BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF THE APPLICATION OF NEW MEXICO GAS COMPANY, INC. FOR REVISIONS TO ITS RATES, RULES, AND CHARGES PURSUANT TO ADVICE. NOTICE NO. 87	)	**Case No. 21-00267-UT**
NEW MEXICO GAS COMPANY, INC.	)	
Applicant.	)	

DIRECT TESTIMONY

OF

ROGER A. MORIN, PhD

ON BEHALF OF

NEW MEXICO GAS COMPANY, INC.

DECEMBER 13, 2021

DIRECT TESTIMONY OF
ROBERT A. MORIN, Ph.D.
NMPRC CASE NO. 21-00267-UT

TABLE OF CONTENTS

I. Introduction and Summary 2

II. Regulatory Framework and Rate of Return 9

III. Cost of Equity Capital Estimates 16

A - DCF Estimates 19

B - CAPM Estimates.....34

C – Historical Risk Premium Estimates.....52

D – Allowed Risk Premiums 54

E – Need for Flotation Cost Adjustment.....57

IV. Summary and Recommendation…….....60

V. Capital Structure and Optimal Bond Rating……..…….62

V. Conclusions…….……..66

EXHIBIT LIST

Exhibit RAM-1	Resume of Roger A. Morin
Exhibit RAM-2	Value Line's Natural Gas Utility Group
Exhibit RAM-3.	Investment-Grade Natural Gas Utilities DCF Analysis: Value Line Growth Projections
Exhibit RAM-4.	Investment-Grade Natural Gas Utilities DCF Analysis: Analysts' Growth Forecasts
Exhibit RAM-5	Investment-Grade Dividend-Paying Combination Gas & Electric Utilities
Exhibit RAM-6.	Investment-Grade Combination Gas & Electric Utilities DCF Analysis: Value Line Growth Projections
Exhibit RAM-7.	Investment-Grade Combination Gas & Electric Utilities DCF Analysis: Analysts' Growth Forecasts
Exhibit RAM-8.	Natural Gas and Combination Gas & Electric Utilities Beta Estimates
Exhibit RAM-9.	Prospective DCF Market Risk Premium analysis
Exhibit RAM-10.	Natural Gas and Combination Gas & Electric Utilities CAPM Results
Exhibit RAM-11.	Utility Industry Historical Risk Premium Analysis
Exhibit RAM-12	Allowed Risk Premium Electric Utilities
Exhibit RAM-13	Natural Gas Companies Common Equity Ratios

APPENDICES

Appendix A	CAPM, Empirical CAPM
Appendix B	Flotation Cost Allowance

I. INTRODUCTION AND SUMMARY OF RECOMMENDATION

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

A. My name is Dr. Roger A. Morin. My business address is Georgia State University, Robinson College of Business, University Plaza, Atlanta, Georgia, 30303. I am Emeritus Professor of Finance at the Robinson College of Business, Georgia State University and Professor of Finance for Regulated Industry at the Center for the Study of Regulated Industry at Georgia State University. I am also a principal in Utility Research International, an enterprise engaged in regulatory finance and economics consulting to business and government. I am testifying on behalf of the New Mexico Gas Company, Inc. ("NMGC" or the "Company").

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I hold a Bachelor of Engineering degree and an MBA in Finance from McGill University, Montreal, Canada. I received my Ph.D. in Finance and Econometrics at the Wharton School of Finance, University of Pennsylvania.

Q. PLEASE SUMMARIZE YOUR ACADEMIC AND BUSINESS CAREER.

A. I have taught at the Wharton School of Finance, University of Pennsylvania, Amos Tuck School of Business at Dartmouth College, Drexel University, University of Montreal, McGill University, and Georgia State University. I was a faculty member of Advanced

Management Research International, and I am currently a faculty member of S&P Global Intelligence (formerly SNL Knowledge Center or SNL), where I conduct frequent national executive-level education seminars throughout the United States. In the last 40 years, I have conducted numerous national seminars on "Utility Finance," "Utility Cost of Capital," "Alternative Regulatory Frameworks," and "Utility Capital Allocation," which I have developed on behalf of S&P Global Intelligence and others. I have also conducted numerous seminars to various regulatory commissions and regulatory staffs, including the Federal Electric Regulatory Commission (FERC).

I have authored or co-authored several books, monographs, and articles in academic scientific journals on the subject of finance. They have appeared in a variety of journals, including The Journal of Finance, The Journal of Business Administration, International Management Review, and Public Utilities Fortnightly. I published a widely-used treatise on regulatory finance, Utilities' Cost of Capital, Public Utilities Reports, Inc., Arlington, Va. 1984. In late 1994, the same publisher released my book, Regulatory Finance, a voluminous treatise on the application of finance to regulated utilities. A revised and epanded edition of this book, The New Regulatory Finance, was published in 2006, and a second edition of the book titled Modern Regulatory Finance is forthcoming in December 2021. I have been engaged in extensive consulting activities on behalf of numerous corporations, legal firms, and regulatory bodies in matters of financial management and corporate litigation.

Please see NMGC Exhibit RAM-1 for my professional qualifications.

Q. HAVE YOU PREVIOUSLY TESTIFIED ON COST OF CAPITAL BEFORE UTILITY REGULATORY COMMISSIONS?

A. Yes, I have been a cost of capital witness before nearly 50 regulatory bodies in North America, including the New Mexico Public Regulatory Commission ("the Commission") and the Federal Energy Regulatory Commission. I have testified before the following state, provincial, and other local regulatory commissions:

Alabama	Florida	Nebraska	Oregon
Alaska	Georgia	Nevada	Pennsylvania
Alberta	Hawaii	New Brunswick	Quebec
Arizona	Illinois	New Hampshire	South Carolina
Arkansas	Indiana	New Jersey	South Dakota
British Columbia	Iowa	New Mexico	Tennessee
California	Maine	New York	Texas
City of New Orleans	Manitoba	Newfoundland	Utah
Colorado	Maryland	North Carolina	Vermont
CRTC	Michigan	North Dakota	Virginia
Delaware	Minnesota	Nova Scotia	Washington
District of Columbia	Mississippi	Ohio	West Virginia
FCC	Missouri	Oklahoma	
FERC	Montana	Ontario	

The details of my participation in regulatory proceedings are also provided in NMGC Exhibit RAM-1.

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

A. The purpose of my testimony in this proceeding is to present an independent appraisal of the fair and reasonable rate of return on common equity ("ROE") on the common equity capital invested in NMGC's natural gas utility operations in the State of New Mexico and to support the Company's requested allowed ROE to be used for establishing rates. Based upon this appraisal, I have formed my professional judgment as to a return on such capital that would:

(1) be fair to ratepayers;

(2) allow NMGC to attract the capital needed for infrastructure and reliability investments on reasonable terms;

(3) maintain NMGC's financial integrity; and

(4) be comparable to returns offered on comparable risk investments.

Q. PLEASE BRIEFLY IDENTIFY THE EXHIBITS AND APPENDICES ACCOMPANYING YOUR TESTIMONY.

A. I have attached to my testimony NMGC Exhibit RAM-1 through NMGC Exhibit RAM-13, and Appendices A and B. These Exhibits and Appendices relate directly to points in my testimony, and are described in further detail in connection with the discussion of those points in my testimony.

Q. PLEASE SUMMARIZE YOUR FINDINGS CONCERNING NMGC'S COST OF COMMON EQUITY.

A. It is my opinion that a fair, reasonable and sufficient ROE for NMGC is 10.1%. My recommended return is predicated on the Commission's adoption of NMGC's proposed capital structure which consists of 53% common equity capital. A minimum ROE of 10.1% is required in order for the Company to: (i) attract capital on reasonable terms, (ii) maintain its financial integrity, and (iii) earn a return commensurate with returns on comparable risk investments.

My ROE recommendation is derived from cost of capital studies that I performed using the financial models available to me and from the application of my professional judgment to the results. I applied various cost of capital methodologies, including the Discounted Cash Flow (DCF), Capital Asset Pricing Model (CAPM), and Risk Premium Models to two surrogates for NMGC. They are: a group of investment-grade natural gas distribution utilities covered in Value Line's Natural Gas Distribution Group and a group of investment-grade combination gas and electric utilities covered in Value Line's Electric Utility Composite. I have also surveyed and analyzed the historical risk premiums in the utility industry and the risk premiums allowed by regulators as indicators of the appropriate risk premium for the natural gas utility industry and NMGC.

My recommended ROE reflects the application of my professional judgment to the results in light of the indicated returns from my DCF, CAPM, and Risk Premium analyses. I do

consider my recommended ROE as conservative given the higher relative risks of the Company by virtue of its significant financing requirements from its large construction program, relatively small size, absence of risk-mitigating mechanisms relative to its peers, lack of regulatory diversification, and a generally heightened industry risk environment.

Similarly, my recommendation reflects certain assumptions about these risks and NMGC's regulatory environment. I assume that NMGC will permit the timely recovery of its capital costs resulting from its construction program and approve the Company's requested capital structure. If there appears to be divergence from these assumptions, then NMGC would be a riskier company than it has been in the recent past, and my recommendation would need to be reconsidered.

Q. WOULD IT BE IN THE BEST INTERESTS OF RATEPAYERS FOR THE COMMISSION TO APPROVE A ROE OF 10.1% FOR NMGC'S NATURAL GAS UTILITY OPERATIONS?

A. Yes. My analysis shows that a 10.1% ROE, albeit conservative, fairly compensates investors, maintains NMGC's credit strength, and attracts the capital needed for utility infrastructure and reliability capital investments. Adopting a lower ROE would ignore the Company's higher relative risks and increase costs for ratepayers.

Q. PLEASE EXPLAIN HOW LOW ALLOWED ROES CAN INCREASE BOTH THE FUTURE COST OF EQUITY AND DEBT FINANCING.

A. If a utility is authorized a ROE below the level required by equity investors, the utility or its parent will find it difficult to access equity capital. Investors will not provide equity capital at the current market price if the earnable ROE is below the level they require given the risks of an equity investment in the utility. The equity market corrects this by generating a stock price in equilibrium that reflects the valuation of the potential earnings stream from an equity investment at the risk-adjusted return that equity investors require. In the case of a utility that has been authorized a return below the level investors believe is appropriate for the risk they bear, the result is a decrease in the utility's market price per share of common stock. This reduces the financial viability of equity financing in two ways. First, because the utility's price per share of common stock decreases, the net proceeds from issuing common stock are reduced. Second, since the utility's market to book ratio decreases with the decrease in the share price of common stock, the potential risk from dilution of equity investments reduces investors' inclination to purchase new issues of common stock. The ultimate effect is the utility will have to rely more on debt financing to meet its capital needs.

As a company relies more on debt financing, its capital structure becomes more leveraged. Because debt payments are a fixed financial obligation to the utility, and income available to common equity is subordinate to fixed charges, this decreases the operating income available for dividend and earnings growth. Consequently, equity investors face greater

uncertainty about future dividends and earnings from the firm. As a result, the firm's equity becomes a riskier investment. The risk of default on a company's bonds also increases, making the utility's debt a riskier investment. This increases the cost to the utility from both debt and equity financing and increases the possibility a company will not have access to the capital markets for its outside financing needs. Ultimately, to ensure that NMGC has access to capital markets on reasonable terms for its capital needs, a fair and reasonable authorized ROE of 10.1% is required.

NMGC must secure outside funds from capital markets to finance required utility plant and equipment investments irrespective of capital market conditions, interest rate conditions and the quality consciousness of market participants. Thus, rate relief and supportive regulation, including approval of my recommended ROE, are essential requirements.

Q. PLEASE DESCRIBE HOW THE REMAINDER OF YOUR TESTIMONY IS ORGANIZED.

A. The remainder of my testimony is divided into four broad sections:

(II) Regulatory Framework and Rate of Return;

(III) Cost of Equity Estimates;

(IV) Capital Structure and Optimal Bond Rating; and

(V) Conclusions.

Section II discusses the rudiments of rate of return regulation and the basic notions underlying rate of return. Section III contains the application of DCF, CAPM, and Risk

Premium methodologies. Section IV discusses the Company's capital structure and the notion of an optimal bond rating. Section V summarizes the results from the various approaches used in determining a fair return.

II. REGULATORY FRAMEWORK AND RATE OF RETURN

Q. PLEASE EXPLAIN HOW A REGULATED COMPANY'S RATES SHOULD BE SET UNDER TRADITIONAL COST OF SERVICE REGULATION.

A. Under the traditional regulatory process, a regulated company's rates should be set so that the company recovers its costs, including taxes and depreciation, plus a fair and reasonable return on its invested capital. The allowed rate of return must necessarily reflect the cost of the funds obtained, that is, investors' return requirements. In determining a company's required rate of return, the starting point is investors' return requirements in financial markets. A rate of return can then be set at a level sufficient to enable a company to earn a return commensurate with the cost of those funds.

