. Rea also cites the Montana, New York, and Alaska commissions, without case citations, and cites no Kentucky precedent.[96]

In summary, the ECAPM is an analytically unsound methodology rooted in historical data mining rather than current market reality, and its results should be disregarded.

E. Mr. Rea's Risk Premium Method

Q. DOES MR. REA'S RISK PREMIUM METHOD PROVIDE INDEPENDENT CORROBORATION OF HIS CAPM RESULTS?

A. No. His risk premium method adds an equity risk premium to a prospective utility bond yield of 6.01%, and his 4.95% premium is built from the same inputs as his CAPM: the same 11.72% prospective market return derived from analyst growth forecasts, the same Kroll historical returns data measured on the same one-year timeframe, and the same 0.79 *Value Line* beta.[97] What this shared input does show is that Mr. Rea's models are not independent. This matters because of the weight Mr. Rea places on the use of multiple

[96] Mr. Rea's Direct Testimony at 82:3-9
[97] *Id.*, Attachment VVR-11.

models, quoting the Commission's multiple-methodologies language in support.[98] When the same 11.72% market return, the same Kroll historical data, and the same beta flow into three of his five results, the agreement among those results reflects the shared inputs. If any shared input is overstated, the results that rest on those inputs are overstated as well.

The construction of his RPM also contains an asymmetry. His prospective premium is measured against a Aaa corporate bond yield (5.62%)[99]—the lowest-risk corporate benchmark—and the blended premium is then added to a higher A-/Baa1 utility bond yield of 6.01%.[100] Measuring the premium against a low benchmark and applying it to a higher yielding one inflates the result by the credit spread between two bonds. Further, the criticisms of the historical and prospective market-return inputs discussed above apply to his RPM with equal force.

Q. MR. REA CLAIMS THAT HIS COMPARATIVE RISK ASSESMENT OF COLUMBIA "IS NOT SIGNIFICANT ENOUGH TO JUSTIFY A FURTHER UPWARD ADJUSTMENT TO THE GAS LDC GROUP'S INDICATED COST OF EQUITY." HOW DO YOU RESPOND?

A. While I agree that potential risk factors—such as "markedly higher variability of book returns on equity"[101]—do not justify an upward adjustment to the Gas LDC Group's indicated cost of equity, I disagree (as the Commission has previously) with Mr. Rea's use of a size premium and floatation cost adjustment.

[98] *Id.* at 57:2-14.
[99] *Id.* at 92:17-21.
[100] *Id.* at 95:7-16.
[101] *Id.* at 32:16.

F. Mr. Rea's Flotation Cost Adjustment

Q. SHOULD THE COMMISSION ACCEPT MR. REA'S FLOTATION COST ADJUSTMENT?

A. No, for three reasons. First, this Commission has already decided this issue: in Columbia's last base rate case, the Commission indicated that it continues to reject the use of flotation cost adjustments in utility rate proceedings in the Commonwealth. Mr. Rea acknowledges this ruling but argues that "these adjustments are necessary"[102] and he applies this rejected adjustment to his DCF, CAPM, CAPM with size adjustment (a size adjustment the same Order likewise rejects), ECAPM, and RPM results.

Second, the common stock of gas utility companies is currently selling at a market price above book value. As a result, when a gas 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 to consider flotation costs.

Third, the issuance costs Mr. Rea references are NiSource's not Columbia's; they're incurred at the holding company level on offerings dating back more than two decades. Additionally, Mr. Rea's own analysis recognizes that approximately 76% of Columbia's common equity consists of retained earnings that never incurred any issuance cost, so his adjustment asks ratepayers to pay a perpetual return on underwriting fees that NiSource paid decades ago and that Columbia itself never incurred.[103]

[102] Mr. Rea's Direct Testimony at 66:1-9 and 67:1-6.
[103] Mr. Rea's Direct Testimony, Appendix C at 4:4-17.

IX. CONCLUSION

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS IN THIS CASE.

A. The Commission should reject Mr. Rea's recommended ROE of 10.95% because it significantly exceeds Columbia's actual cost of equity as indicated by current market data. Instead, I recommend that the Commission set Columbia's rates based on the following:

- An overall cost of capital of 6.69% (6.33% - 6.71%);
- ROE of 8.44% (7.70% - 8.50%);
- A capital structure containing 48.39% common equity, 50.38% long-term debt, 1.23% short-term debt, and 0.00% preferred equity; and
- A long-term debt cost rate of 5.04%.

These recommendations satisfy the *Hope* and *Bluefield* standards, they are grounded in current market data, provide Columbia a reasonable opportunity to attract capital on fair terms, and protect customers from paying too much above the market-based cost of equity.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

APPENDIX A. RATE OF RETURN DEFINITIONS

Cost of Equity (COE): My cost of equity recommendation is my opinion of the return investors require to provide equity capital to Columbia 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, **Columbia**'s cost of equity 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:

> The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.[104]

And:

> [S]ufficient to . . . support its credit and . . . raise the money necessary for the proper discharge of its public duties.[105]

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%.

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, I would say it has a capital structure containing 50% equity and 50% debt. My capital structure recommendation is based on my review of **Columbia**'s justification for its requested regulatory capital structure, the capital structure ratios of other

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

electric and gas utility companies, and the capital structure of Columbia's parent, NiSource Gas Distribution Group, Inc.. 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 subsidiary. Therefore, it is important to make sure Columbia's requested capital structure would not overcharge consumers by including a higher common equity ratio than is appropriate.[106]

Cost of Equity vs. Authorized ROE: The cost of equity is the market-based return investors expect to earn on the market value of any given stock. In other words, the cost of equity is the return investors expect to earn on the market price of equity. As it applies to this proceeding, it is the return on proxies for what investors would require to provide equity capital to Columbia. The appropriate authorized ROE is based on the Commission's determination of the cost of equity 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 cost of equity, which is constantly changing.

Columbia's authorized ROE should not be set based on authorized ROEs in other proceedings. Authorized ROEs set in past proceedings are not the right benchmark for Columbia's cost of equity. They are accounting returns applied to book value, not measures of the return investors currently require on the market value of equity. A real estate analogy

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

makes the point (Note: I discuss this same analogy in Appendix E regarding market-to-book ratios): if an investor buys a property for $100,000 and earns $6,000 per year in rent, that's a 6% return on book. If the property's market value later rises to $200,000 with rent unchanged, the return on market value falls to about 3.0%. Rent does not automatically rise to preserve a 6% book return; it is set by the market. The same is true for utility stocks. With market-to-book ratios well above 1.0 today, the market-based cost of equity is necessarily lower than authorized book returns.

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:26F

> [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.[107]

Consistency with Regulatory Principles: Regarding claims that an ROE below recent authorizations is inconsistent with regulatory principles and risks impairing access to capital, I address this issue in virtually every case, and I anticipate **Mr. Rea** will make the same argument in **him** rebuttal testimony here. The flaw is equating my recommendations with regulatory precedent rather than investor requirements. Hope and Bluefield require that the return be "commensurate with returns on investments in other enterprises having corresponding risks"—that is, consistent with market-based investor

[107] Alfred Kahn, *The Economics of Regulation: Principles and Institutions*, Mass. Inst. Tech. at 48 (fn. 69), 50 (1970).

expectations today. They do not require regulators to match or exceed prior authorizations in other states.

Authorized ROEs are backward-looking and become embedded in rates until the next case; they do not adjust dynamically with market conditions. Basing current decisions on averages of past authorizations creates a circular process that can drift out of alignment with actual investor expectations. By contrast, my recommendations are grounded in current capital market data—interest rates, inflation expectations, equity risk premiums, and forward-looking betas. That is the proper way to satisfy *Hope* and *Bluefield*.

Appropriate Rate of Return: 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.[108]

[108] WACC = Cost of Debt X Debt Ratio + Cost of Equity X Common Equity Ratio + Cost of Preferred Equity X Preferred Equity Ratio.

APPENDIX B. CAPITAL ASSET PRICING MODEL

Risk Free Rate: When looking for a security to calculate an estimate of the risk-free rate, it could be argued that it is appropriate to find one with a term or maturity that best matches the life of the asset being financed. In that sense, the 30-year Treasury bond yield can be argued to be ideal for this specific application. However, it is equally important to find a security that has a beta coefficient with the overall market as close to zero as possible, because by the very definition of the risk-free rate in the CAPM model, its movements should have no correlation to the movements of the market. And this is where the problem with the 30-year Treasury bond yield arises, as it has an established non-zero beta. The 3-month Treasury bill yield has a considerably lower beta, and therefore is superior in that respect to the 30-year Treasury bond yield. Neither one is a perfect fit on both fronts, which is why I have chosen to consider both as proxies for the risk-free rate to establish a range for my CAPM results.

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 "expert" forecasts such as Blue Chip to determine the appropriate risk-free rate to use in a CAPM analysis or any other cost of equity calculations.

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.[109]

Historical Beta: I calculate historical betas following the methodology used by Value Line, with some modifications. Specifically, Value Line adheres to the following guidelines:

1. Returns for each security are regressed against returns for the overall market in the following form:

$$\ln (p^{I}_{t} / p^{I}_{t-1}) = a_{I} + B_{I} * \ln (p^{m}_{t} / p^{m}_{t-1})$$

   Where:

   - p^{I}_{t} is the price of the security I at time t
   - p^{I}_{t-1} is the price of the security I one week before time t
   - p^{m}_{t} and p^{m}_{t-1} are the corresponding values of the market index
   - B_I is the regression estimate of Beta for the security against the market index

2. The natural log of the price ratio is used as an approximation of each return and no adjustment is made for dividends paid during the week.
3. Weekly returns are calculated on one day of the week, with a stated preference for Tuesdays to minimize the effect of holidays as much as possible.

[109] Daniel Kahneman, *Thinking Fast and Slow*, p. 212(New York: Farrar, Straus, and Giroux, 2011).

4. Betas calculated using the regression method above are adjusted as per Blume (1971).[110] using the following formula:[111]

$$\text{Adjusted } B_I = 0.35 + 0.67 * \text{Calculated } B_I$$

There are four differences between my historical beta calculations and Value Line's calculations:

1. The first significant difference is that whereas Value Line uses the New York Stock Exchange Composite Index as the market index, I use the S&P 500 Index.
2. Another important difference is that whereas Value Line calculates weekly returns on one day of the week, with a stated preference for Tuesdays, I calculate weekly returns on all days of the week.
3. Value Line only calculates betas every 3 months in their quarterly company reports, whereas I use the same consistent methodology to calculate betas every week during the most recent 3 complete months (April through June 2026).
4. Value Line always uses a 5-year period for the return regression,[112] whereas I calculate historical betas for periods of 6 months, 2 years, and 5 years.