Funds can be obtained in two general forms, debt capital and equity capital. The cost of debt funds can be easily ascertained from an examination of the contractual interest payments. The cost of common equity funds (i.e., investors' required rate of return) is more difficult to estimate. It is the purpose of the next section of my testimony to estimate a fair and reasonable ROE for NMGC's cost of common equity capital.

Q. WHAT FUNDAMENTAL PRINCIPLES UNDERLIE THE DETERMINATION OF A FAIR AND REASONABLE ROE?

A. The heart of utility regulation is the setting of just and reasonable rates by way of a fair and reasonable return. There are two landmark United States Supreme Court cases that define the legal principles underlying the regulation of a public utility's rate of return and provide the foundations for the notion of a fair return:

1. *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923); and
2. *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944).

The *Bluefield* case set the standard against which just and reasonable rates of return are measured:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public *equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties* ... The *return should be reasonable*, sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to *maintain and support its credit* and *enable it to raise money* necessary for the proper discharge of its public duties.

Bluefield Water Works & Improvement Co., 262 U.S. at 692 (emphasis added).

The *Hope* case expanded on the guidelines to be used to assess the reasonableness of the allowed return. The Court reemphasized its statements in the *Bluefield* case and recognized that revenues must cover "capital costs." The Court stated:

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock ... By that standard *the return to the equity owner should be*

> *commensurate with returns on investments in other enterprises having corresponding risks*. That return, moreover, should be sufficient to *assure confidence in the financial integrity of the enterprise, so as to maintain its credit and attract capital.*

Hope Natural Gas Co., 320 U.S. at 603 (emphasis added).

The United States Supreme Court reiterated the criteria set forth in *Hope* in *Federal Power Commission v. Memphis Light, Gas & Water Division*, 411 U.S. 458 (1973); in *Permian Basin Rate Cases*, 390 U.S. 747 (1968); and, most recently, in *Duquesne Light Co. v. Barasch*, 488 U.S. 299 (1989). In the *Permian Basin Rate Cases*, the Supreme Court stressed that a regulatory agency's rate of return order should

> *reasonably be expected to maintain financial integrity, attract necessary capital, and fairly compensate investors for the risks they have assumed*.

Permian Basin Rate Cases, 390 U.S. at 792.

Therefore, the "end result" of this Commission's decision should be to allow NMGC the opportunity to earn a ROE that is:

(i) commensurate with returns on investments in other firms having corresponding risks;

(ii) sufficient to assure confidence in NMGC's financial integrity; and

(iii) sufficient to maintain NMGC's creditworthiness and ability to attract capital on reasonable terms.

Q. HOW IS THE FAIR RATE OF RETURN DETERMINED?

A. The aggregate return required by investors is called the "cost of capital." The cost of capital is the opportunity cost, expressed in percentage terms, of the total pool of capital employed by the utility. It is the composite weighted cost of the various classes of capital (e.g., bonds and common stock) used by the utility, with the weights reflecting the proportions of the

total capital that each class of capital represents. The fair return in dollars is obtained by multiplying the rate of return set by the regulator by the utility's "rate base." The rate base is essentially the net book value of the utility's plant and other assets used to provide utility service in a particular jurisdiction.

Although utilities like NMGC enjoy varying degrees of monopoly in the sale of public utility services, they (or their parent companies) must compete with everyone else in the free, open market for the input factors of production, whether labor, materials, machines, or capital, including the capital investments required to support the utility infrastructure. The prices of these inputs are set in the competitive marketplace by supply and demand, and it is these input prices that are incorporated in the cost of service computation. This is just as true for capital as for any other factor of production. Since utilities and other investor-owned businesses must go to the open capital market and sell their securities in competition with every other issuer, there is obviously a market price to pay for the capital they require (e.g., the interest on debt capital or the expected ROE). In order to attract the necessary capital, utilities must compete with alternative uses of capital and offer a return commensurate with the associated risks.

Q. HOW DOES THE CONCEPT OF A FAIR RETURN RELATE TO THE CONCEPT OF OPPORTUNITY COST?

A. The concept of a fair return is intimately related to the economic concept of "opportunity cost." When investors supply funds to a utility by buying its stocks or bonds, they are not

only postponing consumption, giving up the alternative of spending their dollars in some other way, they are also exposing their funds to risk and forgoing returns from investing their money in alternative comparable risk investments. The compensation they require is the price of capital. If there are differences in the risk of the investments, competition among firms for a limited supply of capital will bring different prices. The capital markets translate these differences in risk into differences in required return, in much the same way that differences in the characteristics of commodities are reflected in different prices.

The important point is that the required return on capital is set by supply and demand and is influenced by the relationship between the risk and return expected for those securities and the risks expected from the overall menu of available securities.

Q. WHAT ECONOMIC AND FINANCIAL CONCEPTS HAVE GUIDED YOUR ASSESSMENT OF NMGC'S COST OF COMMON EQUITY?

A. Two fundamental economic principles underlie the appraisal of NMGC's cost of equity, one relating to the supply side of capital markets, the other to the demand side.

On the supply side, the first principle asserts that rational investors maximize the performance of their portfolios only if they expect the returns on investments of comparable risk to be the same. If not, rational investors will switch out of those investments yielding lower returns at a given risk level in favor of those investment activities offering higher returns for the same degree of risk. This principle implies that a

company will be unable to attract capital funds unless it can offer returns to capital suppliers that are comparable to those achieved on competing investments of similar risk.

On the demand side, the second principle asserts that a company will continue to invest in real physical assets if the return on these investments equals, or exceeds, a company's cost of capital. This principle suggests that a regulatory commission should set rates at a level sufficient to create equality between the return on physical asset investments and a company's cost of capital.

Q. HOW DOES NMGC OBTAIN ITS CAPITAL AND HOW IS ITS OVERALL COST OF CAPITAL DETERMINED?

A. The funds employed by NMGC are obtained in two general forms, debt capital and equity capital. The cost of debt funds can be ascertained easily from an examination of the contractual interest payments. The cost of common equity funds, that is, equity investors' required rate of return, is more difficult to estimate because the dividend payments received from common stock are not contractual or guaranteed in nature. They are uneven and risky, unlike interest payments. Once a cost of common equity estimate has been developed, it can then easily be combined with the embedded cost of debt based on the utility's capital structure, in order to arrive at the overall cost of capital (overall rate of return).

Q. WHAT IS THE MARKET REQUIRED RATE OF RETURN ON EQUITY CAPITAL?

A. The market required rate of return on common equity, or cost of equity, is the return demanded by the equity investor. Investors establish the price for equity capital through their buying and selling decisions in capital markets. Investors set return requirements according to their perception of the risks inherent in the investment, recognizing the opportunity cost of forgone investments in other companies, and the returns available from other investments of comparable risk.

Q. WHAT MUST BE CONSIDERED IN ESTIMATING A FAIR ROE?

A. The basic premise is that the allowable ROE should be commensurate with returns on investments in other firms having corresponding risks. The allowed return should be sufficient to assure confidence in the financial integrity of the firm, in order to maintain creditworthiness and ability to attract capital on reasonable terms. The "attraction of capital" standard focuses on investors' return requirements that are generally determined using market value methods, such as the DCF, CAPM, or Risk Premium methods. These market value tests define "fair return" as the return investors anticipate when they purchase equity shares of comparable risk in the financial marketplace. This is a market rate of return, defined in terms of anticipated dividends and capital gains as determined by expected changes in stock prices, and reflects the opportunity cost of capital. The economic basis for market value tests is that new capital will be attracted to a firm only if

the return expected by the suppliers of funds is commensurate with that available from alternative investments of comparable risk.

III. COST OF EQUITY CAPITAL ESTIMATES

Q. HOW DID YOU ESTIMATE A FAIR ROE FOR NMGC?

A. To estimate a fair ROE for NMGC, I employed three broad methodologies:

(i) DCF methodology;
(ii) CAPM methodologies; and
(iii) Risk Premium methodologies.

All three methodologies are designed to estimate the return required by investors on the common equity capital committed to NMGC.

Q. WHY DID YOU USE MORE THAN ONE APPROACH FOR ESTIMATING THE COST OF EQUITY?

A. No one single method provides the necessary level of precision for determining a fair return, but each method provides useful evidence to facilitate the exercise of an informed judgment. Reliance on any single method or preset formula is inappropriate when dealing with investor expectations because of possible measurement difficulties and vagaries in individual companies' market data. Examples of such vagaries include dividend suspension, insufficient or unrepresentative historical data due to a recent merger, impending merger or acquisition, and a new corporate identity due to restructuring

activities. The advantage of using several different approaches is that the results of each one can be used to check the others.

As a general proposition, it is extremely dangerous to rely on only one generic methodology to estimate equity costs. The difficulty is compounded when only one variant of that methodology is employed. It is compounded even further when that one methodology is applied to a single company. Hence, several methodologies applied to several comparable risk companies should be employed to estimate the cost of common equity.

As I have stated, there are three broad generic market-based methods available to measure the cost of equity: DCF, CAPM, and Risk Premium. All three of these methods are accepted and used by the financial community and firmly supported in the financial literature. The weight accorded to any one method may vary depending on unusual circumstances in capital market conditions.

Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the method and on the reasonableness of the proxies used to validate the theory and apply the method. Each method has its own way of examining investor behavior, its own premises, and its own set of simplifications of reality. Investors do not necessarily subscribe to any one method, nor does the stock price reflect the application of any one single method by the price-setting investor. There is no guarantee

that a single DCF result is necessarily the ideal predictor of the stock price and of the cost of equity reflected in that price, just as there is no guarantee that a single CAPM or Risk Premium result constitutes the perfect explanation of a stock's price or the cost of equity.

Q. ARE THERE ANY PRACTICAL DIFFICULTIES IN APPLYING COST OF CAPITAL METHODOLOGIES IN ENVIRONMENTS OF VOLATILITY IN CAPITAL MARKETS AND ECONOMIC UNCERTAINTY?

A. Yes, there are. The traditional cost of equity estimation methodologies are difficult to implement when you are dealing with the instability and volatility in the capital markets and the uncertain economy both in the U.S. and abroad. This is not only because stock prices are volatile at this time, but also because utility company historical data have become less meaningful for an industry experiencing substantial change, for example, changing customer expectations, declining customer usage, and the need to secure vast amounts of external capital over the next decade, regardless of capital market conditions. Past earnings and dividend trends may simply not be indicative of the future. For example, historical growth rates of earnings and dividends have been depressed by eroding margins due to a variety of factors, including the sluggish economy, declining customer usage, restructuring, and falling margins. As a result, this historical data may not be representative of the future long-term earning power of these companies. Moreover, historical growth rates may not be necessarily representative of future trends for several utilities involved in mergers and acquisitions, as these companies going forward are not the same companies for which historical data are available.

In short, given the volatility in capital markets and economic uncertainties, the utilization of multiple methodologies is critical, and reliance on a single methodology is highly hazardous.

A. DCF Estimates

Q. PLEASE DESCRIBE THE DCF APPROACH TO ESTIMATING THE COST OF EQUITY CAPITAL.

A. According to DCF theory, the value of any security to an investor is the expected discounted value of the future stream of dividends or other benefits. One widely used method to measure these anticipated benefits in the case of a non-static company is to examine the current dividend plus the increases in future dividend payments expected by investors. This valuation process can be represented by the following formula, which is the traditional DCF model:

$$K_e = D_1/P_0 + g$$

where: K_e = investors' expected return on equity
D_1 = expected dividend at the end of the coming year
P_0 = current stock price
g = expected growth rate of dividends, earnings, stock price, and book value

The traditional DCF formula states that under certain assumptions, which are described in the next paragraph, the equity investor's expected return (K_e) can be viewed as the sum of an expected dividend yield (D_1/P_0) plus the expected growth rate of future dividends and stock price (g). The returns anticipated at a given market price are not directly observable

and must be estimated from statistical market information. The idea of the market value approach is to infer K_e from the observed share price, the observed dividend, and an estimate of investors' expected future growth.

The assumptions underlying this valuation formulation are well known, and are discussed in detail in Chapter 8 of my reference text, The New Regulatory Finance. The standard DCF model requires the following main assumptions:

(i) a constant average growth trend for dividends and earnings;
(ii) a stable dividend payout policy;
(iii) a discount rate in excess of the expected growth rate; and
(iv) a constant price-earnings multiple, which implies that growth in price is synonymous with growth in earnings and dividends.

The standard DCF model also assumes that dividends are paid at the end of each year when in fact dividend payments are normally made on a quarterly basis.

Q. HOW DID YOU ESTIMATE NMGC'S COST OF EQUITY WITH THE DCF MODEL?

A. In estimating NMGC's cost of equity, I applied the DCF model to a group of investment-grade, dividend-paying natural gas distribution utilities and to a group of investment-grade, dividend-paying combination gas and electric utilities, all of which are covered in the Value Line Investment Analyzer database.

In order to apply the DCF model, two components are required: the expected dividend yield (D_1/P_0), and the expected long-term growth (g). The expected dividend (D_1) in the annual DCF model can be obtained by multiplying the current indicated annual dividend rate by the growth factor (1 + g).