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[110]M. Blume, On the Assessment of Risk, *The Journal of Finance*, Vol. XXVI (March 1971) at www.stat.ucla.edu/~nchristo/Fiatlux/blume2.pdf.

[111] Michelfelder and Theodossiou (2013) have discredited the Blume adjustment for regulated public utility stocks, but Gombola and Kahl (1990) found that, while their betas do not approach unity, they are nonstationary. My use of the Blume adjustment, then, is "conservative."

Michelfelder, R.A. & Theodossiou, P. (2013). Public utility beta adjustment and biased costs of capital in public utility rate proceedings, *Electricity Journal* 26(9), 60 68. https://doi.org/10.1016/j.tej.2013.09.017

Gombola, M. & Kahl, D. (1990). Time-series processes for utility betas: implications for forecasting systematic risk, *Financial Management* 19(3), 84–93. https://www.jstor.org/stable/3665827

[112] They offer betas calculated over different time periods on their website, including 3 years and 10 years.

In the following pages, I explain my rationale for making the four modifications above to Value Line's beta calculation methodology.

Choice of Market Index (S&P 500 vs. NYSE): A critical factor in the calculation of a beta coefficient is the choice of index to represent the overall market. Using exactly the same beta calculation methodology with a different market index will result in different values of beta for a given company or portfolio—sometimes drastically different values. It is easy to jump to the conclusion that this points to a flaw in CAPM theory, as different values of beta would result in a different implied cost of equity. However, another key component of the CAPM, the market risk premium, also depends on the choice of the market index, which in theory would have an offsetting effect on the cost of equity calculation. This points to the most important aspect of selecting a market index for a CAPM analysis, which is to be consistent and use the same index for the calculation of beta as for the calculation of the market risk premium. This is a fundamental concept of the CAPM, and using betas based on one index with a market risk premium based on a different index yields invalid results.

As stated above, *Value Line* calculates its published betas based on the NYSE Composite Index. Most methodologies used to calculate the market risk premium, including those I rely on, are based on the S&P 500 Index, so using them in the CAPM together with Value Line betas exactly as published would yield invalid results.

For this reason, I calculate my historical betas versus the S&P 500 Index, making my CAPM approach entirely consistent.

As an aside related to my option-implied betas, using the S&P 500 Index consistently throughout my CAPM has the added benefit that this index has a much larger

number of options traded, which makes the calculation of option-implied betas more reliable.

Daily vs. Single-Day Weekly Return Calculations: Using one day of the week to calculate weekly returns for use in the regression analysis used to calculate historical betas has the unintended effect of generating different values of betas depending on the day of the week that is used. To clarify, if one were to use Value Line's precise methodology for calculating a 5-year historical beta for a given company using weekly returns calculated on Tuesdays, the resulting beta value would be different than the resulting value if one were to use the same exact methodology, but using weekly returns calculated on Wednesdays, or any other day of the week. Even though 5-year historical betas should in theory be quite stable and should not change very much from one day to the next, calculating returns on only one day of the week results in differences that can be significant and make no sense conceptually.

It is easy to understand why it happens. Even though there is some correlation due to some overlap, the set of weekly returns calculated on Mondays is a completely different set of numbers than the set of weekly returns calculated on Tuesdays. As a result, there are five 5-year betas that can result from *Value Line*'s methodology, and even though the Monday beta for a given company will change slowly from week to week, the change between the Monday beta and the Tuesday beta, calculated just one trading day apart, can be quite significant.

Since I became aware of this undesirable effect, I began calculating my historical betas based on an all-encompassing set of weekly returns calculated on every trading day in the beta calculation period. This methodology has the effect of averaging out the five

possible betas that could result from using only one day of the week for the return calculations[113] as *Value Line* does. In this way, a 5-year beta calculated on any two consecutive trading days would only change minimally, as it should.

Using a daily calculation of weekly returns could be criticized for the resulting overlap in a weekly return from Monday to Monday with that from Tuesday to Tuesday. However, given that the overlap is consistent and equal for the net effect of every trading day, no trading day is given undue weight in the regression. Even though the effect of each trading day appears 5 times in the weekly return data, there are also 5 times the total number of weekly returns in the overall set used in the regression, so any individual trading day has the same relative weight than in *Value Line*'s methodology. The fact that the resulting beta value of this aggregate approach turns out to be a sort of average of the five possible values that would result from *Value Line*'s methodology on different days of the week is the final confirmation that this is the superior approach for calculating a historical beta based on weekly returns.

Using a daily calculation of weekly returns has the added benefit of providing more data pairs to be used in historical beta calculations for shorter periods, such as for 6-month historical betas, where instead of 25 return pairs, the regression is performed on 117 return pairs.

Benefits of Independent Calculations & Statistical Significance: Doing my own historical beta calculations using *Value Line*'s established methodology allows me to see how beta values change from week to week and to use the most up-to-date beta calculations

[113] The resulting beta is not a direct arithmetic or geometric average of the other five betas, but rather a regression based on the union of all five possible sets of weekly returns.

instead of relying on stale beta values that can be more than 3 months old, inappropriate for the up-to-date snapshot of the market that I am taking.

Regarding the number of data point pairs necessary to estimate the relationship between two variables in a regression analysis, establishing a minimum number is somewhat subjective, though various authorities on statistics argue the number is between 3 and 8 data pairs. While one can broadly correctly generalize that the more data point pairs one uses, the more certain one can be about the significance of the results of any correlation analysis, this is very different from stating that one cannot achieve statistical significance with a relatively low number of data pairs. In fact, it is important to realize that one can achieve statistical significance with fewer than 10 data pairs, and that even hundreds of data pairs do not guarantee statistical significance. For precisely this reason, statisticians have developed a tool that helps determine statistical significance based on the number of data pairs in a regression analysis.

A "table of critical values" of Pearson's correlation, which can be readily found online[114] or in most statistics books, tells a statistician that for 25 data point pairs (implying N-2=23 "degrees of freedom"), a correlation, or beta, coefficient of 0.505 or higher will occur *by chance* with a probability of only 0.01.[115] As explained in more detail in the text regarding how to use the table of critical values,[116] any beta coefficient above this level, and certainly above the 0.209 3-month average for the recent 6-month betas for my Rea Gas LDC Group, by definition are considered statistically significant. The threshold for

[114] University of Connecticut, *r Critical Value Table*, available at: https://researchbasics.education.uconn.edu/r_critical_value_table/#
[115] In fact, many researchers use a more lenient "alpha level" of 0.05 for determinations of statistical significance.
[116] University of Connecticut, *Statistical Significance: Is there a relationship (difference) or isn't there a relationship (difference)?* at https://researchbasics.education.uconn.edu/statistical_significance

statistical significance for 117 data point pairs (implying 115 "degrees of freedom"), is so low that it is not even included in the table of critical values. The maximum "degrees of freedom" listed is 100, with an already very low threshold of 0.254.

Historical Blended Beta: I am not aware of any academic study specifically focused on the optimal relative weight of historical betas to predict future betas. However, the authors of the paper I relied upon for guidance on the calculation of my option-implied betas did attempt to quantify the predictive power of 6-month option-implied ("forward-looking") betas as well as that of 6-month ("180-day"), 1-year, and 5-year historical betas by back-testing historical predictions with actual *expost* results, or "realized" betas, for the 30 companies in the Dow Jones Index. In addition to using each of the betas above independently, they also measured the predictive power of a "mixed" beta consisting of a simple average of the six-month option-implied beta and the 6-month historical beta.

Their conclusions for predicting 6-month future betas are as follows:

> The forward-looking beta outperforms the other methods ten times, and the same is true for the 180-day historical beta. The mixed beta is the best performer in seven cases, and the 1-year historical beta in three cases. The 5-year historical beta is always outperformed by at least one other method, and it often ranks last. The 180-day historical beta clearly dominates the two other historical methods.[117]

Their conclusions for predicting 1-year and 2-year future betas are as follows:

> Somewhat unexpectedly, the performance of the forward-looking beta compared to that of the 180-day historical beta is much better [for the one-year prediction] than [for the six-month prediction], and this conclusion carries over to [the two-year prediction]. The mixed beta also perform [sic] well. It is perhaps not surprising that the performance of the 180-day historical beta [for the one- and two-year predictions] is poorer than [for the six-month prediction], because the horizons used in the construction of realized betas are no longer equal to 180 days. What is harder to explain is why the correlation between realized beta and forward-looking beta is in

[117] Peter Christoffersen, Kris Jacobs, & Gregory Vainberg, *Forward-Looking Betas*, p. 16 (April 25, 2008) at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=891467.

> many cases higher [for the one- and two-year predictions] than [for the six-month prediction]. Finally, it is also interesting that the 1-year and 5-year historical betas do not perform well [for the one-and two-year predictions]. In summary, [for the one-year prediction] either the forward-looking beta or the mixed beta is the best performer in nineteen out of thirty cases. [For the two-year prediction], this the case twenty-two times out of thirty.[118]

Their conclusions strongly support the use of 6-month historical betas, 6-month option-implied betas, and/or an average of the two as predictors of future betas 6 months, 1 year, or 2 years into the future. Therefore, considering a historical blended beta in conjunction with option-implied betas to calculate the cost of equity is consistent with research findings that combining historical and option-implied betas is the best predictor of future betas.

I decided on the composition of my historical blended betas primarily based on the conclusions of the authors above. Though the predictive power of longer-term historical betas seems to be quite reduced, it is not zero, so in an effort to preserve the effect of longer-term market trends in my historical blended betas, I chose to incorporate 5-year historical betas.

Market Risk Premium: I used a cumulative probability of 50.0% in the calculation of my option-implied growth for the S&P 500, which results in an average value of 7.00% as of June 30, 2026 and a value of 7.62% for the weighted average of the 3 months ending on that date. As stated above, a cumulative probability of 50% represents the median of the probability distribution, or in this case the option-implied market consensus, which is why I have chosen to use this level.

The cumulative probabilities referred to in this case are directly comparable to the cumulative probabilities I have used or referred to in his prior filed testimonies. In late

[118] *Id. at 17.*

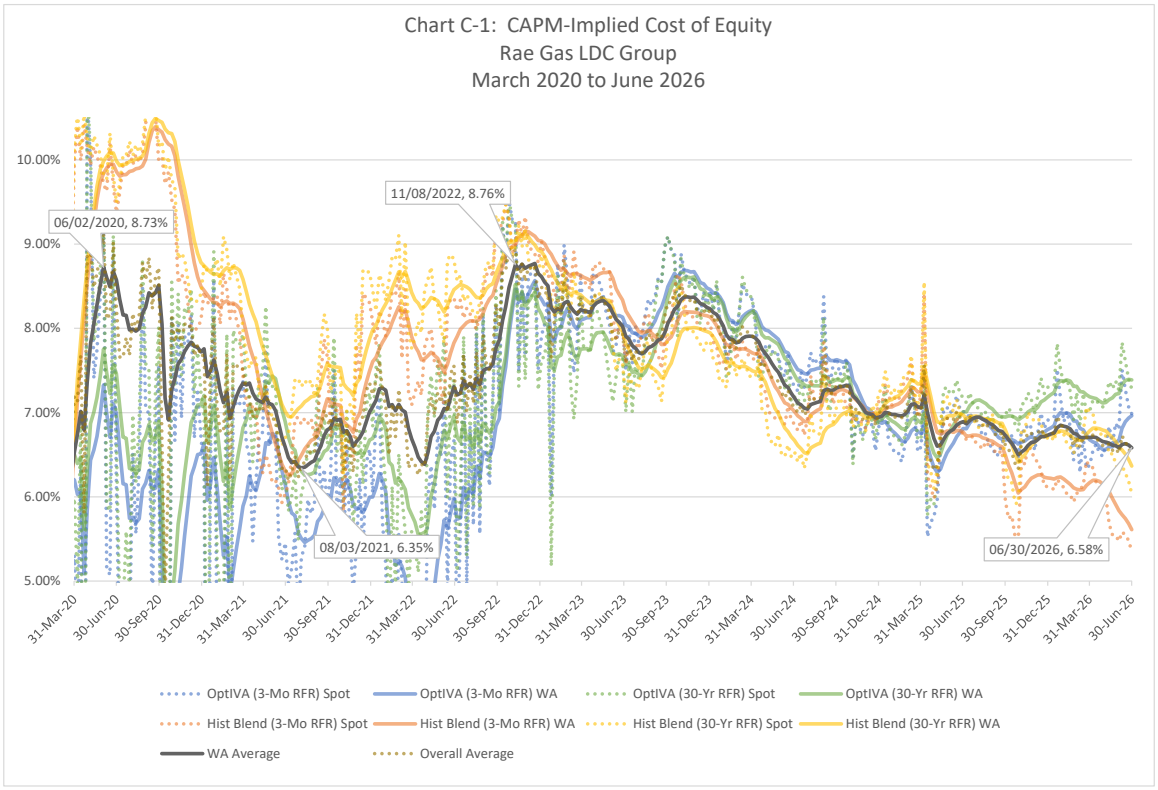
2020, after significant efforts related to the complexities in processing extremely large volumes of option data, I was finally able to use option-implied volatility and option-implied skewness to come up with a log-normal distribution that approximates the probability distribution of the possible trajectories for the S&P 500 implied by the options market as of any given day, as explained above. All of the testimonies I have filed since then, starting in 2021, have used this complete and superior approach along with a cumulative probability of 50%, representing the median of the probability distribution, or the option-implied market consensus, to estimate expected market growth. Any references to cumulative probability in these testimonies are directly comparable.

Prior to incorporating skewness into the approximation, I used a normal function to estimate the same probability distribution referred to above. Using a normal distribution as an approximation is a simplification used commonly in economics, including in the Black-Scholes formula for a single option. However, unlike a skewed log-normal distribution, a normal distribution has the same median and mean, meaning that when applied in this case, the option-implied market consensus of this simplified approximation implies market growth of 0%. As a result, before using log-normal distributions, I had to resort to finding an adequate level of cumulative probability above 50% to estimate market growth, which is admittedly somewhat subjective. To be conservative, I often used a cumulative probability of 68.3%, which is the probability found within one standard deviation of the mean of a normal distribution, which I understood would lead to a conservatively high estimate for market growth.

It is important to point out that the cumulative probabilities of the simplified normal distribution approximation I used in cases before 2021 cannot be directly compared to the

cumulative probabilities of the superior log-normal distribution approximation, which takes skewness into account. The considerably improved approximation based on a log-normal distribution eliminates all subjectivity in arriving at the implied market consensus and allows a much better measure of implied cumulative probabilities of deviations from that market consensus.

APPENDIX C. CAPM-IMPLIED COST OF EQUITY FOR REA GAS LDC GROUP OVER TIME SINCE ONSET OF COVID PANDEMIC



Notes regarding the content of this chart:

- *The information in this chart is the property of Rothschild Financial Consulting ("RFC") and may not be used for any purpose without the express written consent of RFC. Even when the underlying data are publicly available from another source, the results of analyses performed by RFC and the way of presenting the data are and remain the property of RFC.*

- *The data presented herein may not agree 100% with past recommendations by RFC for numerous reasons, including differences in the underlying proxy group and the fact that this chart represents only results based on the CAPM, whereas RFC usually bases recommendations on the CAPM and other models, such as various forms of the DCF.*

APPENDIX D. OPTION-IMPLIED GROWTH METHODOLOGY

The "Inverse Problem" Approach (Market-Implied Expectations): My methodology solves what economists call the "inverse problem." Historically, academics used theoretical assumptions to guess what a stock's price should be. My approach reverses this logic: instead of guessing, I look at what the price is in the options market, and I work backward to mathematically determine the exact growth and return expectations that justify that price.

Extracting Expectations from Stock Options: It is a fundamental economic reality that the price investors pay for an option today is directly determined by their expectations of the stock's future value. To extract this information, my analysis is based on an extremely large set of market data, making it highly robust. To avoid short-lived changes in the market, I gathered data weekly over the course of the last quarter on 13 sequential Tuesdays between April 2026 and June 2026.

The depth of this data is substantial. On any given date, the option contracts analyzed cover between 4,277 and 5,197 different strike prices. Even after applying strict filtering criteria to remove illiquid quotes, the dataset remains massive: the average number of share equivalents covered across the 13 dates is 1,051 million (over 1 billion shares) per week, providing an undeniable, real-time market signal.

An Established, Institutional Methodology: This is not a novel or experimental method. It is the foundation of the exact same mathematical framework utilized by the Federal Reserve Bank of Minneapolis to estimate market probabilities, and by the Chicago Board Options Exchange (CBOE) to calculate global benchmarks like the VIX and SKEW indices.

The 5-Step Calculation Process: To calculate the option-implied growth of the S&P 500, I rely on the exact same proven mathematical frameworks utilized by the CBOE. I perform the following steps:

1. Gather and Filter Data: I obtain S&P 500 option data and apply the CBOE's strict filtering rules (e.g., utilizing mid-quotes, removing zero bids, and cleaning out inactive options) to ensure only valid, high-quality pricing signals are used.
2. Calculate Option-Implied Volatility: Using the CBOE methodology, I calculate the expected magnitude of future stock price movements (risk).
3. Calculate Option-Implied Skewness: I then calculate the market's expectation regarding the shape of that risk—specifically, the fear of a sudden market crash (tail risk).
4. Extract the Probability Distribution: Using a standard mathematical framework originating with the Breeden-Litzenberger theorem, I measure how these option prices change across different strike prices to reveal the exact probability distribution the market assigns to the stock's future trajectory.
5. Determine Expected Growth: Finally, I convert this distribution into the specific growth investors expect. Financial theory dictates that investors require a higher return (a "risk premium") for assets that are volatile or prone to sudden crashes. This step mathematically converts the "fear" measured by volatility and skewness into the specific "return" investors demand to compensate them for that fear.

The median of this distribution represents the true market consensus of expected growth. This forward-looking, market-derived Option-Implied Growth Rate is what I then

use in my DCF analysis, providing a vastly superior reflection of current economic reality than a reliance on short-term analyst forecasts.

APPENDIX E. MARKET-TO-BOOK RATIOS AND THE MARKET-BASED COE

The Relationship Between Market Returns and Book Returns: A market-to-book ratio significantly above one indicates that the COE for gas utility companies is lower than the expected return on book equity. Calculating the COE (investors' equity return expectations) is more complicated than calculating the return on a rental property, but the same concept applies regarding the relationship between market returns and book returns.

If an investor purchases an apartment for $100,000 and expects to receive $500 per month ($500 × 12 = $6,000 per year) in rent, they will expect an annual return of 6% ($6,000 / $100,000) on their investment. When the investor purchases the apartment, they would record the book value as $100,000 and the market value as $100,000, unless they determined that the purchase price was higher or lower than the market value. If the value of the apartment increases to $200,000, for example, the market-to-book ratio would increase to 2.0, and therefore, their return on book value would remain at about 6% while their return on the market value of the apartment would decrease to about 3.0%.

In this rental property example, an increasing market value results in a lower expected return on market (3.0%) compared to the expected return on book (6%) if the rent price remains constant. Rent prices do not increase to maintain an expected 6% return on book value; they are set by what the rental market reasonably can bear.

The same is true of utility stocks. An ROE is not established based on constant return on book (accounting) returns; it is set based on what investors in the market expect that market to return. 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. As this rental property

example demonstrates, there is nothing inconsistent about investors expecting a lower return on the market price of an investment than on the book value of an investment. In fact, with market-to-book ratios of gas utility companies significantly above one, it would be surprising if investors expected a return on market equal, or anywhere close, to the return on book.

APPENDIX F. RESUME OF AARON L. ROTHSCHILD

SUMMARY

Rate of return expert witness preparing testimonies focused on utility cost of capital, specifically the cost of equity, cost of debt, and capital structure, to recommend allowed rates of return. Expertise includes measuring the consequences of alternative regulatory outcomes on utility credit metrics using stress testing and credit-risk analyses. Actively contributing to advances in cost-of-capital regulation, including the development of a probability distribution-free Value at Risk (VaR) framework that extracts the market cost of equity directly from index option prices to establish a real-time, forward-looking term structure, with this recent research submitted for presentation at the University of Vienna. Methodologies have been formally adopted by state regulatory bodies. Notably, the South Carolina Public Service Commission adopted analytical approaches using option-implied cost of equity models. This decision was subsequently upheld by the Supreme Court of South Carolina, while the California Public Utilities Commission (CPUC) has adopted testimony using this approach to determine authorized ROEs. Business experience includes complex systems science research regarding the power sector at an independent research institute, investment banking consulting in New York, and financial analysis in the telecom industry across the United States and Asia Pacific.