Q. HOW DID YOU ESTIMATE THE DIVIDEND YIELD COMPONENT OF THE DCF MODEL?

A. From a conceptual viewpoint, the stock price to employ in calculating the dividend yield is the then-current price of the security at the time of estimating the cost of equity. This is because the current stock prices provide a better indication of true stock prices than any other price in an efficient market. An efficient market implies that prices adjust rapidly to the arrival of new information. Therefore, current prices reflect the fundamental economic value of a security. A considerable body of empirical evidence indicates that capital markets are efficient with respect to a broad set of information. This implies that observed current prices represent the fundamental value of a security, and that a DCF estimate should start with current prices.

In implementing the DCF model, I have used the dividend yields reported in the Value Line Investment Analyzer software. Basing dividend yields on average results from a large group of companies reduces the concern that the vagaries of individual company stock prices will result in an unrepresentative dividend yield.

Q. WHY DID YOU MULTIPLY THE SPOT DIVIDEND YIELD BY (1 + G) RATHER THAN BY (1 + 0.5G)?

A. Some analysts multiply the spot dividend yield by one plus one half the expected growth rate (1 + 0.5g) rather than the conventional one plus the expected growth rate (1 + g). This procedure understates the return expected by the investor.

The fundamental assumption of the basic annual DCF model is that dividends are received annually at the end of each year and that the first dividend is to be received one year from now. Thus, the appropriate dividend to use in a DCF model is the full prospective dividend to be received at the end of the year. Since the appropriate dividend to use in a DCF model is the prospective dividend one year from now rather than the dividend one-half year from now, multiplying the current dividend yield by (1 + 0.5g) understates the proper dividend yield.

Moreover, multiplying the spot dividend yield by (1 + g) is actually a conservative attempt to capture the reality of quarterly dividend payments typically employed by publicly-traded utility holding companies. Use of this method is conservative in the sense that the annual DCF model fully ignores the more frequent compounding of quarterly dividends which would produce a slightly higher estimate of investor return.

Q. HOW DID YOU ESTIMATE THE GROWTH COMPONENT OF THE DCF MODEL?

A. The principal difficulty in calculating the required return by the DCF approach is in ascertaining the growth rate that investors currently expect. Since no explicit estimate of expected growth is observable, proxies must be employed.

As proxies for expected growth, I examined the consensus growth estimate developed by professional analysts. Projected long-term growth rates actually used by institutional investors to determine the desirability of investing in different securities influence investors' growth anticipations. These forecasts are made by large reputable organizations, and the data are readily available and are representative of the consensus view of investors. Because of the dominance of institutional investors in investment management and security selection, and their influence on individual investment decisions, analysts' growth forecasts influence investor growth expectations and provide a sound basis for estimating the cost of equity with the DCF model.

Growth rate forecasts of several analysts are available from published investment newsletters and from systematic compilations of analysts' forecasts, such as those tabulated by Zacks Investment Research Inc. I relied on analysts' long-term earnings growth forecasts reported in Zacks Investment Research ("Zacks") as proxies for investors' growth expectations in applying the DCF model. I also used Value Line's earnings growth forecasts as additional proxies.

Q. WHY DID YOU REJECT THE USE OF HISTORICAL GROWTH RATES IN APPLYING THE DCF MODEL TO UTILITIES?

A. I have rejected historical growth rates as proxies for expected growth in the DCF calculation for two reasons. First, historical growth patterns are already incorporated in analysts' growth forecasts that should be used in the DCF model, and are therefore redundant. Second, published studies in the academic literature demonstrate that growth forecasts made by security analysts are reasonable indicators of investor expectations, and that investors rely on analysts' forecasts. This considerable literature is summarized in Chapter 9 of my most recent textbook, The New Regulatory Finance.

Q. DID YOU CONSIDER ANY OTHER METHOD OF ESTIMATING EXPECTED GROWTH TO APPLY THE DCF MODEL?

A. Yes, I did. I considered using the so-called "sustainable growth" method, also referred to as the "retention growth" method. According to this method, future growth is estimated by multiplying the fraction of earnings expected to be retained by a company, 'b', by the expected return on book equity, ROE, as follows:

$$g = b \times ROE$$

where: g = expected growth rate in earnings/dividends
b = expected retention ratio
ROE = expected return on book equity

Q. DO YOU HAVE ANY RESERVATIONS IN REGARDS TO THE SUSTAINABLE GROWTH METHOD?

A. Yes, I do. First, the sustainable method of predicting growth contains a logical trap: the method requires an estimate of expected return on book equity to be implemented. But if the expected return on book equity input required by the model differs from the recommended ROE, a fundamental contradiction in logic follows. In short, the method is circular. Second, the empirical finance literature demonstrates that the sustainable growth method of determining growth is not as significantly correlated to measures of value, such as stock prices and price/earnings ratios, as analysts' growth forecasts. I therefore chose not to rely on this method.

Q. DID YOU CONSIDER DIVIDEND GROWTH IN APPLYING THE DCF MODEL?

A. No, not at this time. The reason is that as a practical matter, while there is an abundance of earnings growth forecasts, there are very few forecasts of dividend growth. Moreover, it is reasonable to assume that utilities will continue to lower their dividend payout ratios over the next several years in response to heightened business risk and the need to fund very significant construction programs over the next decade. Dividend growth should remain largely stagnant in future years as utilities are increasingly conserving financial resources in order to hedge against rising business risks and finance large infrastructure investments. As a result, investors' attention has shifted from dividends to earnings. Therefore, earnings growth provides a more meaningful guide to investors' long-term

growth expectations. Indeed, it is growth in earnings that will support future dividends and share prices.

Q. IS THERE ANY EMPIRICAL EVIDENCE DOCUMENTING THE IMPORTANCE OF EARNINGS IN EVALUATING INVESTORS' EXPECTATIONS?

A. Yes, there is an abundance of evidence attesting to the importance of earnings in assessing investors' expectations. First, the sheer volume of earnings forecasts available from the investment community relative to the scarcity of dividend forecasts attests to their importance. To illustrate, Value Line, Yahoo Finance, Zacks, First Call Thompson, Reuters, and IBES provide comprehensive compilations of investors' earnings forecasts. The fact that these investment information providers focus on growth in earnings rather than growth in dividends indicates that the investment community regards earnings growth as a superior indicator of future long-term growth. Second, Value Line's principal investment rating assigned to individual stocks, Timeliness Rank, is based primarily on earnings, which accounts for 65% of the ranking.

Q. HOW DID YOU APPROACH THE COMPOSITION OF COMPARABLE GROUPS IN ORDER TO ESTIMATE NMGC'S COST OF EQUITY?

A. Because NMGC is a wholly-owned subsidiary of Emera and is not publicly traded, the DCF model cannot be applied to NMGC and proxies must be used. In the uncertain capital market and industry environment, it is important to select relatively large sample sizes representative of the utility industry as a whole, as opposed to small sample sizes consisting

of a handful of companies. This is because the equity market as a whole and utility industry capital market data are volatile. As a result of this volatility, the composition of small groups of companies is very fluid, with companies exiting the sample due to dividend suspensions or reductions, insufficient or unrepresentative historical data due to recent mergers, impending merger or acquisition, and changing corporate identities due to restructuring activities.

Moreover, from a statistical standpoint, confidence in the reliability of the DCF model result is considerably enhanced when applying the DCF model to a large group of companies. Any distortions introduced by measurement errors in the two DCF components of equity return for individual companies, namely dividend yield and growth, are mitigated. Utilizing a large portfolio of companies reduces the influence of either overestimating or underestimating the cost of equity for any one individual company. For example, in a large group of companies, positive and negative deviations from the expected growth will tend to cancel out owing to the law of large numbers, provided that the errors are independent.[1]

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[1] If σ_i^2 represents the average variance of the errors in a group of N companies, and σ_{ij} the average covariance between the errors, then the variance of the error for the group of N companies, σ_N^2 is:

$$\sigma_N^2 = \frac{1}{N}\bar{\sigma}_i^2 + \frac{N-1}{N}\bar{\sigma}_{ij}$$

If the errors are independent, the covariance between them (σ_{ij}) is zero, and the variance of the error for the group is reduced to:

The average growth rate of several companies is less likely to diverge from expected growth than is the estimate of growth for a single firm. More generally, the assumptions of the DCF model are more likely to be fulfilled for a large group of companies than for any single firm or for a small group of companies.

Moreover, small samples are subject to measurement error, and in violation of the Central Limit Theorem of statistics.[2] Reliance on robust sample sizes mitigates the impact of possible measurement errors and vagaries in individual companies' market data, such as those I listed above.

The point of all this is that the use of a handful of companies in a highly fluid and unstable industry produces fragile and statistically unreliable results. A far safer procedure is to employ large sample sizes representative of the industry as a whole and, if needed, apply

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$$\sigma_N^2 = \frac{1}{N}\sigma_i^2$$

As N gets progressively larger, the variance gets smaller and smaller.

2 The Central Limit Theorem describes the characteristics of the distribution of values we would obtain if we were able to draw an infinite number of random samples of a given size from a given population and we calculated the mean of each sample. The Central Limit Theorem asserts: [1] The mean of the sampling distribution of means is equal to the mean of the population from which the samples were drawn. [2] The variance of the sampling distribution of means is equal to the variance of the population from which the samples were drawn divided by the size of the samples. [3] If the original population is distributed normally, the sampling distribution of means will also be normal. If the original population is not normally distributed, the sampling distribution of means will increasingly approximate a normal distribution as sample size increases.

subsequent risk adjustments to the extent that a company's risk profile differs from that of the industry average.

Q. CAN YOU DESCRIBE YOUR FIRST PROXY GROUP FOR NMGC'S NATURAL GAS UTILITY BUSINESS?

A. As a first proxy for NMGC, I examined a group of investment-grade dividend-paying natural gas utilities contained in Value Line's natural gas utility universe. This group of natural gas utilities, displayed on NMGC Exhibit RAM- 2, possesses utility assets similar to NMGC's natural gas business[3].

Q. WHAT DCF RESULTS DID YOU OBTAIN USING VALUE LINE GROWTH PROJECTIONS?

A. The DCF analysis for the natural gas utilities group using Value Line growth projections is shown on NMGC Exhibit RAM-3. As shown on Column 3 line 11 of NMGC Exhibit RAM-3, the average long-term growth forecast obtained from Value Line is 7.56% for the natural gas distribution group. Combining this growth rate with the average expected dividend yield of 3.74% shown in Column 4 line 11 produces an estimate of equity costs of 11.29% shown in Column 5. Recognition of flotation costs brings the cost of equity

[3] UGI Corp was eliminated on the grounds of its impending acquisition of Mountaineer Gas.

estimate to 11.49%, shown in Column 6. The need for a flotation cost allowance is discussed at length later in my testimony.

Q. WHAT DCF RESULTS DID YOU OBTAIN USING ANALYSTS' GROWTH PROJECTIONS?

A. The DCF analysis for the natural gas utilities group using analyst growth projections is shown on NMGC RAM-4. Repeating the exact same procedure as above, only this time using the Zacks analysts earnings growth forecast of 6.49% instead of the Value Line forecast, the cost of equity for the natural gas distribution group is 10.19%, unadjusted for flotation costs. Adding an allowance for flotation costs brings the cost of equity estimate to 10.38%.

Q. CAN YOU DESCRIBE YOUR SECOND PROXY GROUP FOR NMGC'S NATURAL GAS UTILITY BUSINESS?

A. It is reasonable to postulate that the Company's natural gas utility operations possess an investment risk profile similar to the combination gas and electric utility business. Combination gas and electric utilities are reasonable proxies for natural gas distribution utilities, because they possess economic characteristics very similar to those of natural gas utilities. They are both involved in the transmission-distribution of energy services products at regulated rates in a cyclical and weather-sensitive market. They both employ a capital-intensive network with similar physical characteristics. They are both subject to rate of return regulation and have enjoyed similar allowed rates of return, attesting to their

risk comparability. Because of this convergence and similarity, all these utilities are lumped in the same group by Standard and Poor's in defining bond rating benchmarks and assigning business risk scores.

Finally, as pointed out earlier, sole reliance on a smaller group of utilities is less reliable from a statistically viewpoint. The smaller the sample, the greater the likelihood of skewed results. I have therefore relied on a second proxy group of companies described below as well as on the natural gas utilities group.

Q. CAN YOU DESCRIBE YOUR SECOND PROXY GROUP FOR NMGC'S NATURAL GAS UTILITY BUSINESS IN MORE DETAIL?

A. As a second proxy group of companies for NMGC, I examined a group of investment-grade dividend-paying combination gas and electric utilities covered in Value Line's Electric Utility peer group, meaning that these companies all possess utility assets similar to NMGC's. I began with all the companies designated as combination gas and electric utilities that are also covered in the Value Line Investment Analyzer database as shown on NMGC Exhibit RAM-5. Fortis was added to the group since it owns several US combination gas and electric utility companies. Private partnerships, private companies, non-dividend-paying companies, and companies below investment-grade (with a Moody's bond rating below Baa3) were eliminated, as well as those companies whose market capitalization was less than $1 billion, in order to minimize any stock price anomalies due

to thin trading.[4] The final groups of companies only include those companies with a preponderance of their revenues from regulated utility operations.

Q. WHAT DCF RESULTS DID YOU OBTAIN USING VALUE LINE GROWTH PROJECTIONS?

A. NMGC RAM-6 displays the DCF analysis using Value Line growth projections for the 21 companies in NMGC's second proxy group. As shown on column 3, line 23 of NMGC Exhibit RAM- G, the average long-term earnings per share growth forecast obtained from Value Line is 5.76%. Combining this growth rate with the average expected dividend yield of 3.47% shown on column 4, line 23 produces an estimate of equity costs of 9.23% for the proxy group, as shown on column 5, line 23. Recognition of flotation costs brings the cost of equity estimate to 9.42% for the group, shown on Column 6, line 23. The need for a flotation cost allowance is discussed at length later in my testimony.

Q. WHAT DCF RESULTS DID YOU OBTAIN USING ANALYSTS' CONSENSUS GROWTH FORECASTS?

A. NMGC Exhibit RAM-7 displays the DCF analysis using analysts' consensus growth forecasts for the 21 companies in the proxy group. As shown on column 3, line 23 of NMGC Exhibit RAM-8, the average long-term earnings per share growth forecast obtained

[4] This is necessary in order to minimize the well-known thin trading bias in measuring beta. Unitil was excluded for this reason.

from analysts is 5.05% for the group. Combining this growth rate with the average expected dividend yield of 3.45% shown on column 4, line 23, produces an estimate of equity costs of 8.50% unadjusted for flotation cost, as shown on column 5, line 23. Recognition of flotation costs brings the cost of equity estimate to 8.68%, shown on Column 6, line 23.

Q. PLEASE SUMMARIZE THE DCF ESTIMATES FOR NMGC.

A. Table 1 below summarizes the DCF estimates for NMGC:

Table 1. DCF Estimates for NMGC

DCF STUDY	ROE
Natural Gas Util. Value Line Growth	11.49%
Natural Gas Util. Analysts Growth	10.38%
Gas & Elec Util. Value Line Growth	9.42%
Gas & Elect Util. Analysts Growth	8.68%

B. CAPM Estimates

Q. PLEASE DESCRIBE YOUR APPLICATION OF THE CAPM RISK PREMIUM APPROACH.

A. My first two risk premium estimates are based on the CAPM and on an empirical approximation to the CAPM ("ECAPM"). The CAPM is a fundamental paradigm of

finance. Simply put, the fundamental idea underlying the CAPM is that risk-averse investors demand higher returns for assuming additional risk, and higher-risk securities are priced to yield higher expected returns than lower-risk securities. The CAPM quantifies the additional return, or risk premium, required for bearing incremental risk. It provides a formal risk-return relationship anchored on the basic idea that only market risk matters, as measured by beta (β). According to the CAPM, securities are priced such that:

EXPECTED RETURN = RISK-FREE RATE + RISK PREMIUM

Denoting the risk-free rate by R_F and the return on the market as a whole by R_M, the CAPM is stated as follows:

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

where: K = investors' expected return on equity
R_F = risk-free rate
R_M = return on the market as a whole
β = systematic risk (i.e., change in a security's return relative to that of the market)

This is the seminal CAPM expression, which states that the return required by investors is made up of a risk-free component, R_F, plus a risk premium determined by β x (R_M - R_F). The bracketed expression (R_M - R_F) expression is known as the market risk premium (MRP). To derive the CAPM risk premium estimate, three quantities are required: the risk-free rate (R_F), beta (β), and the MRP (R_M - R_F).

For the risk-free rate (R_F), I used 3.3%, based on forecast yields on long-term U.S. Treasury bonds and on normalized yields bonds. For beta (β), I used 0.88 based on Value Line

estimates. For the MRP (R_M - R_F), I used 7.8% based on historical and prospective market risk premium studies. These inputs to the CAPM are explained below.

CAPM RISK-FREE RATE

Q. HOW DID YOU ARRIVE AT YOUR RISK-FREE RATE ESTIMATE OF 3.3% IN YOUR CAPM AND RISK PREMIUM ANALYSES?

A. To implement the CAPM and Risk Premium methods, an estimate of the risk-free rate is required. I relied on two proxies. First, I examined noted economic forecasts which call for a rising trend in interest rates in response to the recovering economy, anticipated renewed inflation, and high federal deficits. Value Line, Global Insight, the Congressional Budget Office, the Bureau of Labor Statistics, the Economic Report of the President, and the U.S. Energy Information Administration all project higher long-term Treasury bond rates in the future. Second, I relied on an estimate of the normalized risk-free rate, as described later.

Q. WHY DID YOU RELY ON LONG-TERM BONDS INSTEAD OF SHORT-TERM BONDS?

A. The appropriate proxy for the risk-free rate in the CAPM is the return on the longest-term Treasury bond possible. This is because common stocks are very long-term instruments more akin to very long-term bonds rather than to short-term Treasury bills or intermediate-term Treasury notes. In a risk premium model, the ideal estimate for the risk-free rate has a term to maturity equal to the security being analyzed. Since common stock is a very long-term investment because the cash flows to investors in the form of dividends last

indefinitely, the yield on the longest-term possible government bonds, that is the yield on 30-year Treasury bonds, is the best measure of the risk-free rate for use in the CAPM. The expected common stock return is based on very long-term cash flows, regardless of an individual's holding time period. Moreover, utility asset investments generally have very long-term useful lives and should correspondingly be matched with very long-term maturity financing instruments.

While long-term Treasury bonds are potentially subject to interest rate risk, this is only true if the bonds are sold prior to maturity. A substantial fraction of bond market participants, usually institutional investors with long-term liabilities (e.g., pension funds and insurance companies), in fact hold bonds until they mature, and therefore are not subject to interest rate risk. Moreover, institutional bondholders neutralize the impact of interest rate changes by matching the maturity of a bond portfolio with the investment planning period, or by engaging in hedging transactions in the financial futures markets. The merits and mechanics of such immunization strategies are well documented by both academicians and practitioners.

Another reason for utilizing the longest maturity Treasury bond possible is that common equity has an infinite life span, and the inflation expectations embodied in its market-required rate of return will therefore be equal to the inflation rate anticipated to prevail over the very long term. The same expectation should be embodied in the risk-free rate used in applying the CAPM model. It stands to reason that the yields on 30-year Treasury bonds

will more closely incorporate within their yields the inflation expectations that influence the prices of common stocks than do short-term Treasury bills or intermediate-term U.S. Treasury notes.

Among U.S. Treasury securities, 30-year Treasury bonds have the longest term to maturity and the yields on such securities should be used as proxies for the risk-free rate in applying the CAPM. Therefore, I have relied on the forecast yield on 30-year Treasury bonds in implementing the CAPM and risk premium methods.

Q. ARE THERE OTHER REASONS WHY YOU REJECT SHORT-TERM INTEREST RATES AS PROXIES FOR THE RISK-FREE RATE IN IMPLEMENTING THE CAPM?

A. Yes. Short-term rates are volatile, fluctuate widely, and are subject to more random disturbances than are long-term rates. Short-term rates are largely administered rates. For example, Treasury bills are used by the Federal Reserve as a policy vehicle to stimulate the economy and to control the money supply, and are used by foreign governments, companies, and individuals as a temporary safe-house for money.

As a practical matter, it makes no sense to match the return on common stock to the yield on 90-day Treasury Bills. This is because short-term rates, such as the yield on 90-day Treasury Bills, fluctuate widely, leading to volatile and unreliable equity return estimates. Moreover, yields on 90-day Treasury Bills typically do not match the equity investor's

planning horizon. Equity investors generally have an investment horizon far in excess of 90 days.

As a conceptual matter, short-term Treasury Bill yields reflect the impact of factors different from those influencing the yields on long-term securities such as common stock. For example, the premium for expected inflation embedded into 90-day Treasury Bills is likely to be far different than the inflationary premium embedded into long-term securities yields. On grounds of stability and consistency, the yields on long-term Treasury bonds match more closely with common stock returns.

Q. WHAT IS YOUR FIRST ESTIMATE OF THE RISK-FREE RATE ?

A. All the noted interest rate forecasts that I am aware of point to significantly higher interest rates over the next several years. Table 2 below reports the forecast yields on 30-year US Treasury bonds from several prominent sources, including the Congressional Budget Office, Bureau of Labor Statistics, U.S. Energy Information Administration, HIS (formerly Global Insight), Value Line, and the Economic Report of the President.

Table 2 Forecast Yields on

30-year U.S. Treasury Bonds

Value Line Economic Forecast 2021	3.0
U.S. Energy Information Administration (EIA)	3.9
Congressional Budget Office (CBO)	3.5
Economic Report of the President	2.9
White House Budget 2022	3.3
Blue Chip Economic Indicators	2.9

AVERAGE	**3.3**

The average long-term bond yield forecast from the six sources is 3.3%. The individual forecasts are quite consistent as they are closely clustered around the average. Based on this evidence, a long-term bond yield forecast of 3.3% is a reasonable estimate of the expected risk-free rate for purposes of forward-looking CAPM/ECAPM and Risk Premium analyses in the current economic environment.

Q. WHY DID YOU IGNORE THE CURRENT LEVEL OF INTEREST RATES IN DEVELOPING YOUR PROXY FOR THE RISK-FREE RATE IN A CAPM ANALYSIS?

A. I relied on projected long-term Treasury interest rates for three reasons. First, investors price securities on the basis of long-term expectations, including interest rates. Cost of capital models, including both the CAPM and DCF models, are prospective (i.e., forward-looking) in nature and must take into account current market expectations for the future because investors price securities on the basis of long-term expectations, including interest rates. As a result, in order to produce a meaningful estimate of investors' required rate of return, the CAPM must be applied using data that reflects the expectations of actual investors in the market. While investors examine history as a guide to the future, it is the expectations of future events that influence security values and the cost of capital.

Second, investors' required returns can and do shift over time with changes in capital market conditions, hence the importance of considering interest rate forecasts. The fact that organizations such as Value Line, EIA, and CBO among many others devote considerable expertise and resources to developing an informed view of the future, and the fact that investors are willing to purchase such expensive services confirm the importance of economic/financial forecasts in the minds of investors. Moreover, the empirical evidence demonstrates that stock prices do indeed reflect prospective financial input data.

Third, given that this proceeding is to provide ROE estimates for future proceedings, forecast interest rates are far more relevant. The use of interest rate forecasts is no different than the use of projections of other financial variables in DCF analyses.

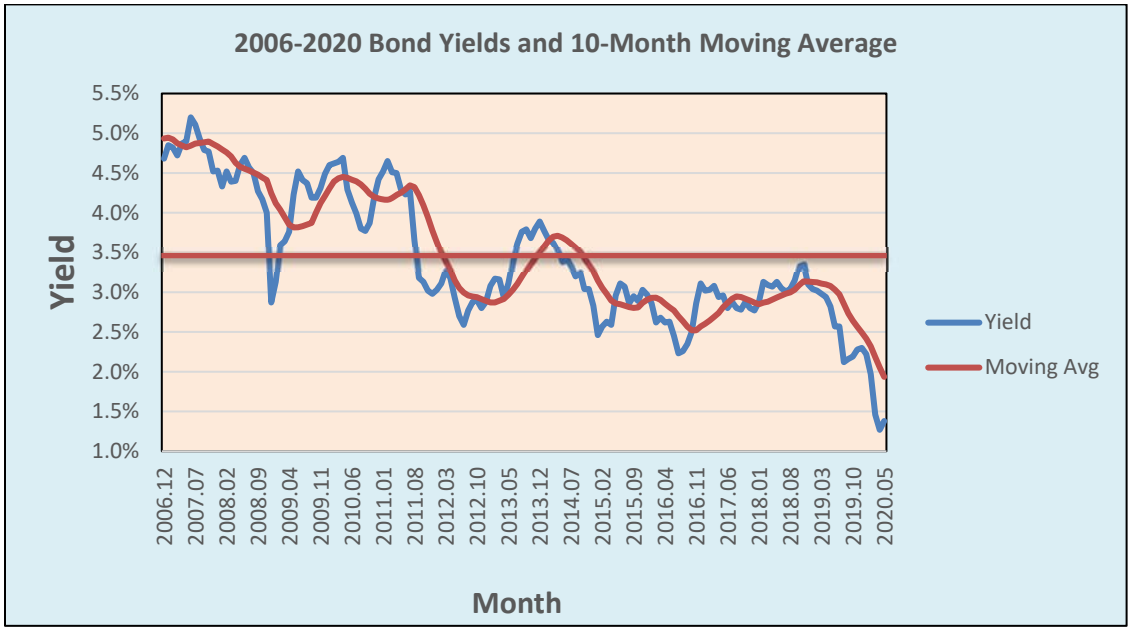
Q. DR. MORIN, WHY DID YOU ALSO RELY ON A NORMALIZED RISK-FREE RATE IN IMPLEMENTING THE CAPM?