EXPERIENCE

Rothschild Financial Consulting, Ridgefield, CT
Independent consulting firm specializing in utility sector
President (November 2001 – Present)

- Deliver expert financial testimony and robust discovery requests regarding cost of capital and rate of return in regulatory dockets across jurisdictions including South Carolina, New York, Connecticut, and Rhode Island.
- Develop advanced, option-implied cost of equity models that have been formally adopted by public utility commissions and upheld by state supreme courts for rate-setting purposes.
- Pioneer a distribution-free Value at Risk (VaR) framework that extracts the market expected rate of return directly from S&P 500 index option prices, equipping regulators with a real-time, forward-looking term structure.
- Develop credit-risk stress testing frameworks to evaluate alternative regulatory outcomes, parent-company financing, and the resulting impacts on utility credit metrics.
- Assess whether the incremental credit-risk cost of a regulatory decision, such as potential downgrade risks or market-spread effects, offsets the consumer savings of a lower authorized ROE or lower equity ratio.
- Present analytical methods at major utility regulation conferences (e.g., NARUC/NASUCA, MARC), with recent sessions focusing on beta coefficients at SURFA in Charlotte, having previously presented on topics such as complex systems science, power purchase agreements, and subsidy auctions.

360 Networks, Hong Kong
Pioneer of the fiber optic telecommunications industry

Senior Manager (January 2001 – October 2001)

- Led business development and investment evaluation initiatives.
- Negotiated landing rights and formed local partnerships in Korea, Japan, Singapore, and Hong Kong for a $1 billion undersea cable project.
- Structured a fiber optic bandwidth swapping agreement with Enron and Global Crossing.
- Established relationships with Hong Kong-based investment bankers to communicate Asia Pacific objectives and accomplishments to Wall Street.

Dantis, Chicago, IL
Start-up managed data-hosting services provider
Director (July 2000 – December 2000)

- Built capital raise valuation models and negotiated with potential investors.
- Collaborated with a team to raise $100M from a venture capital firm through valuation negotiations and internal strategic analysis.

MFS, MCI-WorldCom, Chicago, Hong Kong, Tokyo
American Telecommunications Company
Head of Business Analysis for Japan Operations (September 1996 – July 2000)

- Managed a staff of 5 business development analysts.
- Raised $80M internally for a Japanese national fiber network expansion plan by conducting an investment evaluation and presenting findings to the CEO of international operations in London, UK.
- Built a financial model for local fiber optic investment evaluation that was used by business development offices in Oak Brook, IL, and Sydney, Australia.

EDUCATION

Vanderbilt University, Nashville, TN
MBA, Finance (1994 – 1996)

- Completed business plan for Nextlink Communications in support of their national fiber optic network expansion, including identifying opportunities from passage of Telecom Act of 1996
- Developed analytical framework to evaluate predictability of rare events
- Provided financial and accounting analysis to Chicago's consumer advocate, the Citizens Utility Board (CUB) as a summer intern

Clark University, Worcester, MA
BA, Mathematics (1990 – 1994)

APPENDIX G. TESTIFYING EXPERIENCE OF AARON L. ROTHSCHILD

Filed Rate of Return Testimonies:

California

- Pacific Gas and Electric Company, Application 25-03-010, Rate of Return, July 2025
- Southern California Edison, Application 25-03-011, Rate of Return, July 2025
- San Diego Gas & Electric Company, Application 25-03-012, Rate of Return, July 2025
- Southern California Gas Company Application 25-03-013, Rate of Return, July 2025
- Pacific Gas and Electric, Application 22-04-008 et al, Rate of Return/Cost of Capital Mechanism, January 2024
- Liberty Utilities, Application A.23-05-004, Rate of Return, August 2023
- San Gabriel Water Company, Application 23-05-001, Rate of Return, August 2023
- Suburban Water Company, Application 23-05-003, Rate of Return, August 2023
- Great Oaks Water Company, Application 23-05-002, Rate of Return, August 2023
- Incumbent Local Exchange Carriers (ILECs), Application 22-09-003, Rate of Return, May 2023
- Pacific Gas and Electric Company, Application 22-04-008, Rate of Return, August 2022
- Southern California Edison, Application 22-04-009, Rate of Return, August 2022
- San Diego Gas & Electric Company, Application 22-04-012, Rate of Return, August 2022
- California American Water Company, Application 21-05-001, Rate of Return, January 2022
- California Water Service Company, Application 21-05-002, Rate of Return, January 2022
- Golden State Water Company, Application 21-05-003, Rate of Return, January 2022
- San Jose Water Company, Application 21-05-004, Rate of Return, January 2022
- Southern California Edison, Application 21-08-013, Rate of Return/Cost of Capital Mechanism, January 2022
- San Diego Gas & Electric Company, Application 21-08-014, Rate of Return/Cost of Capital Mechanism, January 2022
- Pacific Gas and Electric Company, Application 21-08-015, Rate of Return/Cost of Capital Mechanism, January 2022
- Pacific Gas and Electric Company, Application 21-01-004, Securitization, February 2021
- Pacific Gas and Electric Company, Application 20-04-023, Securitization, October 2020
- Southern California Edison, Application 20-07-008, Securitization, September 2020
- San Diego Gas & Electric Company, Application 19-04-017, Rate of Return, August 2019
- Southern California Gas Company, Application 19-04-016, Rate of Return, August 2019
- Pacific Gas and Electric Company, Application 19-04-015, Rate of Return, August 2019
- Southern California Edison, Application 19-04-014, Rate of Return, August 2019
- Liberty Utilities, Application A.18-05-006, Rate of Return, August 2018
- San Gabriel Water Company, Application 18-05-005, Rate of Return, August 2018
- Suburban Water Company, Application 18-05-004, Rate of Return, August 2018
- Great Oaks Water Company, Application 18-05-001, Rate of Return, August 2018
- California Water Service Company, Application 17-04-006, Rate of Return, August 2017
- California American Water Company, Application 17-04-003, Rate of Return, August 2017
- Golden State Water Company, Application 17-04-002, Rate of Return, August 2017
- San Jose Water Company, Application 17-04-001, Rate of Return, August 2017

Colorado
- Public Service Company of Colorado, Docket No. 11AL-947E, Rate of Return, March 2012

Connecticut
- Aquarion Water Company of Connecticut, Docket No. 25-12-12, Rate of Return, June 2026
- Yankee Gas Service Company, Docket No. 24-14-01, Rate of Return, March 2025
- United Illuminating Company, Docket No. 24-10-04, Rate of Return, February 2025
- Connecticut Natural Gas Corporation, Docket No. 23-11-02, Rate of Return, February 2024
- The Southern Connecticut Gas Company, Docket No. 23-11-02, Rate of Return, February 2024
- The Connecticut Water Company, Docket No. 23-08-32, Rate of Return, December 2023
- United Illuminating Company, Docket No. 22-08-08, Rate of Return, December 2022
- Aquarion Water Company of Connecticut, Docket No. 22-07-01, Rate of Return, October 2022
- Eversource and United Illuminating, Docket No. 17-12-03RE11, Rate of Return / Interim Rate Reduction, April 2021
- United Water Connecticut, Docket No. 07-05-44, Rate of Return, November 2008
- Valley Water Systems, Docket No. 06-10-07, Rate of Return, May 2007

Delaware
- Tidewater Utilities, Inc., PSC Docket No. 11-397, Rate of Return, April 2012

District of Columbia
- Washington Gas Light Company, Formal Case No. 1180, Rate of Return, January 2025
- Washington Gas Light Company, Formal Case No. 1169, Rate of Return, May 2023

Florida
- Florida Power & Light (FPL), Docket No. 070001-EI, October 2007
- Florida Power Corp., Docket No. 060001 Fuel Clause, September 2007

Maryland
- Delmarva Power & Light, Case No. 9317, Rate of Return, June 2013
- Columbia Gas of Maryland, Case No. 9316, Rate of Return, May 2013
- Potomac Electric Power Company, Case No. 9286, Rate of Return, March 2012
- Delmarva Power & Light, Case No. 9285, Rate of Return, March 2012

New Jersey
- Aqua New Jersey, Inc., BPU Docket No. WR11120859, Rate of Return, April 2012

New York
- Consolidated Edison Company of New York, Inc., Docket No. 2025-S-0741, March 2026

New Hampshire
- Public Service Company Of New Hampshire., Docket No. DG 24-07,0 Rate of Return, January 2025
- Liberty Utilities (Energy North Natural Gas) Corp., Docket No. DG 23-067, Rate of Return, February 2024
- Liberty Utilities (Granite State Electric) Corp., Docket No. DE 23-039, Rate of Return, December 2023

North Dakota
- Montana-Dakota Utilities Co., Case No. PU-20-379, Rate of Return, January 2021
- Otter Tail Power Company, Case No. PU-17-398, Rate of Return, May 2018
- Montana-Dakota Utilities Co., Case No. PU-15-90, Rate of Return, August 2015
- Northern States Power, Case No. PU-400-04-578, Rate of Return, March 2005

Pennsylvania

- Aqua Pennsylvania, Inc., Docket No. R-2024-3047822, Rate of Return, August 2024
- Peoples Natural Gas Company LLC, Docket No. R-2023-304459, Rate of Return, March 2024
- UGI Utilities, Inc. – Electric Division, Docket No. R-2022-3037368, Rate of Return, April 2023
- Pennsylvania American Water Company, Docket No. R-2022-3031672 and R-2022-3031673, Rate of Return, July 2022
- UGI Utilities, Inc. – Electric Division, Docket No. R-2021-3023618, Rate of Return, May 2021
- Pennsylvania American Water Company, Docket No. P-2021-3022426, Rate of Return, February 2021
- Audubon Water Company, Docket No. R-2020-3020919, Rate of Return, November 2020
- Pennsylvania American Water Company, Docket No. R-2020-3019369 and R-2020-3019371, Rate of Return, September 2020
- Twin Lakes Utilities, Inc., Docket No. R-2019-3010958, Rate of Return, October 2019
- City of Lancaster Sewer Fund, Docket No. R-2019-3010955, Rate of Return, October 2019
- Community Utilities of Pennsylvania Inc. Wastewater Division, Docket No. R-2019-3008948, Rate of Return, July 2019
- Community Utilities of Pennsylvania Inc. Water Division, Docket No. R-2019-3008947, Rate of Return, July 2019
- Newtown Artesian Water Company, Docket No. R-20019-3006904, Rate of Return, May 2019
- Hidden Valley Utility Services, L.P. – Wastewater Division, Docket No. R-2018-3001307, Rate of Return, September 2018
- Hidden Valley Utility Services, L.P. – Water Division, Docket No. R-2018-3001306, Rate of Return, September 2018
- The York Water Company, Docket No. R-2018-3000019, Rate of Return, August 2018
- SUEZ PA Pennsylvania, Inc., Docket No. R-2018-000834, Rate of Return, July 2018
- UGI Utilities, Inc. – Electric Division, Docket No. R-2017-2640058, Rate of Return, April 2018
- Wellsboro Electric Company, Docket No. R-2016-2531551, Rate of Return, December 2016
- Citizens' Electric Company of Lewisburg, PA, Docket No. R-2016-2531550, Rate of Return, December 2016
- Columbia Gas of Pennsylvania, Inc., Docket No. R-2016-2529660, Rate of Return, June 2016
- Columbia Gas of Pennsylvania, Inc., Docket No. R-2015-2468056, Rate of Return, June 2015
- Pike County Light & Power Company, Docket No. R-2013-2397353 (gas), Rate of Return, April 2014
- Pike County Light & Power Company, Docket No. R-2013-2397237 (electric), Rate of Return, April 2014
- Columbia Water Company, Docket No. R-2013-2360798, Rate of Return, August 2013
- Peoples TWP LLC, Docket No. R-2013-2355886, Rate of Return, July 2013
- City of Dubois – Bureau of Water, Docket No. R-2013-2350509, Rate of Return, July 2013
- City of Lancaster – Sewer Fund, Docket No. R-2012-2310366, Rate of Return, December 2012
- Wellsboro Electric Company, Docket No. R-2010-2172665, Rate of Return, September 2010
- Citizens' Electric Company of Lewisburg, PA, Docket No. R-2010-2172662, Rate of Return, September 2010
- T.W. Phillips Gas and Oil Company, Docket No. R-2010-2167797, Rate of Return, August 2010
- York Water Company, Docket No. R-2010-2157140, Rate of Return, August 2010
- Joint Application of The Peoples Natural Gas Company, Dominion Resources, Inc. and Peoples Hope Gas Company LLC, Docket No. A-2008-2063737, Financial Analysis, December 2008
- York Water Company, Docket No. R-2008-2023067, Rate of Return, August 2008

Rhode Island

- Rhode Island Energy, Docket No. 25-45-GE, Rate of Return, April 2026

South Carolina

- Piedmont Natural Gas Company, Inc., Docket No. 26-61-G, Rate of Return, July 2026
- Dominion Energy South Carolina, Inc., Docket No. 2025-325-E, Rate of Return, March 2026
- Kiawah Island Utility, Inc., Docket No., Rate of Return, 2025-243-WS, December 2025
- Duke Energy Carolinas, LLC., Docket No. 2025-172-E, Rate of Return, October 2025
- Duke Energy Progress, LLC., Docket No. 2025-154-E, Rate of Return, September 2025
- Duke Energy Carolinas, LLC., Docket No. 2025-65-E, Securitization, May 2025
- Dominion Energy South Carolina, Inc., Docket No. 2024-34-E, Rate of Return, June 2024
- Duke Energy Carolinas, LLC., Docket No. 2023-388-E, Rate of Return, April 2024
- Duke Energy Progress, LLC., Docket No. 2023-89-E, Securitization, September 2023
- Dominion Energy South Carolina, Inc., Docket No. 2023-170-G, Rate of Return, July 2023
- Duke Energy Progress, LLC., Docket No. 2022-254-E, Rate of Return, December 2022
- Daufuskie Island Utility Company, Inc., Docket No. 22-142-WS, Rate of Return, September 2022
- Piedmont Natural Gas Company, Inc., Docket No. 22-89-G, Rate of Return, July 2022
- Kiawah Island Utility, Inc., Docket No. 2021-324-WS, Rate of Return, February 2022
- Palmetto Wastewater Reclamation, Inc., Docket No. 2021-153-S, Rate of Return, September 2021
- Dominion Energy South Carolina, Inc., Docket No. 2020-125-E, Rate of Return, November 2020
- Palmetto Utilities, Inc., Docket No. 2019-281-S, Rate of Return, May 2020
- Palmetto Utilities, Inc., Docket No. 2019-281-S, Accounting, May 2020
- Blue Granite Water Company, Docket No. 2019-290-WS, Rate of Return, January 2020

Tennessee

- Limestone Water Utility Operating Company, Inc., Docket No. 24-00044, Rate of Return, December 2024
- Tennessee American Water Company, Inc., Docket No. 24-00032, Rate of Return, September 2024
- Kingsport Power Company D/B/A AEP Appalachian Power, Docket No. 21-00107, Rate of Return, March 2022

Vermont

- Central Vermont Public Service Corp., Docket No. 7321, Rate of Return, September 2007

Wisconsin

- American Transmission Company, LLC, ITC, Midwest, LLC, Case No. 19-CV-3418, financial and regulatory analysis regarding requested temporary injunction to halt the construction in Wisconsin of the proposed Cardinal-Hickory Creek transmission line, October 2021

OVERALL COST OF CAPITAL
Columbia Gas of Kentucky, Inc.

	Ratios		Cost Rate		Weighted Cost Rate
					[D]
Long-Term Debt	50.38%	[A]	5.04%	[B]	2.54%
Short-Term Debt	1.23%	[B]	5.00%	[B]	0.06%
Preferred Equity	0.00%	[B]	0.00%	[B]	0.00%
Common Equity	48.39%	[A]	8.44%	[C]	4.08%
	100.00%				**6.69%**

RECOMMENDED RANGES	Low		High
Proxy Group Cost of Equity Range	7.70%		8.50%
Proxy Group Cost of Equity		8.44%	
Based on RFC Capital Structure Recommendation			
Capital Structure Risk Adjustment [E]		0.00%	
Adjusted Recommended Cost of Equity Range	**7.70%**		**8.50%**
Company Specific Cost of Equity Recommendation		**8.44%**	
Cost of Capital Range	6.33%		6.71%
Based on Mr. Rea's Capital Structure Recommendation			
Capital Structure Risk Adjustment [F]		-0.17%	
Adjusted Recommended Cost of Equity Range	**7.53%**		**8.33%**
Company Specific Cost of Equity Recommendation		**8.27%**	
Cost of Capital Range	6.35%		6.77%
Comprehensive Cost of Capital Range			
Cost of Debt Range	5.04%		3.64%
Common Equity Ratio Range	48.39%		44.84%
Comprehensive Cost of Capital Range	6.33%		5.83%

Sources:
[A] Recommendation based on Proxy Group capital structures
[B] Mr. Rea's Direct Testimony, VVR-2
[C] Company Specific Cost of Equity Recommendation based on RFC Capital Structure Recommendation
[D] Ratios times Cost Rate
[E] Not applicable because of recommended Capital Structure within Proxy Group range.
[F] Based on estimate of 0.04% change in Cost of Equity for each 1% difference in Common Equity Ratio compared to the Proxy Group (Exhibit ALR-1 vs. Exhibit ALR-5, page 4).

COST OF EQUITY SUMMARY

Rea Gas LDC Group (7 Companies)

		Low	High	Percentile			
				50.0% (Median)	60.0%	70.0%	80.0%
DCF		**7.78%**	**9.61%**				
Constant Growth - Sustainable Growth	[A]	9.57%	9.61%				
Constant Growth - Option-Implied Growth	[B]	7.78%	8.44%				
Non-Constant Growth	[C]	8.47%	8.53%				
CAPM		**5.35%**	**7.38%**				
3-Mo. Weighted Average (Apr. to Jun. 2026)							
3-Month Treasury Bill Risk-Free Rate	[D]	5.61%	6.96%				
30-Year Treasury Bond Risk-Free Rate	[D]	6.36%	7.38%				
Spot (Jun. 30, 2026)							
3-Month Treasury Bill Risk-Free Rate	[E]	5.35%	6.99%				
30-Year Treasury Bond Risk-Free Rate	[E]	6.04%	7.28%				
Proxy Group Cost of Equity				7.33% Median of Overall Range of Results	**7.70%**	**8.44% COE Recommendation**	**8.50%**
					<---- Recommended Range ---->		

Sources:
[A] Exhibit ALR-3, page 1
[B] Exhibit ALR-3, page 2
[C] Exhibit ALR-3, page 3 and Exhibit ALR-3, page 4
[D] Exhibit ALR-4, page 1
[E] Exhibit ALR-4, page 5

CONSTANT GROWTH DISCOUNTED CASH FLOW (DCF) - INDICATED COST OF EQUITY
Rea Gas LDC Group (7 Companies)

			Based on Average Market Price For Year Ending 6/30/2026	Based On Market Price As Of 6/30/2026
1	Dividend Yield On Market Price	[A]	3.34%	3.27%
2	Retention Rate:			
	a) Market-to-Book Ratio	[A]	1.76	1.76
	b) Dividend Yield on Book	[B]	5.87%	5.76%
	c) Expected Return on Equity	[C]	9.10%	9.10%
	d) Retention Rate	[D]	35.50%	36.67%
3	Reinvestment Growth	[E]	3.23%	3.34%
4	New Financing Growth	[F]	2.90%	2.90%
5	Total Estimate of Investor Anticipated Growth	[G]	6.13%	6.24%
6	Increment to Dividend Yield for Growth to Next Year	[H]	0.10%	0.10%
7	**Indicated Cost of Equity**	**[I]**	**9.57%**	**9.61%**

Sources:

[A] Exhibit ALR-5, page 1

[B] Line 1 x Line 2a

[C] Some of the considerations for determining Future Expected Return on Equity:

	Median	Mean	From
Value Line Expectation	**10.00%**	**10.07%**	Exhibit ALR-5, page 2
Return on Equity to Achieve Zacks Growth	8.63%	8.28%	Exhibit ALR-5, page 3
Average Historical Growth	8.44%	8.91%	
Earned Return on Equity in 2025	8.44%	9.37%	Exhibit ALR-5, page 2
Earned Return on Equity in 2024	8.21%	8.60%	Exhibit ALR-5, page 2
Earned Return on Equity in 2023	8.66%	8.75%	Exhibit ALR-5, page 2

[D] 1 - Line 2b / Line 2c

[E] Line 2c x Line 2d

			From
[F] S x V = (Ext. Fin Rate) x (Line 2a - 1)	Ext. Fin. Rate =	3.82%	Exhibit ALR-3, page 5

S = rate of continuous new stock financing

V = fraction of funds raised by sale of stock that increases the book value of existing shareholders' common equity

[G] Line 3 + Line 4

[H] Line 1 x one-half of Line 5

[I] Line 1 + Line 5 + Line 6

CONSTANT GROWTH DISCOUNTED CASH FLOW (DCF) - INDICATED COST OF EQUITY
Rea Gas LDC Group (7 Companies)