A. I relied on a normalized risk-free rate estimate because during "crises" periods, such as the current COVID-19 pandemic and the 2008-2009 debt crisis, the Federal Reserve Bank's continuing intervention in the debt markets creates artificially low long-term interest rates, and the resulting sharp decline in interest rates creates CAPM estimates that are implausible. In fact, during time periods in which Treasury yields are abnormally low due to various "black swan" factors, such as the ongoing COVID-19 pandemic and its current and lasting effects on the output of the global economy, the accommodating and expansive

Federal Reserve monetary policy during these crises, or periodic flight to quality episodes, normalizing the risk-free rate becomes a reasonable alternative.

Q. DR. MORIN, HOW DID YOU ESTIMATE THE NORMALIZED RISK-FREE RATE?

A. Normalizing the risk-free rate can be done in two ways. One expedient method is to smooth a historical time series of yields on 30-year Treasury bonds over a meaningful period. The smoothing process is accomplished using a 10-day moving average. The graph below depicts the yield on long-term U.S. Treasury bonds from 2006 to 2021 (in blue) and the 10-day moving average yield (in red). As shown by the horizontal line on the graph, the average yield for the period is 3.4% which provides a reasonable estimate for the risk-free rate to be used in a CAPM analysis.



The second method to normalize the risk-free rate involves assembling the two building blocks of the risk-free rate as follows. The nominal risk-free rate can be seen as the sum of the inflation-free "real risk-free rate" and an inflation premium:[5]

RISK-FREE RATE = REAL RATE + EXPECTED INFLATION

To estimate expected inflation, one simply compares current real and nominal interest rates by looking at interest rates on comparable maturity Treasury securities, one that is not adjusted for inflation and one that is adjusted for inflation. So far in 2021, the yield on 20-year Treasury securities and the yield on inflation-protected Treasury securities, so-called "TIPS" has differed by 2.2%. The difference of 2.2% between the two yields over that period provides an estimate of expected inflation.

The real interest rate is simply the difference between the nominal yield on Treasury securities and the yield on inflation-protected TIPS. Such comparisons over time typically produce real interest rate estimates in the 1.0% - 2.0% range. There is an abundant economic research literature on the real rate of interest[6] suggesting a consensus estimate in the 1.0% - 2.0% range with a recent trend towards the lower part of the range.

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[5] This is the famed "Fisher equation", named after Irving Fisher. Fisher's "The Theory of Interest" was first published by Macmillan (New York), in 1930.

[6] See for example Taylor, J. B. and Wieland, V., "*Finding the Equilibrium Real Interest Rate in a Fog of Policy Deviations*," Hoover Institution Economics Working Papers, 2016; Kiley, M. T., "*The Global*

Adding the long-term real risk-free rate of 1.0% to the expected long-term inflation of 2.3%, the normalized risk-free rate becomes 3.3% which also provides a reasonable estimate of the risk-free rate to be used in a CAPM analysis which is identical to the average forecast interest rate of 3.3%.

Q. DR. MORIN, WHAT IS YOUR FINAL ESTIMATE OF THE APPROPRIATE RISK-FREE RATE TO BE USED IN A CAPM ANALYSIS?

A. My final estimate of the appropriate risk-free to be used in a CAPM analysis is 3.3%. This is based on the economic forecasts of 3.3% risk-free rate, the normalized risk-free estimate of 3.4% , and the Fisher normalized risk-free rate estimate of 3.3%. The three estimates from vastly different methodologies are remarkably consistent.

CAPM BETA ESTIMATE

Q. HOW DID YOU SELECT THE BETA FOR YOUR CAPM ANALYSIS?

A. A major thrust of modern financial theory as embodied in the CAPM is that perfectly diversified investors can eliminate the company-specific component of risk, and that only market risk remains. The latter is technically known as "beta" (β), or "systematic risk." The beta coefficient measures change in a security's return relative to that of the market. The beta coefficient states the extent and direction of movement in the rate of return on a

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Equilibrium Real Interest Rate: Concepts, Estimates, and Challenges," Finance and Economics Discussion Series Washington: Board of Governors of the Federal Reserve System, 2019-076, https://doi.org/10.17016/FEDS.2019.076.

stock relative to the movement in the rate of return on the market as a whole. It indicates the change in the rate of return on a stock associated with a one percentage point change in the rate of return on the market. It measures the degree to which a particular stock shares the risk of the market as a whole. Modern financial theory has established that beta incorporates several economic characteristics of a corporation that are reflected in investors' return requirements.

NMGC common stock is not publicly traded and, therefore, proxies must be used. In the discussion of DCF estimates of the cost of common equity earlier, I examined a group of investment-grade dividend-paying natural gas distribution utilities covered by Value Line. As shown on NMGC Exhibit RAM-8 Page 1, the average beta for the natural gas utility group is 0.88. Based on these results, I shall use 0.88 as an estimate for the beta applicable to NMGC's natural gas business. I note that the average beta estimate of 0.88 represents a dramatic increase in the average beta of the natural gas utility industry when compared to recent historical levels of 0.60 - 0.70. The same is true for the electric utility industry whose average beta of 0.91 is now nearly the same as that of the natural gas utility industry, as shown on Page 2 of NMGC Exhibit RAM-8 Page 2.

CAPM MARKET RISK PREMIUM

Q. WHAT MRP DID YOU USE IN YOUR CAPM ANALYSIS?

A. For the MRP, I used 7.8%. This estimate is based on the results of both historical and prospective studies of long-term market risk premiums.

Q. CAN YOU DESCRIBE THE HISTORICAL MRP STUDY USED IN YOUR CAPM ANALYSIS?

A. Yes. The historical MRP estimate is based on the results obtained in Duff & Phelps' 2021 Valuation Handbook (formerly published by Morningstar and earlier by Ibbotson Associates), which compiles historical returns from 1926 to 2020. This well-known study summarized on NMGC Exhibit 6.8 of the handbook shows that a very broad market sample of common stocks outperformed long-term U.S. Government bonds by 6.1%. The historical MRP over the income component of long-term U.S. Government bonds, rather than over the total return, is 7.3%.

The historical MRP should be computed using the income component of bond returns because the intent, even using historical data, is to identify an expected MRP. The income component of total bond return (*i.e.*, the coupon rate) is a far better estimate of expected return than the total return (*i.e.*, the coupon rate + capital gain), because both realized capital gains and realized losses are largely unanticipated by bond investors. The long-horizon (1926-2020) MRP is 7.3%.

Q. ON WHAT MATURITY BOND DOES THE DUFF & PHELPS HISTORICAL RISK PREMIUM DATA RELY?

A. Because 30-year bonds were not always traded or even available throughout the entire study period covered in the Duff & Phelps study of historical returns, the latter study relied on bond return data based on 20-year Treasury bonds. Given that the normal yield curve is

virtually flat above maturities of 20 years for most of the period covered in the Duff & Phelps study, the difference in yield is not material.

Q. WHY DID YOU USE LONG TIME PERIODS IN ARRIVING AT YOUR HISTORICAL MRP ESTIMATE?

A. Because realized returns can be substantially different from prospective returns anticipated by investors when measured over short time periods, it is important to employ returns realized over long time periods rather than returns realized over more recent time periods when estimating the MRP with historical returns. Therefore, a Risk Premium study should consider the longest possible period for which data are available. Short-run periods during which investors earned a lower risk premium than expected are offset by short-run periods during which investors earned a higher risk premium than expected. Only over long-time periods will investor return expectations and realizations converge.

I have therefore ignored realized risk premiums measured over short time periods. Instead, I relied on results over periods of enough length to smooth out short-term aberrations, and to encompass several business and interest rate cycles. The use of the entire study period in estimating the appropriate MRP minimizes subjective judgment and encompasses many diverse regimes of inflation, interest rate cycles, and economic cycles.

To the extent that the estimated historical equity risk premium follows what is known in statistics as a random walk, one should expect the equity risk premium to remain at its

historical mean. Since I found no evidence that the MRP in common stocks has changed over time, that is, no significant serial correlation in the Duff & Phelps study prior to that time, it is reasonable to assume that these quantities will remain stable in the future.

Q. SHOULD STUDIES OF HISTORICAL RISK PREMIUMS RELY ON ARITHMETIC AVERAGE RETURNS OR GEOMETRIC AVERAGE RETURNS?

A. Whenever relying on historical risk premiums, only arithmetic average returns over long periods are appropriate for forecasting and estimating the cost of capital. Geometric average returns are not.[7]

Q. PLEASE EXPLAIN HOW THE ISSUE OF WHAT IS THE PROPER "MEAN" ARISES IN THE CONTEXT OF ANALYZING THE COST OF EQUITY?

A. The issue arises in applying methods that derive estimates of a utility's cost of equity from historical relationships between bond yields and earned returns on equity for individual companies or portfolios of several companies. Those methods produce series of numbers representing the annual difference between bond yields and stock returns over long historical periods. The question is how to translate those series into a single number that can be added to a current bond yield to estimate the current cost of equity for a stock or a

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7 *See* Roger A. Morin, Ph.D., The New Regulatory Finance: Chapter 4 (2006); Richard A. Brealey, et al., Principles of Corporate Finance (11th ed. 2014).

portfolio. Calculating geometric and arithmetic means are two ways of converting series of numbers to a single, representative figure.

Q. IF BOTH ARE "REPRESENTATIVE" OF THE SERIES, WHAT IS THE DIFFERENCE BETWEEN THE TWO MEANS?

A. Each mean represents different information about the series. The geometric mean of a series of numbers is the value which, if compounded over the period examined, would have made the starting value grow to the ending value. The arithmetic mean is simply the average of the numbers in the series. Where there is any annual variation (volatility) in a series of numbers, the arithmetic mean of the series, which reflects volatility, will always exceed the geometric mean, which ignores volatility. Because investors require higher expected returns to invest in a company whose earnings are volatile than one whose earnings are stable, the geometric mean is not useful in estimating the expected rate of return which investors require to make an investment.

Q. CAN YOU PROVIDE A NUMERICAL EXAMPLE TO ILLUSTRATE THIS DIFFERENCE BETWEEN GEOMETRIC AND ARITHMETIC MEANS?

A. Yes. Table 3 below compares the geometric and arithmetic mean returns of a hypothetical Stock A, whose yearly returns over a ten-year period are very volatile, with those of a hypothetical Stock B, whose yearly returns are perfectly stable during that period. Consistent with the point that geometric returns ignore volatility, the geometric mean returns for the two series are identical (11.6% in both cases), whereas the arithmetic mean

return of the volatile stock (26.7%) is much higher than the arithmetic mean return of the stable stock (11.6%).

If relying on geometric means, investors would require the same expected return to invest in both of these stocks, even though the volatility of returns in Stock A is very high while Stock B exhibits perfectly stable returns. That is clearly contrary to the most basic financial theory; that is, the higher the risk, the higher the expected return.

Chapter 4, Appendix A of my book The New Regulatory Finance contains a detailed and rigorous discussion of the impropriety of using geometric averages in estimating the cost of capital. Briefly, the disparity between the arithmetic average return and the geometric average return raises the question as to what purposes should these different return measures be used. The answer is that the geometric average return should be used for measuring historical returns that are compounded over multiple time periods. The arithmetic average return should be used for future-oriented analysis, where the use of expected values is appropriate.

Table 3 Arithmetic vs Geometric Mean Returns

Year	Stock A	Stock B
2012	50.0%	11.6%
2013	-54.7%	11.6%
2014	98.5%	11.6%
2015	42.2%	11.6%
2016	-32.3%	11.6%
2017	-39.2%	11.6%
2018	153.2%	11.6%
2019	-10.0%	11.6%
2020	38.9%	11.6%
2021	20.0%	11.6%
Std. Deviation	**64.9%**	**0.0%**
Arith. Mean	**26.7%**	**11.6%**
Geom. Mean	**11.6%**	**11.6%**

Q. CAN YOU DESCRIBE THE PROSPECTIVE MRP ESTIMATE USED IN YOUR CAPM ANALYSIS?

A. As a second estimate of the MRP, I examined Value Line's dividend yield and growth forecasts for the stocks in the S&P 500 Stock Index, that is, for the broad U.S. economy. NMGC Exhibit RAM-9 provides a prospective DCF analysis of the dividend-paying stocks that make up the S&P 500 Index using Value Line's screening software. The dividend yield on the dividend-paying stocks in the S&P 500 Index is 2.1%, and the average projected long-term growth rate is 9.4%. Adding the dividend yield to the growth component produces an expected market return on aggregate equities of 11.5%. Allowing for flotation cost brings the market return estimate of 11.5% to 11.7%. Subtracting the

prospective risk-free rate of 3.3% from the latter, the implied risk premium is 8.4% over long-term U.S. Treasury bonds.

The average of the historical MRP of 7.3% and the prospective MRP of 8.4% is 7.8%, which is my final estimate of the MRP for purposes of implementing the CAPM.