			Based On Weighted Averages As Of 6/30/2026	Based On Spot Market Values As Of 6/30/2026
1	Dividend Yield On Market Price	[A]	3.34%	3.27%
2	Total Estimate of Investor Anticipated Growth	[B]	4.37%	5.08%
3	Increment to Dividend Yield for Growth to Next Year	[C]	0.07%	0.08%
4	**Indicated Cost of Equity**	**[D]**	**7.78%**	**8.44%**

Sources:
[A] Exhibit ALR-5, page 1
[B] 6-Month Option-Implied Growth
[C] Line 1 x one-half of Line 2
[D] Line 1 + Line 2 + Line 3

NON-CONSTANT GROWTH DISCOUNTED CASH FLOW (DCF) - INDICATED COST OF EQUITY
(BASED ON VALUE LINE FORECASTS AND CLOSING STOCK PRICE)
Rea Gas LDC Group

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
		Forecasted Dividends per Share					Growth	Book Value		Closing Stock Price		Cash Flow From Buying and Selling Stock (At Closing Price)					
		2026	2027	2028	2029	2030	2027-30	6/30/26	6/30/30	6/30/2026	6/30/2030	2026	2027	2028	2029	2030	IRR / DCF
		[A]	[A]	[B]	[B]	[A]	[B]	[C]	[C]	[D]	[E]	[F]	[F]	[F]	[F]	[F]	[G]
ATMOS ENERGY CORP.	ATO	$4.00	$4.24	$4.49	$4.76	$5.05	6.00%	$86.69	$107.57	$172.27	$213.77	($170.27)	$4.24	$4.49	$4.76	$216.30	8.05%
NEW JERSEY RES.	NJR	$1.90	$2.00	$2.13	$2.26	$2.40	6.27%	$24.55	$31.78	$56.04	$72.54	($55.09)	$2.00	$2.13	$2.26	$73.74	10.29%
NI SOURCE INC.	NI	$1.20	$1.28	$1.36	$1.44	$1.52	5.90%	$20.70	$32.70	$47.55	$75.11	($46.95)	$1.28	$1.36	$1.44	$75.87	14.69%
N.W. NATURAL	NWN	$1.97	$1.98	$1.99	$1.99	$2.00	0.34%	$35.87	$38.99	$49.06	$53.32	($48.08)	$1.98	$1.99	$1.99	$54.32	6.15%
ONE GAS, INC.	OGS	$2.72	$2.76	$2.82	$2.89	$2.95	2.24%	$55.74	$58.30	$77.07	$80.61	($75.71)	$2.76	$2.82	$2.89	$82.09	4.82%
SOUTHWEST GAS	SWX	$2.55	$2.55	$2.64	$2.74	$2.84	3.66%	$56.52	$66.67	$88.68	$104.60	($87.41)	$2.55	$2.64	$2.74	$106.02	7.13%
SPIRE INC.	SR	$3.30	$3.46	$3.63	$3.81	$4.00	4.95%	$54.43	$62.66	$78.09	$89.91	($76.44)	$3.46	$3.63	$3.81	$91.91	8.17%
Maximum		$4.00	$4.24	$4.49	$4.76	$5.05	6.27%	$86.69	$107.57	$172.27	$213.77	($46.95)	$4.24	$4.49	$4.76	$216.30	14.69%
Minimum		$1.20	$1.28	$1.36	$1.44	$1.52	0.34%	$20.70	$31.78	$47.55	$53.32	($170.27)	$1.28	$1.36	$1.44	$54.32	4.82%
Median		$2.55	$2.55	$2.64	$2.74	$2.84	4.95%	$54.43	$58.30	$77.07	$80.61	($75.71)	$2.55	$2.64	$2.74	$82.09	8.05%
Average		$2.52	$2.61	$2.72	$2.84	$2.97	4.19%	$47.78	$56.95	$81.25	$98.55	($79.99)	$2.61	$2.72	$2.84	$100.04	**8.47%**

Sources:
[A] Value Line: Most current data available at time of schedule preparation. 2030 data is VL forecast for 2029-31.
[B] Straight line interpolation based on Value Line data, assuming constant dividend growth for 2027-30.
[C] Straight line interpolation based on Value Line data, assuming constant book value growth for 2027-30.
[D] EOD Data: Market Data as of June 30, 2026.
[E] Stock Price projected assuming constant Market to Book Ratio (Exhibit ALR-5, page 1) and using VL projected Book Value.
[F] Cash Flow from purchasing stock on July 1, 2026, receiving dividends through 2030, and selling on June 30, 2030.
Negative number in 2026 reflects cash outflow required to purchase stock.
Cash flow sources are 1) dividends and 2) proceeds of stock sale.
2 of 4 dividends assumed received in 2026 and 2 of 4 in 2030 based on purchase and sale date.
[G] Total return on equity to investor who purchased, held, and sold stock as described above,
assuming Value Line projections of Dividends and Book Value are correct and
assuming Stock Price grows at same rate as Book Value.
DCF result is an Internal Rate of Return computation made using the "IRR" function built into Microsoft Excel
based on projected cash flows from 2026 to 2030.

NON-CONSTANT GROWTH DISCOUNTED CASH FLOW (DCF) - INDICATED COST OF EQUITY
(BASED ON VALUE LINE FORECASTS AND LTM AVERAGE STOCK PRICE)
Rea Gas LDC Group

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
		Forecasted Dividends per Share					Growth	LTM Avg. Book Value		LTM Avg. Stock Price		Cash Flow From Buying and Selling Stock (At LTM Average Price)					
		2026	2027	2028	2029	2030	2027-30	2026	2030	6/30/26	6/30/30	2026	2027	2028	2029	2030	IRR / DCF
		[A]	[A]	[B]	[B]	[A]	[B]	[C]	[C]	[D]	[E]	[F]	[F]	[F]	[F]	[F]	[G]
ATMOS ENERGY CORP.	ATO	$4.00	$4.24	$4.49	$4.76	$5.05	6.00%	$83.90	$104.11	$171.25	$212.50	($169.25)	$4.24	$4.49	$4.76	$215.03	8.06%
NEW JERSEY RES.	NJR	$1.90	$2.00	$2.13	$2.26	$2.40	6.27%	$23.76	$30.75	$51.02	$66.04	($50.07)	$2.00	$2.13	$2.26	$67.24	10.65%
NI SOURCE INC.	NI	$1.20	$1.28	$1.36	$1.44	$1.52	5.90%	$19.91	$31.45	$43.83	$69.24	($43.23)	$1.28	$1.36	$1.44	$70.00	14.91%
N.W. NATURAL	NWN	$1.97	$1.98	$1.99	$1.99	$2.00	0.34%	$35.42	$38.50	$47.64	$51.78	($46.66)	$1.98	$1.99	$1.99	$52.78	6.28%
ONE GAS, INC.	OGS	$2.72	$2.76	$2.82	$2.89	$2.95	2.24%	$54.55	$57.05	$80.88	$84.59	($79.52)	$2.76	$2.82	$2.89	$86.07	4.64%
SOUTHWEST GAS	SWX	$2.55	$2.55	$2.64	$2.74	$2.84	3.66%	$54.18	$63.90	$83.43	$98.41	($82.16)	$2.55	$2.64	$2.74	$99.83	7.32%
SPIRE INC.	SR	$3.30	$3.46	$3.63	$3.81	$4.00	4.95%	$53.51	$61.61	$83.28	$95.88	($81.63)	$3.46	$3.63	$3.81	$97.88	7.88%
Maximum		$4.00	$4.24	$4.49	$4.76	$5.05	6.27%	$83.90	$104.11	$171.25	$212.50	($43.23)	$4.24	$4.49	$4.76	$215.03	14.91%
Minimum		$1.20	$1.28	$1.36	$1.44	$1.52	0.34%	$19.91	$30.75	$43.83	$51.78	($169.25)	$1.28	$1.36	$1.44	$52.78	4.64%
Median		$2.55	$2.55	$2.64	$2.74	$2.84	4.95%	$53.51	$57.05	$80.88	$84.59	($79.52)	$2.55	$2.64	$2.74	$86.07	7.88%
Average		$2.52	$2.61	$2.72	$2.84	$2.97	4.19%	$46.46	$55.34	$80.19	$96.92	($78.93)	$2.61	$2.72	$2.84	$98.40	**8.53%**

Sources:
[A] Value Line: Most current data available at time of schedule preparation. 2030 data is VL forecast for 2029-31.
[B] Straight line interpolation based on Value Line data, assuming constant dividend growth for 2027-30.
[C] Straight line interpolation based on Value Line data, assuming constant book value growth for 2027-30.
[D] EOD Data: Market Data as of June 30, 2026.
[E] Stock Price projected assuming constant Market to Book Ratio (Exhibit ALR-5, page 1) and using VL projected Book Value.
[F] Cash Flow from purchasing stock on July 1, 2026, receiving dividends through 2030, and selling on June 30, 2030.
Negative number in 2026 reflects cash outflow required to purchase stock.
Cash flow sources are 1) dividends and 2) proceeds of stock sale.
2 of 4 dividends assumed received in 2026 and 2 of 4 in 2030 based on purchase and sale date.
[G] Total return on equity to investor who purchased, held, and sold stock as described above,
assuming Value Line projections of Dividends and Book Value are correct and
assuming Stock Price grows at same rate as Book Value.
DCF result is an Internal Rate of Return computation made using the "IRR" function built into Microsoft Excel
based on projected cash flows from 2026 to 2030.