Q. IS YOUR MRP ESTIMATE OF 7.8% CONSISTENT WITH THE ACADEMIC LITERATURE ON THE SUBJECT?

A. Yes, it is. In their authoritative corporate finance textbook, Professors Brealey, Myers, and Allen[8] conclude from their review of the fertile literature on the MRP that a range of 5% to 8% is reasonable for the MRP in the United States. My own extensive survey of the MRP literature, which appears in Chapter 5 of my textbook, The New Regulatory Finance, is also consistent with this range.

Q. WHAT IS YOUR ESTIMATE OF NMGC'S COST OF EQUITY USING THE CAPM APPROACH?

A. Inserting those input values into the CAPM equation, namely a risk-free rate of 3.3%, a beta of 0.88, and a MRP of 7.8%, the CAPM estimate of NMGC's cost of common equity is: 3.3% + 0.88 x 7.80% = 10.2%. This estimate becomes 10.4% with flotation costs,

[8] Richard A. Brealey, Stewart C. Myers, and Paul Allen, Principles of Corporate Finance, Irwin McGraw-Hill (11th ed. 2014).

discussed later in my testimony. Please see NMGC RAM-10 Page 1 for a detailed description of the CAPM analysis of the natural gas group. Page 2 of NMGC RAM-10 displays the same CAPM analysis of the combination gas and electric group and shows a CAPM estimate of 10.3% for the group, which is nearly identical to the 10.4% estimate for the natural gas group.

Q. CAN YOU DESCRIBE YOUR APPLICATION OF THE EMPIRICAL VERSION OF THE CAPM?

A. There have been countless empirical tests of the CAPM to determine to what extent security returns and betas are related in the manner predicted by the CAPM. This literature is summarized in Chapter 6 of my latest book, The New Regulatory Finance. The results of the tests support the idea that beta is related to security returns, that the risk-return tradeoff is positive, and that the relationship is linear. The contradictory finding is that the risk-return tradeoff is not as steeply sloped as the predicted CAPM. That is, empirical research has long shown that low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted.

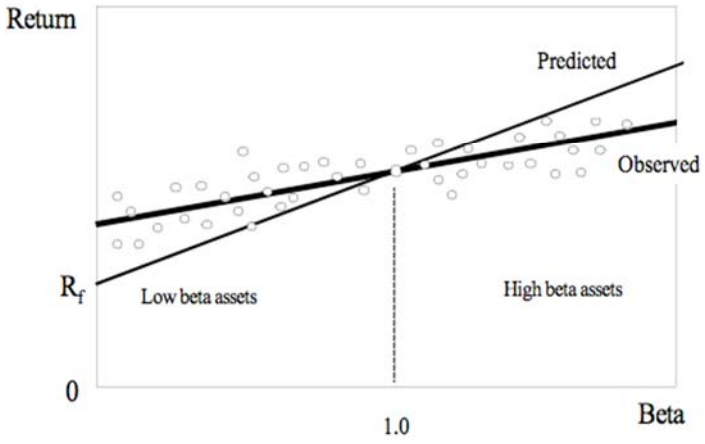
A CAPM-based estimate of cost of capital underestimates the return required from low-beta securities and overstates the return required from high-beta securities, based on the empirical evidence. This is one of the most wNMGC-known results in finance. It is displayed graphically below.

A number of variations on the original CAPM theory have been proposed to explain this finding. The ECAPM makes use of these empirical findings. The ECAPM estimates the cost of capital with the equation:

$$K = R_F + \alpha + \beta \times ((R_M - R_F) - \alpha)$$

where the symbol alpha, α , represents the "constant" of the risk-return line, MRP is the market risk premium ($R_M - R_F$), and the other symbols are defined as previously noted.

CAPM: Predicted vs Observed Returns



Inserting the long-term risk-free rate as a proxy for the risk-free rate, an alpha in the range of 1% - 2%, and reasonable values of beta and the MRP in the above equation produces results that are indistinguishable from the following more tractable ECAPM expression:

$$K = R_F + 0.25 \times (R_M - R_F) + 0.75\ \beta \times (R_M - R_F)$$

An alpha range of one to two percent is somewhat lower than that estimated empirically. The use of a lower value for alpha leads to a lower estimate of the cost of capital for low-

beta stocks such as regulated utilities. This is because the use of a long-term risk-free rate rather than a short-term risk-free rate already incorporates some of the desired effects of using the ECAPM. In other words, the long-term risk-free rate version of the CAPM has a higher intercept and a flatter slope than the short-term risk-free version which has been tested. This is also because the use of adjusted betas rather than the use of raw betas incorporates some of the desired effect of using the ECAPM.[9] Thus, it is reasonable to apply a conservative alpha adjustment. Please see Appendix A for a discussion of the CAPM and the ECAPM.

In short, the following equation provides a viable approximation to the observed relationship between risk and return, and provides the following cost of equity capital estimate:

$$K = R_F + 0.25 (R_M - R_F) + 0.75 \times \beta \times (R_M - R_F)$$

Inserting the risk-free rate of 3.3%, a MRP of 7.8% for $(R_M - R_F)$ and a beta of 0.88 in the above equation, the return on common equity is 10.4%. This estimate becomes 10.6% with flotation costs, discussed later in my testimony. Please see NMGC RAM-10 Page 1 for a detailed description of the ECAPM analysis of the natural gas group. The corresponding

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[9] The regression tendency of betas to converge to 1.0 over time is very wNMGC known and widely discussed in the financial literature. As a result of this beta drift, several commercial beta producers adjust their forecasted betas toward 1.00 in an effort to improve their forecasts. Value Line, Bloomberg, and Merrill Lynch betas are adjusted for their long-term tendency to regress toward 1.0 by giving approximately 66% - weight to the measured raw beta and approximately 33% weight to the prior value of 1.0 for each stock:

$$\beta_{adjusted} = 0.33 + 0.66 \beta_{raw}$$

analysis for the combination gas and electric group produces a cost of equity estimate of 10.5% which is nearly identical to the estimate for the natural gas group.

Q. IS THE USE OF THE ECAPM CONSISTENT WITH THE USE OF ADJUSTED BETAS?

A. Yes, it is. It is sometimes wrongly argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend, an ECAPM analysis results in double-counting. This argument is erroneous.

Fundamentally, the ECAPM is not a beta adjustment. The observed return on high beta securities is actually lower than that produced by the CAPM estimate, and conversely the observed return on low beta securities such as utility companies is actually higher than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprise two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks. And even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to the previous graph, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary.

Q. PLEASE SUMMARIZE YOUR CAPM ESTIMATES.

A. Table 4 below summarizes the natural gas companies' common equity estimates obtained from the CAPM studies.

Table 4 CAPM Results

CAPM Method	ROE
Traditional CAPM	10.4%
Empirical CAPM	10.6%

C. Historical Risk Premium Estimates

Q. PLEASE DESCRIBE YOUR HISTORICAL RISK PREMIUM ANALYSIS OF THE UTILITY INDUSTRY USING TREASURY BOND YIELDS.

A. A historical risk premium for the utility industry was estimated with an annual time series analysis applied to the utility industry as a whole over the 1930-2020 period, using Standard and Poor's Utility Index (S&P Index) as an industry proxy. The risk premium was estimated by computing the actual realized ROE capital for the S&P Utility Index for each year, using the actual stock prices and dividends of the index, and then subtracting the long-term Treasury bond return for that year. Please see NMGC Exhibit RAM-9, for an analysis of the historical risk premium for the utility industry using an annual time series analysis applied to the utility industry as a whole over the 1930-2020 period, using the S&P Index as an industry proxy.

As shown on NMGC RAM-11 at the bottom of Column 8, the average risk premium over the period was 5.4% over long-term Treasury bond yields and 6.2% over the income component of bond yields as shown at the bottom of Column 9. As discussed previously, the latter is the appropriate risk premium to use. Given the risk-free rate of 3.3%, and using the estimate of 6.2% for bond returns, the implied cost of equity is 3.3% + 6.3% = 9.6%. This estimate becomes 9.8% with flotation costs, discussed later in my testimony.

Q. ARE YOU CONCERNED ABOUT THE REALISM OF THE ASSUMPTIONS THAT UNDERLIE THE HISTORICAL RISK PREMIUM METHOD?

A. No, I am not, for they are no more restrictive than the assumptions that underlie the DCF model or the CAPM, and are in fact far less restrictive. While it is true that the method looks backward in time and assumes that the risk premium is constant over time, these assumptions are not necessarily restrictive. By employing returns realized over long time periods rather than returns realized over more recent time periods, investor return expectations and realizations converge. Realized returns can be substantially different from prospective returns anticipated by investors, especially when measured over short time periods. By ensuring that the Risk Premium study encompasses the longest possible period for which data are available, short-run periods during which investors earned a lower risk premium than they expected are offset by short-run periods during which investors earned a higher risk premium than they expected. Only over long time periods will investor return expectations and realizations converge, or else, investors would be reluctant to invest money.

D. Allowed Risk Premium Estimates

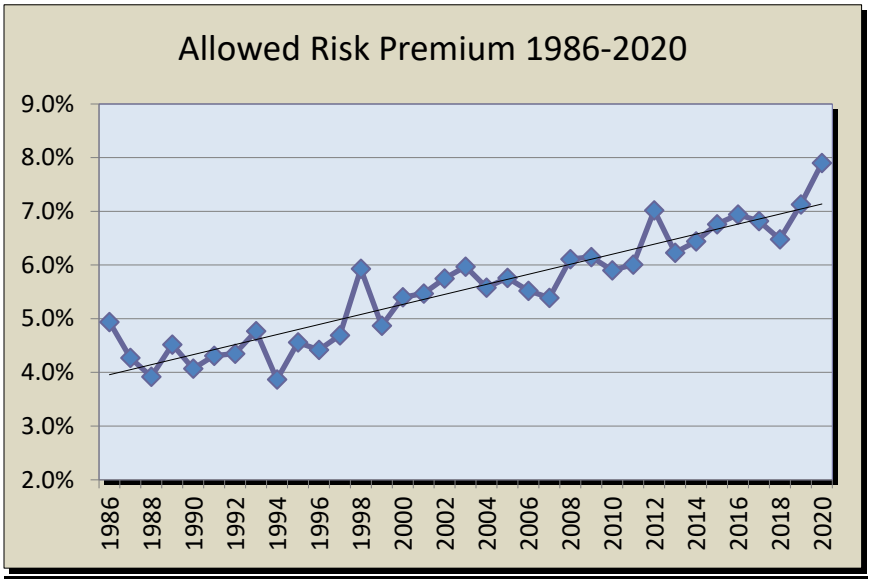
Q. PLEASE DESCRIBE YOUR ANALYSIS OF ALLOWED RISK PREMIUMS IN THE NATURAL GAS UTILITY INDUSTRY.

A. To estimate the natural gas utility industry's cost of common equity, I also examined the historical risk premiums implied in the ROEs allowed by regulatory commissions over the 1986-2020 period for which data were available, relative to the contemporaneous level of the long-term Treasury bond yield. Please see NMGC Exhibit RAM-12, for an analysis of historical risk premiums implied in the ROEs allowed by regulatory commissions over the 1986-2020 period.

This variation of the risk premium approach is reasonable because allowed risk premiums are based on the results of market-based methodologies (DCF, CAPM, Risk Premium, etc.) presented to regulators in rate hearings and on the actions of objective unbiased investors in a competitive marketplace. Historical allowed ROE data are readily available over long periods on a quarterly basis from Regulatory Research Associates (now S&P Global Intelligence) and easily verifiable from prior issues of that same publication and past commission decision archives.

The average ROE spread over long-term Treasury yields was 5.5% over the entire 1986-2020 period for which data were available, as displayed on NMGC Exhibit RAM-12 Column 3. The graph below shows the year-by-year allowed risk premium. The escalating

trend of the risk premium in response to lower interest rates and rising competition is noteworthy.

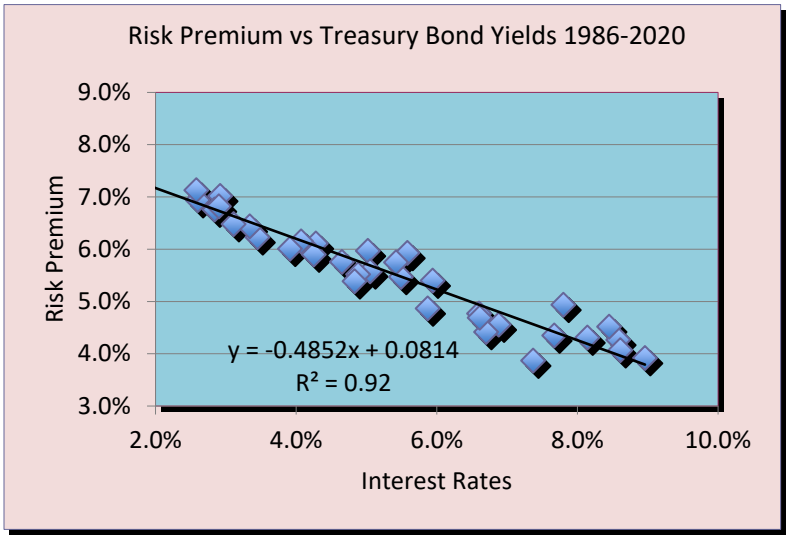


A careful review of these ROE decisions relative to interest rate trends reveals a narrowing of the risk premium in times of rising interest rates, and a widening of the premium as interest rates fall. The following statistical relationship between the risk premium (RP) and interest rates (YIELD) emerges over the 1986-2020 period:

$$RP = 8.1400 - 0.4852\ YIELD. \qquad R^2 = 0.92$$

The relationship is highly statistically significant[10] as indicated by the very high R^2. The graph below shows a clear inverse relationship between the allowed risk premium and interest rates as revealed in past ROE decisions.