COMMON SHARES OUTSTANDING AND EXTERNAL FINANCING RATE
Rea Gas LDC Group

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
		Common Stock Outstanding (Millions of Shares)								Annual Growth Rate		
		2021	2022	2023	2024	2025	2026	2027	2030	2021-25	2025-30	2021-30
		[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[B]	[B]	[B]
ATMOS ENERGY CORP.	ATO	125.9	132.4	140.9	148.5	155.3	161.6	171.0	200.0	5.38%	5.19%	5.28%
NEW JERSEY RES.	NJR	95.8	95.0	96.3	97.6	99.5	100.5	102.0	105.0	0.94%	1.09%	1.02%
NI SOURCE INC.	NI	391.8	405.3	412.1	447.4	469.8	478.4	485.0	525.0	4.65%	2.25%	3.31%
N.W. NATURAL	NWN	30.6	31.1	35.5	37.6	40.2	41.6	45.0	50.0	7.08%	4.45%	5.61%
ONE GAS, INC.	OGS	53.2	53.6	55.4	56.6	59.9	62.7	64.0	75.0	3.02%	4.61%	3.90%
SOUTHWEST GAS	SWX	57.2	60.4	67.1	71.6	71.8	72.2	73.0	77.0	5.85%	1.41%	3.36%
SPIRE INC.	SR	51.6	51.7	52.5	53.2	57.7	59.0	62.0	75.0	2.83%	5.38%	4.24%
Maximum		391.8	405.3	412.1	447.4	469.8	478.4	485.0	525.0	7.08%	5.38%	5.61%
Minimum		30.6	31.1	35.5	37.6	40.2	41.6	45.0	50.0	0.94%	1.09%	1.02%
Median		57.2	60.4	67.1	71.6	71.8	72.2	73.0	77.0	4.65%	4.45%	3.90%
Average		115.1	118.5	122.8	130.3	136.3	139.4	143.1	158.1	4.25%	3.48%	3.82%
								Sustainable Growth	**[C]**			**3.82%**

Sources:
[A] Value Line: Most current data available at time of schedule preparation.
[B] Annualized Growth Rate calculation.
[C] Estimated Sustainable Growth in Common Stock based on analysis of historical and projected growth rates.

CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY

WEIGHTED - All Inputs Weighted From April to June 2026

Rea Gas LDC Group

	3-Month Treasury Bill		30-Year Treasury Bond	
	Historical Blended Beta	Forward Beta	Historical Blended Beta	Forward Beta
Risk-Free Rate	3.76%	3.76%	4.95%	4.95%
Beta	0.37	0.65	0.37	0.65
Risk Premium	4.95%	4.95%	3.76%	3.76%
CAPM (Weighted)	5.61%	6.96%	6.36%	7.38%

CAPITAL ASSET PRICING MODEL (CAPM) - RISK-FREE RATE

Spot (Jun. 30, 2026)	
3-Month Treasury Bill	3.87%
30-Year Treasury Bond	4.91%
3-Mo. Weighted Average (Apr. to Jun. 2026)	
3-Month Treasury Bill	3.76%
30-Year Treasury Bond	4.95%

Source: www.treasury.gov

CAPITAL ASSET PRICING MODEL (CAPM) - BETAS

(BASED ON HISTORICAL AND OPTION-IMPLIED RETURNS)

Rea Gas LDC Group

Betas	03/31/2026	04/07/2026	04/14/2026	04/21/2026	04/28/2026	05/05/2026	05/12/2026	05/19/2026	05/26/2026	06/02/2026	06/09/2026	06/16/2026	06/23/2026	06/30/2026	Average	Time Avg.
Forward (6 months)	0.45	0.50	0.55	0.52	0.53	0.56	0.60	0.57	0.63	0.61	0.73	0.71	0.70	0.72	0.598	0.646
Historical (6 months)	0.34	0.37	0.37	0.34	0.34	0.33	0.22	0.18	0.19	0.15	0.17	0.18	0.18	0.15	0.252	0.209
Historical (2 yrs)	0.50	0.50	0.50	0.49	0.49	0.49	0.48	0.48	0.48	0.47	0.47	0.47	0.47	0.46	0.483	0.475
Historical (5 yrs)	0.64	0.64	0.64	0.64	0.64	0.64	0.63	0.63	0.63	0.63	0.62	0.62	0.62	0.62	0.632	0.628
Weighting																
Forward (6 months)	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%		
Historical (6 months)	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%		
Historical (2 yrs)	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%		
Historical (5 yrs)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%		
Historical Blended Beta	**0.45**	**0.46**	**0.46**	**0.44**	**0.44**	**0.44**	**0.38**	**0.36**	**0.37**	**0.34**	**0.35**	**0.36**	**0.35**	**0.34**	0.397	0.373
Slope	15%															
Points	0.00	1.00	1.15	1.32	1.52	1.75	2.01	2.31	2.66	3.06	3.52	4.05	4.65	5.35		
Time Weight	0.0%	2.9%	3.3%	3.8%	4.4%	5.1%	5.9%	6.7%	7.7%	8.9%	10.2%	11.8%	13.5%	15.6%		

CAPM Betas	Spot (Jun 30, 2026)	Weighted (Apr - Jun 2026)
Forward	0.72	0.65
Historical Blended	0.34	0.37

Note: Historical betas are calculated on Tuesdays, following Value Line's methodology. Forward (option-implied) betas are also calculated on Tuesdays for the sake of compatibility.

CAPITAL ASSET PRICING MODEL (CAPM) - MARKET RISK PREMIUM

WEIGHTED - All Inputs Weighted From April to June 2026

Cumulative Probability	50.00%	
S&P 500 Option-Implied Growth Rate	7.62%	
S&P 500 Dividend Yield	1.10%	
S&P 500 Market Return	8.72%	
	3-Month Treasury Bill	**30-Year Treasury Bond**
Risk-Free Rate	3.76%	4.95%
Option-Implied Market Risk Premium (Weighted)	4.95%	3.76%

CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY

SPOT - All Inputs Based on Last Available Data as of June 30, 2026

Rea Gas LDC Group

	3-Month Treasury Bill		30-Year Treasury Bond	
	Historical Blended Beta	Forward Beta	Historical Blended Beta	Forward Beta
Risk-Free Rate	3.87%	3.87%	4.91%	4.91%
Beta	0.34	0.72	0.34	0.72
Risk Premium	4.35%	4.35%	3.31%	3.31%
CAPM (Spot)	5.35%	6.99%	6.04%	7.28%

CAPITAL ASSET PRICING MODEL (CAPM) - MARKET RISK PREMIUM

SPOT - All Inputs Based on Last Available Data as of June 30, 2026

Cumulative Probability	50.00%
S&P 500 Option-Implied Growth Rate	7.16%
S&P 500 Dividend Yield	1.06%
S&P 500 Market Return	8.22%

	3-Month Treasury Bill	30-Year Treasury Bond
Risk-Free Rate	3.87%	4.91%
Option-Implied Market Risk Premium (Spot)	4.35%	3.31%

MARKET TO BOOK RATIO AND DIVIDEND YIELD

Rea Gas LDC Group

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
		Book Value per Share															
		Actual				**Estimated**			**Market Price**			**Mkt. to Book Ratio**		**Dividend Rate**		**Dividend Yield**	
		12/31/22	**12/31/23**	**12/31/24**	**12/31/25**	**6/30/25**	**6/30/26**	**12/31/26**	**6/30/26**	**LTM High**	**LTM Low**	**6/30/26**	**LTM Avg.**	**MRQ**	**Annual**	**6/30/26**	**LTM Avg.**
		[A]	[A]	[A]	[A]	[B]	[B]	[A]	[C]	[C]	[C]	[D]	[D]	[A]	[E]	[F]	[F]
ATMOS ENERGY CORP.	ATO	$66.85	$73.20	$78.31	$83.92	$81.12	$86.69	$89.45	$172.27	$192.51	$149.98	1.99	2.04	$1.000	$4.000	2.32%	2.34%
NEW JERSEY RES.	NJR	$18.88	$20.40	$22.12	$23.80	$22.96	$24.55	$25.30	$56.04	$58.57	$43.46	2.28	2.15	$0.475	$1.900	3.39%	3.72%
NI SOURCE INC.	NI	$14.63	$17.40	$18.48	$19.75	$19.12	$20.70	$21.65	$47.55	$49.21	$38.45	2.30	2.20	$0.300	$1.200	2.52%	2.74%
N.W. NATURAL	NWN	$33.09	$34.12	$34.44	$35.49	$34.97	$35.87	$36.25	$49.06	$55.99	$39.29	1.37	1.35	$0.493	$1.972	4.02%	4.14%
ONE GAS, INC.	OGS	$46.69	$48.91	$51.85	$54.87	$53.36	$55.74	$56.60	$77.07	$90.78	$70.97	1.38	1.48	$0.680	$2.720	3.53%	3.36%
SOUTHWEST GAS	SWX	$45.57	$46.25	$48.82	$54.84	$51.83	$56.52	$58.20	$88.68	$94.43	$72.43	1.57	1.54	$0.645	$2.580	2.91%	3.09%
SPIRE INC.	SR	$49.08	$50.29	$51.83	$53.35	$52.59	$54.43	$55.50	$78.09	$95.31	$71.24	1.43	1.56	$0.825	$3.300	4.23%	3.96%
Maximum		$66.85	$73.20	$78.31	$83.92	$81.12	$86.69	$89.45	$172.27	$192.51	$149.98	2.30	2.20	$1.000	$4.000	4.23%	4.14%
Minimum		$14.63	$17.40	$18.48	$19.75	$19.12	$20.70	$21.65	$47.55	$49.21	$38.45	1.37	1.35	$0.300	$1.200	2.32%	2.34%
Median		$45.57	$46.25	$48.82	$53.35	$51.83	$54.43	$55.50	$77.07	$90.78	$70.97	1.57	1.56	$0.645	$2.580	3.39%	3.36%
Average		$39.26	$41.51	$43.69	$46.57	$45.13	$47.78	$48.99	$81.25	$90.97	$69.40	1.76	1.76	$0.631	$2.525	3.27%	3.34%

Sources:

[A] Value Line: Most current data available at time of schedule preparation.

[B] Straight-line interpolation of Actual and Estimated VL year-end values.

[C] EOD Data: Market Data as of June 30, 2026.

[D] Market Price divided by Book Value per Share.

[E] Most Recent Quarterly Dividend multiplied by 4.

[F] Dividend Rate divided by Market Price.

EARNINGS PER SHARE AND RETURN ON EQUITY

Rea Gas LDC Group

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
		Earnings per Share				**Return on Equity**			
		2022	**2023**	**2024**	**2025**	**2023**	**2024**	**2025**	**VL Future Exp.**
		[A]	[A]	[A]	[A]	[B]	[B]	[B]	[A]
ATMOS ENERGY CORP.	ATO	$5.60	$6.10	$6.83	$7.46	8.71%	9.02%	9.20%	10.00%
NEW JERSEY RES.	NJR	$2.50	$2.71	$2.92	$3.33	13.80%	13.73%	14.50%	13.00%
NI SOURCE INC.	NI	$1.47	$1.60	$1.75	$1.95	9.99%	9.75%	10.20%	9.00%
N.W. NATURAL	NWN	$2.54	$2.59	$2.03	$2.77	7.71%	5.92%	7.92%	8.00%
ONE GAS, INC.	OGS	$4.08	$4.14	$3.91	$4.48	8.66%	7.76%	8.40%	10.50%
SOUTHWEST GAS	SWX	($3.10)	$2.13	$2.76	$3.60	4.64%	5.81%	6.95%	9.50%
SPIRE INC.	SR	$3.95	$3.85	$4.19	$4.44	7.75%	8.21%	8.44%	10.50%
Maximum		$5.60	$6.10	$6.83	$7.46	13.80%	13.73%	14.50%	13.00%
Minimum		($3.10)	$1.60	$1.75	$1.95	4.64%	5.81%	6.95%	8.00%
Median		$2.54	$2.71	$2.92	$3.60	8.66%	8.21%	8.44%	10.00%
Average		$2.43	$3.30	$3.48	$4.00	8.75%	8.60%	9.37%	10.07%

Sources:
[A] Value Line: Most current data available at time of schedule preparation.
[B] Earnings per Share divded by average Book Value. Book Values shown on Exhibit ALR-5, page 1.