[10] The coefficient of determination R^2, sometimes called the "goodness of fit measure," is a measure of the degree of explanatory power of a statistical relationship. It is simply the ratio of the explained portion to the total sum of squares. The higher R^2 the higher is the degree of the overall fit of the estimated regression equation to the sample data.



Inserting the long-term Treasury bond yield of 3.3% in the above equation suggests a risk premium estimate of 6.5%, implying a cost of equity of 9.8%. The latter result is identical to the 9.8% result of the historical risk premium study.[11]

Q. DO INVESTORS TAKE INTO ACCOUNT ALLOWED RETURNS IN FORMULATING THEIR RETURN EXPECTATIONS?

A. Yes, they do. Investors do indeed take into account returns granted by various regulators in formulating their risk and return expectations, as evidenced by the availability of commercial publications disseminating such data, including Value Line and S&P Global Intelligence (formerly SNL and Regulatory Research Associates). Allowed returns, while

[11] There is no need to adjust this figure for flotation cost given that the ROE data are based on allowed returns on book equity rather than on market-based returns.

certainly not a precise indication of a particular company's cost of equity capital, are nevertheless important determinants of investor growth perceptions and investor expected returns.

Q. PLEASE SUMMARIZE YOUR RISK PREMIUM ESTIMATES.

A. Table 5 below summarizes the ROE estimates obtained from the two Risk Premium studies.

Table 5 Risk Premium Estimates for NMGC

Risk Premium Method	ROE
Historical Risk Premium	9.8%
Allowed Risk Premium	9.8%

E. Need for Flotation Cost Adjustment

Q. PLEASE DESCRIBE THE NEED FOR A FLOTATION COST ALLOWANCE.

A. All the market-based estimates reported above include an adjustment for flotation costs. The simple fact of the matter is that issuing common equity capital is not free. Flotation costs associated with stock issues are similar to the flotation costs associated with bonds and preferred stocks. Flotation costs are not expensed at the time of issue, and therefore must be recovered via a rate of return adjustment. This is done routinely for bond and preferred stock issues by most regulatory commissions, including FERC. Clearly, the common equity capital accumulated by the Company is not cost-free. The flotation cost allowance to the cost of common equity capital is discussed and applied in most corporate finance textbooks; it is unreasonable to ignore the need for such an adjustment.

Flotation costs are very similar to the closing costs on a home mortgage. In the case of issues of new equity, flotation costs represent the discounts that must be provided to place the new securities. Flotation costs have a direct and an indirect component. The direct component is the compensation to the security underwriter for his marketing/consulting services, for the risks involved in distributing the issue, and for any operating expenses associated with the issue (e.g., printing, legal, prospectus). The indirect component represents the downward pressure on the stock price as a result of the increased supply of stock from the new issue. The latter component is frequently referred to as "market pressure."

Investors must be compensated for flotation costs on an ongoing basis to the extent that such costs have not been expensed in the past, and therefore the adjustment must continue for the entire time that these initial funds are retained in the firm. Appendix B to my testimony discusses flotation costs in detail, and shows: (1) why it is necessary to apply an allowance of 5% to the dividend yield component of equity cost by dividing that yield by 0.95 (100% - 5%) to obtain the fair return on equity capital; (2) why the flotation adjustment is permanently required to avoid confiscation even if no further stock issues are contemplated; and (3) that flotation costs are only recovered if the rate of return is applied to total equity, including retained earnings, in all future years.

By analogy, in the case of a bond issue, flotation costs are not expensed but are amortized over the life of the bond, and the annual amortization charge is embedded in the cost of

service. The flotation adjustment is also analogous to the process of depreciation, which allows the recovery of funds invested in utility plant. The recovery of bond flotation expense continues year after year, irrespective of whether a company issues new debt capital in the future, until recovery is complete, in the same way that the recovery of past investments in plant and equipment through depreciation allowances continues in the future even if no new construction is contemplated. In the case of common stock that has no finite life, flotation costs are not amortized. Thus, the recovery of flotation costs requires an upward adjustment to the allowed ROE.

A simple example will illustrate the concept. A stock is sold for $100, and investors require a 10% return, that is, $10 of earnings. But if flotation costs are 5%, the Company nets $95 from the issue, and its common equity account is credited by $95. In order to generate the same $10 of earnings to the shareholders, from a reduced equity base, it is clear that a return in excess of 10% must be allowed on this reduced equity base, here 10.53%.

According to the empirical finance literature discussed in Appendix B, total flotation costs amount to 4% for the direct component and 1% for the market pressure component, for a total of 5% of gross proceeds. This in turn amounts to approximately 20 basis points, depending on the magnitude of the dividend yield component. To illustrate, dividing the average expected dividend yield of around 4.0% for utility stocks by 0.95 yields 4.2%, which is 20 basis points higher.

Sometimes, the argument is made that flotation costs are real and should be recognized in calculating the fair ROE, but only at the time when the expenses are incurred. In other words, as the argument goes, the flotation cost allowance should not continue indefinitely, but should be made in the year in which the sale of securities occurs, with no need for continuing compensation in future years. This argument is valid only if the Company has already been compensated for these costs. If not, the argument is without merit. My own recommendation is that investors be compensated for flotation costs on an on-going basis rather than through expensing, and that the flotation cost adjustment continue for the entire time that these initial funds are retained in the firm.

In theory, flotation costs could be expensed and recovered through rates as they are incurred. This procedure, although simple in implementation, is not considered appropriate, however, because the equity capital raised in a given stock issue remains on the utility's common equity account and continues to provide benefits to ratepayers indefinitely. In the absence of valid reasons to do so, burdening the current generation of ratepayers with the full costs of raising capital is not preferable when the benefits of that capital extend indefinitely. The common practice of capitalizing rather than expensing eliminates the intergenerational transfers that would prevail if today's ratepayers were asked to bear the full burden of flotation costs of bond/stock issues in order to finance capital projects designed to serve future as wNMGC as current generations. Moreover, expensing flotation costs requires an estimate of the market pressure effect for each individual issue, which is likely to prove unreliable. A more reliable

approach is to estimate market pressure for a large sample of stock offerings rather than for one individual issue.

Q. DR. MORIN, CAN YOU PLEASE ELABORATE ON THE MARKET PRESSURE COMPONENT OF FLOTATION COST?

A. The indirect component, or market pressure component, of flotation costs represents the downward pressure on the stock price as a result of the increased supply of stock from the new issue, reflecting the basic economic fact that when the supply of securities is increased following a stock or bond issue, the price falls. The market pressure effect is real, tangible, measurable, and negative. According to the empirical finance literature cited in Appendix B, the market pressure component of the flotation cost adjustment is approximately 1% of the gross proceeds of an issuance. The announcement of the sale of large blocks of stock produces a decline in a company's stock price, as one would expect given the increased supply of common stock.

Q. IS A FLOTATION COST ADJUSTMENT REQUIRED FOR AN OPERATING SUBSIDIARY LIKE NMGC THAT DOES NOT TRADE PUBLICLY?

A. Yes, it is. It is sometimes alleged that a flotation cost allowance is inappropriate if the utility is a subsidiary whose equity capital is obtained from its owners, in this case, Emera. This objection is unfounded since the parent-subsidiary relationship does not eliminate the costs of a new issue, but merely transfers them to the parent. It would be unfair and discriminatory to subject parent shareholders to dilution while individual shareholders are

absolved from such dilution. Fair treatment must consider that, if the utility-subsidiary had gone to the capital markets directly, flotation costs would have been incurred.

V. SUMMARY OF RESULTS AND RECOMMENDATION

Q. PLEASE SUMMARIZE YOUR RESULTS AND RECOMMENDATION.

A. To arrive at my final recommendation, I performed:

(i) a DCF analysis on a group of investment-grade dividend-paying natural gas utilities using Value Line's growth forecasts;

(ii) a DCF analysis on a group of investment-grade dividend-paying natural gas utilities using analysts' growth forecasts;

(iii) a DCF analysis on a group of investment-grade dividend-paying electric utilities using Value Line's growth forecasts;

(iv) a DCF analysis on a group of investment-grade dividend-paying electric utilities using analysts' growth forecasts;

(v) a traditional CAPM using current market data;

(vi) an empirical approximation of the CAPM using current market data;

(vii) historical risk premium data from utility industry aggregate data, using the yield on long-term US Treasury bonds; and

(vi) allowed risk premium data from natural gas utility industry aggregate data, using the current yield on long-term US Treasury bonds.

Table 6 below summarizes the ROE estimates for NMGC.

Table 6 Summary of ROE Estimates

STUDY	ROE
CAPM	10.4%
Empirical CAPM	10.6%
Historical Risk Premium Electric	9.8%
Allowed Risk Premium	9.8%
DCF Elec Utilities Value Line Growth	9.4%
DCF Elec Utilities Analysts Growth	8.7%
DCF Nat Gas Utilities Value Line Growth	11.5%
DCF Nat Gas Utilities Analysts Growth	10.4%

The average estimate is 10.1%. The truncated mean[12] is also 10.1%, as well as the median and the midpoint of the range of estimates.

I stress that no one individual method provides an exclusive foolproof formula for determining a fair return, but each method provides useful evidence so as to facilitate the exercise of an informed judgment. Reliance on any single method or preset formula is hazardous when dealing with investor expectations. Moreover, the advantage of using several different approaches is that the results of each one can be used to check the others. Thus, the results shown in Table 6 above must be viewed as a whole rather than each as a

[12] The truncated mean is obtained by removing the high and low results and computing the average of the remaining observations.

stand-alone. It would be inappropriate to select any particular number from Table 6 and infer the cost of common equity from that number alone.

Q. DR. MORIN, WHAT IS YOUR FINAL CONCLUSION REGARDING NMGC'S RETURN ON COMMON EQUITY CAPITAL?

A. Based on the results of all my analyses, the application of my professional judgment, and the risk circumstances of NMGC, it is my opinion that a just and reasonable ROE for NMGC's natural gas utility operations in the State of New Mexico is 10.1%. I do consider my recommended ROE as barebones and conservative given the relative risks of the Company by virtue of its significant financing requirements, relative small size, lack of regulatory diversification, and paucity of risk-mitigating mechanisms. Indeed, these risk circumstances point to an ROE above the central tendency of my analyses, and, therefore, an ROE of less than 10.1% would not be just and reasonable.

Q. DR. MORIN, PLEASE ELABORATE ON WHY YOU CONSIDER YOUR RECOMMENDED RETURN OF 10.1% CONSERVATIVE?

A. I consider my recommended return conservative for four reasons. The first reason is the small relative size of the Company's natural gas business. NMGC's natural gas distribution business is small relative to that of its peer companies on the basis of revenues, capital base, and number of customers. Investment risk increases as company size diminishes, all else remaining constant. The size phenomenon is well documented in the finance literature, and is fully discussed in Chapter 6 of my book The New Regulatory

Finance and is also fully discussed in the Duff & Phelps Valuation 2021 Yearbook documenting and quantifying the size effect. The gist of the literature is that small companies have very different returns than large ones and on average those returns have been higher. The greater risk of small stocks does not fully account for their higher returns over many historical periods. The average small stock premium is well in excess of that of the average stock, more than could be expected by risk differences alone, suggesting that the cost of equity for small stocks is considerably larger than for large capitalization stocks. In addition to earning the highest average rates of return, small stocks also have the highest volatility, as measured by the standard deviation of returns.

Q. CAN YOU COMMENT ON THE SECOND REASON?

A. Yes. The second reason is that he Company is very likely to raise very large sums of money in a rising interest rate environment over the next five years. The Company's capital expenditure program for its natural gas business will require approximately $750 million of financing over the next five years for new utility infrastructure investments. To place that number in proper perspective, the Company's common equity balance is approximately $500 million, and test year total rate base is approximately $860 million. In other words, the company is expected to spend an amount that exceeds its entire common equity ownership capital, and to almost double its total capitalization base over the next five years.

Because of the Company's very large construction program relative to its rate base and

owners' capital (common equity balance) over the next few years, rate relief requirements and regulatory treatment uncertainty will increase regulatory risks as well. Generally, regulatory risks include approval risks, lags and delays, potential rate base exclusions, and potential disallowances. Continued regulatory support from the Commission will be required. Reviews of the economic and environmental aspects of new construction can consume as much as one year before approval or denial. Regulatory approval for financings required for new construction will also be required, injecting additional risks.

Q. CAN YOU COMMENT ON THE THIRD REASON?

A. Yes. The third reason is that the Company possesses fewer risk mitigating mechanisms other than a weather normalization clause relative to its peers, and therefore the Company is riskier than its peers on those grounds alone.

Most, if not all, natural gas and electric utilities in the industry are under some form of rider/adjustment clause/cost recovery/mechanisms. The approval of riders, adjustment clauses, cost recovery mechanisms, revenue decoupling mechanisms, and various forms of risk-mitigating mechanisms by regulatory commissions is widespread in the utility business. Such mechanisms have become the norm for regulated utilities across the U.S. A 2015 study by the Edison Foundation ("*Alternative Regulation for Emerging Utility Challenges: 2015 Update*") reports that a majority of states have risk mitigating mechanisms in place.

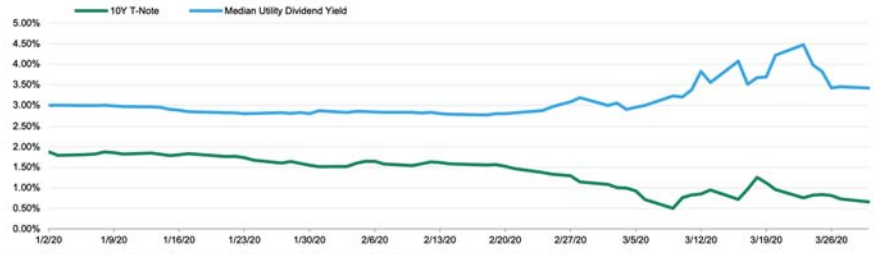
Q. CAN YOU COMMENT ON THE FOURTH REASON?

A. Yes. The fourth reason is the lack of diversification of regulatory regime relative to its peers.

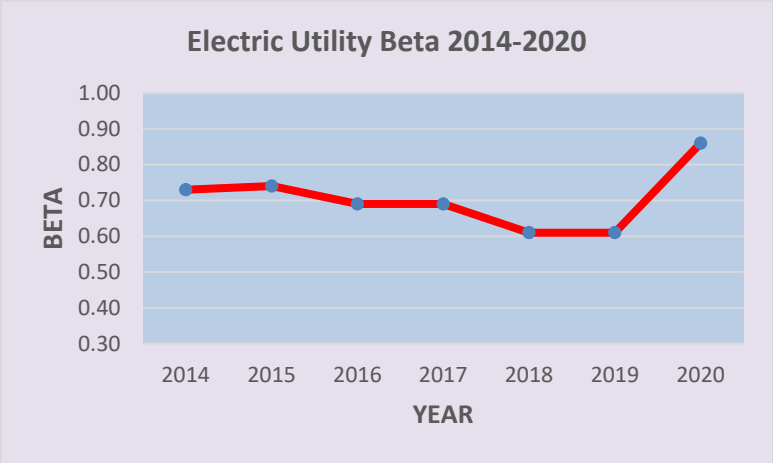
Q. HAVE THE RISK PERCEPTIONS OF THE NATURAL GAS AND ELECTRIC UTILITY INDUSTRIES INCREASED IN RECENT YEARS?

A. Yes, they have intensified and that is yet another reason why I view my recommended return as conservative. The two graphs below illustrate my point. The first graph shows the widening spread between the dividend yields (D/P) of natural gas and electric utility stocks and the yield on long-term Treasury bonds in 2020, indicating higher risk perceptions. The second graph shows a dramatic increase in the average beta risk measure for electric utility stocks over the 2014-2020 period, rising from the 0.65 level to above 0.85. The same is true for natural gas utility betas which have nearly reached the 90% level compared to the 0.70 level in recent years.

Exhibit 4
Widening spread points to investor uncertainty about dividend sustainability
Year-to-date median dividend yield of US utility holding companies and 10-year US Treasury yields as of 30 March 2020



Note: Median utility dividend yield based on the 38 electric and gas utility parent companies identified in this report
Source: FactSet



For all these reasons, I consider my recommended return of 10.1% conservative.

V. CAPITAL STRUCTURE AND OPTIMAL BOND RATING

Q. DR. MORIN, WHAT CAPITAL STRUCTURE ASSUMPTION UNDERLIES YOUR RECOMMENDED RETURN ON NMGC'S COMMON EQUITY CAPITAL?

A. My recommended return on common equity for NMGC is predicated on the adoption of a capital structure consisting of approximately 53% common equity capital.

Q. IS THE COMPANY'S PROPOSED CAPITAL STRUCTURE CONSISTING OF 53% COMMON EQUITY REASONABLE FOR RATEMAKING PURPOSES?

A. Yes, it is for several reasons. First, I have examined the capital structures of the companies in my peer group of natural gas utilities. As shown on Column 5 of NMGC Exhibit RAM-13, Page 1, the median common equity ratio for the natural gas utility group over the last three years is 52%, and as seen on Column 5 of NMGC Exhibit RAM-13, the median projected common equity ratio over the 2022-2024 period for the natural gas peer group is 53% which is equal to the the Company's requested 53%.

I also examined the capital structures of the operating utility companies rather than those of the parent companies on the grounds that regulatory commissions regulate the capital structures of the operating utility companies and not those of the parent companies.

Page 2 of NMGC Exhibit RAM-13 displays the common equity ratios of the natural gas

utility subsidiaries rather than those of the parent companies. The average common equity ratio is 58.5% in 2020. However, given the very small sample on which this average is based and its limited statistical validity, I also examined the common equity ratios of electric operating utility companies. As displayed on Page 3 of NMGC Exhibit RAM-13, this large sample of 92 operating utility companies had an average common equity ratio of 54%.

Second, I have examined the credit rating agencies' financial ratio benchmarks for various bond rating categories for utilities. Moody's publishes a matrix of financial ratios that correspond to its assessment of the investment risk of utility companies and related bond rating.

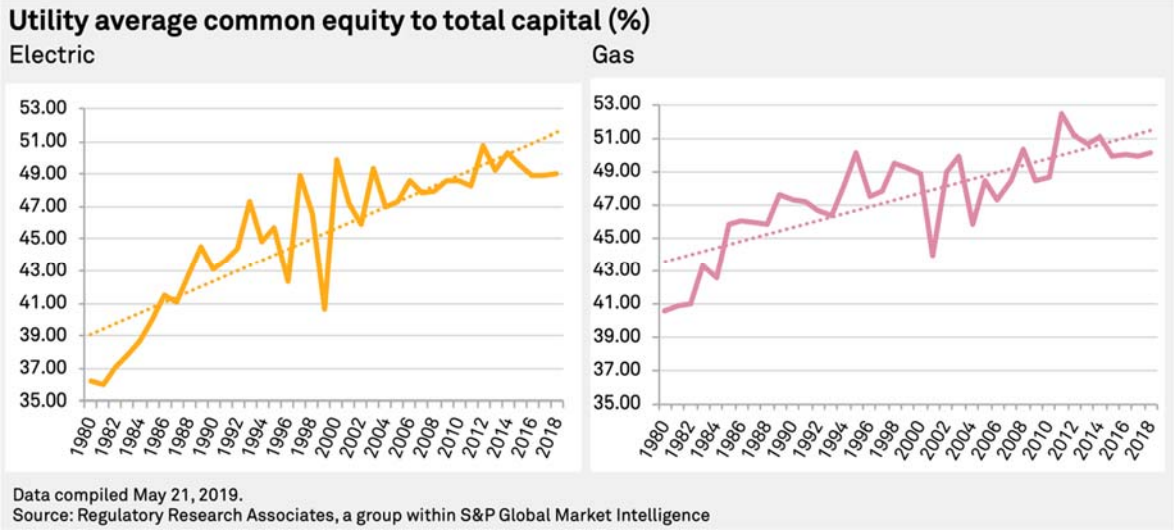
Table 7 below reproduces Moody's range for a utility company's debt ratio and related bond rating, one of its four primary financial ratios that it uses as guidance in its credit review for utility companies.[13] For a single-A bond rating, which I consider optimal and cost-efficient for utility customers, the debt ratio range is 35% - 45%, implying a common equity ratio range of 55% - 65%. Even for a Baa bond rating, which is NMGC's current Fitch bond rating, the corresponding debt ratio range is 45% - 55%, implying a common equity range of 45%- 55%, which is consistent with NMGC's 53% ratio.

[13] Moody's Investors Service, "Regulated Electric and Gas Utilities", June 23, 2017. *See also* Moody's Investors Service, "Electric & Gas Utilities: Assessing Their Credit Quality and Outlook," Jan. 2013.

Table 7 Moody's Benchmark Debt Ratios

Bond Rating	Debt/capital %
Aaa	<25
Aa	25-35
A	**35-45**
Baa	**45-55**
Ba	55-65
B	>65

Third, I have examined the trend in common equity ratios authorized by regulators over the last decade for natural gas utilities. The graph below, published by Regulatory Research Associates, shows the steady increase in utility equity ratios in the past four decades for both electric and gas utilities. Moreover, all else remaining constant, an enhanced equity base increases the probability of maintaining and possibly improving the bond rating to at least the single A level, by placing the company closer to the guidelines stipulated by bond rating agencies for a single A status, which I consider optimal for both the company and its ratepayers. This is consistent with NMGC's slightly elevated 53% ratio as compared to the 52% settled on in the last rate case. An improved bond rating not only would result in lower interest rates on debt issues but would also provide improved access to the debt markets during periods of instability in the capital markets on reasonable financial terms.



It is clear from these multiple perspectives that NMGC's 53% common equity ratio is appropriate and even conservative given the Company's heightened risk factors previously discussed.

Finally, I show below why it is essential for both the Company and its customers to at least retain, if not improve, the Company's Baa1 bond rating to a single A rating. The Commission's regulatory support will help ensure NMGC remains financially healthy, including retaining its existing bond rating and increasing the probability of an upgrade to a single-A rating, which I show to be optimal below. Given that ROE exerts a direct impact on the determinants of a credit rating, approval of my recommended ROE certainly increases the probability that NMGC will retain, and potentially increase, its bond rating to single A, which is cost efficient for customers, as discussed below.

OPTIMAL BOND RATING AND CAPITAL STRUCTURE

Q. DR. MORIN, WHAT IS THE OPTIMAL BOND RATING FOR A REGULATED UTILITY?

A. A single-A bond rating generally results in the lowest pre-tax cost of capital for investor-owned regulated utilities, and therefore the lowest customer burden, especially under adverse economic conditions, which are far more relevant to the question of capital structure. This result prevails over a wide range of cost of common equity models and estimates utilized and remains robust to changes in key assumptions.

As I showed in the optimal capital structure simulation model developed in Chapter 19 of my book The New Regulatory Finance, a strong single-A bond rating will minimize the pre-tax cost of capital to customers. Long-term achievement/retention of a single-A bond rating is in both the utility's and customers' best interests. If the company has a debt ratio within the optimal range discussed earlier for a single A-rated company, its overall cost of capital should be minimized. If a company reduces its debt ratio below that point, it would be giving up the tax benefits associated with debt but would not reap the benefits from a lower cost of debt and equity. If the company operates at a debt ratio beyond that point, the cost of debt and equity will rise, and therefore so will the cost of service. The converse is true as well.

Q. PLEASE PROVIDE A SIMPLE NUMERICAL EXAMPLE SHOWING WHAT WOULD HAPPEN TO CUSTOMERS IF A COMPANY'S BONDS WERE UPGRADED FROM BBB TO A.

A. The following example shows that the customer burden would decrease significantly. Let's say the Company issues a 20-year $100 million bond. The difference in cost between being a single A-rated company and being a BBB-rated company is approximately 50 basis points (0.50%), based on historical spreads between A and BBB bonds; that is, the cost of debt increases by 50 basis points when a company's bonds are downgraded from single A to BBB, and conversely decreases by 50 basis points when the bonds are upgraded from BBB to single A. So, every year for 20 years, the additional saving to customers is $500,000 (0.50% times $100M). Over the entire 20-year period the total additional savings to customers is therefore $10 million (20 times $500,000). This example is conservative, for it does not even consider the decrease in common equity capital costs, which would be equally burdensome.

In short, for every $100 million of bonds issued by the company, the saving to customers of being a A-rated company instead of being a BBB-rated company is approximately $10 million.

Q. WERE NMGC EXHIBITS RAM-1 TO RAM-13 AND APPENDICES A AND B PREPARED BY YOU AND UNDER YOUR DIRECTION?

A. Yes, they were.

Q. IF CAPITAL MARKET CONDITIONS CHANGE SIGNIFICANTLY BETWEEN THE DATE OF FILING YOUR PREPARED TESTIMONY AND THE DATE ORAL TESTIMONY IS PRESENTED, WOULD THIS CAUSE YOU TO REVISE YOUR ESTIMATED COST OF EQUITY?

A. Yes. Interest rates and security prices do change over time, and risk premiums change also, although much more sluggishly. If substantial changes were to occur between the filing date and the time my oral testimony is presented, I will update my testimony accordingly.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes, it does.