RETURN ON EQUITY IMPLIED BY ZACKS GROWTH RATES

Rea Gas LDC Group

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
		Book Value	**EPS**	**Annual Dividend**	**Analyst 5 Year**	**Analyst-Implied Book Value before SV**		**Analyst-Implied Book Value Incl. SV**		**Implied EPS**	**Analyst-Implied**
		12/31/25	**2025**	**Rate**	**Growth Rate**	**12/31/2029**	**12/31/2030**	**12/31/2029**	**12/31/2030**	**2030**	**ROE**
		[A]	[A]	[A]	[B]	[C]	[C]	[C]	[C]	[C]	[C]
ATMOS ENERGY CORP.	ATO	$83.92	$7.46	$4.000	6.80%	$100.28	$105.09	$136.11	$153.96	$10.37	7.15%
NEW JERSEY RES.	NJR	$23.80	$3.33	$1.900	NA	NA	NA	NA	NA	NA	NA
NI SOURCE INC.	NI	$19.75	$1.95	$1.200	6.10%	$23.24	$24.24	$27.81	$30.35	$2.62	9.02%
N.W. NATURAL	NWN	$35.49	$2.77	$1.972	NA	NA	NA	NA	NA	NA	NA
ONE GAS, INC.	OGS	$54.87	$4.48	$2.720	6.20%	$63.07	$65.45	$78.41	$85.92	$6.05	7.37%
SOUTHWEST GAS	SWX	$54.84	$3.60	$2.580	9.90%	$60.03	$61.67	$65.26	$68.45	$5.77	8.63%
SPIRE INC.	SR	$53.35	$4.44	$3.300	11.20%	$59.34	$61.28	$77.76	$85.92	$7.55	9.22%
Maximum		$83.92	$7.46	$4.000	11.20%	$100.28	$105.09	$136.11	$153.96	$10.37	9.22%
Minimum		$19.75	$1.95	$1.200	6.10%	$23.24	$24.24	$27.81	$30.35	$2.62	7.15%
Median		$53.35	$3.60	$2.580	6.80%	$60.03	$61.67	$77.76	$85.92	$6.05	8.63%
Average		$46.57	$4.00	$2.525	8.04%	$61.19	$63.55	$77.07	$84.92	$6.47	8.28%

Sources:

[A] Value Line: Most current data available at time of schedule preparation.

[B] Zacks: Data as of July 09, 2026.

[C] Analyst-Implied Book Value and Return on Equity is obtained by escalating both Dividends and Earnings per Share by the stated Analyst Growth Rate and adding Earnings and subtracting Dividends for each projected year.

"SV" = S X V, where S = rate of continuous new stock financing and V = rate of return on common equity investment.

CAPITAL STRUCTURE WITH SHORT TERM DEBT
Rea Gas LDC Group

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
		% Common Equity					($ millions)						Percentage			
		2021	2022	2023	2024	2025	Total Debt	LT Debt	ST Debt	Pfd Stock	Equity	Total Capital	LT Debt	ST Debt	Pfd Stock	Equity Ratio
		[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[B]	[B]	[B]	[B]
ATMOS ENERGY CORP.	ATO	61.6%	62.1%	62.1%	60.7%	60.2%	$ 9,629.3	$ 9,618.0	$ 11.3	$ -	$ 14,547.8	$ 24,177.1	39.8%	0.0%	0.0%	60.2%
NEW JERSEY RES.	NJR	43.0%	42.2%	41.8%	43.3%	42.5%	$ 3,596.3	$ 3,281.7	$ 314.6	$ -	$ 2,425.6	$ 6,021.9	54.5%	5.2%	0.0%	40.3%
NI SOURCE INC.	NI	33.5%	35.3%	40.3%	41.8%	37.9%	$ 16,767.0	$ 15,459.0	$ 1,308.0	$ -	$ 9,434.7	$ 26,201.7	59.0%	5.0%	0.0%	36.0%
N.W. NATURAL	NWN	47.2%	48.5%	47.4%	45.2%	38.6%	$ 2,604.4	$ 2,272.4	$ 332.0	$ -	$ 1,428.6	$ 4,033.0	56.3%	8.2%	0.0%	35.4%
ONE GAS, INC.	OGS	38.9%	49.3%	56.1%	56.5%	59.3%	$ 3,381.2	$ 2,340.3	$ 1,040.9	$ -	$ 3,409.8	$ 6,791.0	34.5%	15.3%	0.0%	50.2%
SOUTHWEST GAS	SWX	41.8%	41.0%	41.8%	44.6%	53.6%	$ 3,509.0	$ 3,434.0	$ 75.0	$ -	$ 3,966.9	$ 7,475.9	45.9%	1.0%	0.0%	53.1%
SPIRE INC.	SR	43.2%	44.6%	41.3%	43.1%	46.6%	$ 7,955.1	$ 5,762.0	$ 2,193.1	$ -	$ 5,028.3	$ 12,983.4	44.4%	16.9%	0.0%	38.7%
Maximum		61.6%	62.1%	62.1%	60.7%	60.2%	$ 16,767.0	$ 15,459.0	$ 2,193.1	$ -	$ 14,547.8	$ 26,201.7	59.0%	16.9%	0.0%	60.2%
Minimum		33.5%	35.3%	40.3%	41.8%	37.9%	$ 2,604.4	$ 2,272.4	$ 11.3	$ -	$ 1,428.6	$ 4,033.0	34.5%	0.0%	0.0%	35.4%
Median		43.0%	44.6%	41.8%	44.6%	46.6%	$ 3,596.3	$ 3,434.0	$ 332.0	$ -	$ 3,966.9	$ 7,475.9	45.9%	5.2%	0.0%	40.3%
Average		44.2%	46.1%	47.3%	47.9%	48.4%	$ 6,777.5	$ 6,023.9	$ 753.6	$ -	$ 5,748.8	$ 12,526.3	47.8%	7.4%	0.0%	**44.8%**

Sources:

[A] Value Line: Most current data available at time of schedule preparation.

[B] Percentage calculated on Total Capital including Short Term Debt.

CAPITAL STRUCTURE WITHOUT SHORT TERM DEBT
Rea Gas LDC Group

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
		% Common Equity					($ millions)						Percentage			
		2021	2022	2023	2024	2025	Total Debt	LT Debt	ST Debt	Pfd Stock	Equity	Total Capital	LT Debt	ST Debt	Pfd Stock	Equity Ratio
		[A]	[A]	[A]	[A]	[A]	[A]	[A]	[B]	[A]	[A]	[A]	[B]	[B]	[B]	[B]
ATMOS ENERGY CORP.	ATO	61.6%	62.1%	62.1%	60.7%	60.2%	$ 9,629.3	$ 9,618.0		$ -	$ 14,547.8	$ 24,165.8	39.8%	0.0%	0.0%	60.2%
NEW JERSEY RES.	NJR	43.0%	42.2%	41.8%	43.3%	42.5%	$ 3,596.3	$ 3,281.7		$ -	$ 2,425.6	$ 5,707.3	57.5%	0.0%	0.0%	42.5%
NI SOURCE INC.	NI	33.5%	35.3%	40.3%	41.8%	37.9%	$ 16,767.0	$ 15,459.0		$ -	$ 9,434.7	$ 24,893.7	62.1%	0.0%	0.0%	37.9%
N.W. NATURAL	NWN	47.2%	48.5%	47.4%	45.2%	38.6%	$ 2,604.4	$ 2,272.4		$ -	$ 1,428.6	$ 3,701.0	61.4%	0.0%	0.0%	38.6%
ONE GAS, INC.	OGS	38.9%	49.3%	56.1%	56.5%	59.3%	$ 3,381.2	$ 2,340.3		$ -	$ 3,409.8	$ 5,750.1	40.7%	0.0%	0.0%	59.3%
SOUTHWEST GAS	SWX	41.8%	41.0%	41.8%	44.6%	53.6%	$ 3,509.0	$ 3,434.0		$ -	$ 3,966.9	$ 7,400.9	46.4%	0.0%	0.0%	53.6%
SPIRE INC.	SR	43.2%	44.6%	41.3%	43.1%	46.6%	$ 7,955.1	$ 5,762.0		$ -	$ 5,028.3	$ 10,790.3	53.4%	0.0%	0.0%	46.6%
Maximum		61.6%	62.1%	62.1%	60.7%	60.2%	$ 16,767.0	$ 15,459.0		$ -	$ 14,547.8	$ 24,893.7	62.1%	0.0%	0.0%	60.2%
Minimum		33.5%	35.3%	40.3%	41.8%	37.9%	$ 2,604.4	$ 2,272.4		$ -	$ 1,428.6	$ 3,701.0	39.8%	0.0%	0.0%	37.9%
Median		43.0%	44.6%	41.8%	44.6%	46.6%	$ 3,596.3	$ 3,434.0		$ -	$ 3,966.9	$ 7,400.9	53.4%	0.0%	0.0%	46.6%
Average		44.2%	46.1%	47.3%	47.9%	48.4%	$ 6,777.5	$ 6,023.9		$ -	$ 5,748.8	$ 11,772.7	51.6%	0.0%	0.0%	**48.4%**

Sources:
[A] Value Line: Most current data available at time of schedule preparation.
[B] Percentage calculated on Total Capital excluding Short Term Debt.

AFFIDAVIT

STATE OF CONNECTICUT

COUNTY OF FAIRFIELD

AARON L. ROTHSCHILD, being duly sworn, deposes and states: that the attached is his sworn testimony and that the statements contained are true and correct to the best of his knowledge, information and belief.

Aaron L. Rothschild

Sworn to and subscribed before me on this 17th day of August 2026.

JILL M MAGUIRE NOTARY PUBLIC STATE OF CONNECTICUT

Notary Public

JILL M MAGUIRE
Notary Public, State of Connecticut
My Commission Expires Dec. 31, 2026