BEFORE THE
PUBLIC SERVICE COMMISSION OF MARYLAND

In the Matter of the Application of Washington Gas Light Company for Authority to Increase its Existing Rates and Charges and to Revise its Terms and Conditions for Gas Service	Case No. 9651

DIRECT TESTIMONY OF

DAVID J. GARRETT

SUBMITTED ON BEHALF OF THE
MARYLAND OFFICE OF PEOPLE'S COUNSEL

NOVEMBER 20, 2020

TABLE OF CONTENTS

LIST OF EXHIBITS

LIST OF APPENDICES

I. INTRODUCTION

Q. STATE YOUR NAME AND OCCUPATION.

A. My name is David J. Garrett. I am a consultant specializing in public utility regulation. I am the managing member of Resolve Utility Consulting PLLC.

Q. SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a B.B.A. with a major in Finance, an M.B.A., and a Juris Doctor from the University of Oklahoma. I worked in private legal practice for several years before accepting a position as assistant general counsel at the Oklahoma Corporation Commission in 2011. At the commission, I worked in the Office of General Counsel in regulatory proceedings. In 2012, I began working for the Public Utility Division as a regulatory analyst providing testimony in regulatory proceedings. After leaving the commission, I formed Resolve Utility Consulting PLLC, where I have represented various consumer groups and state agencies in utility regulatory proceedings, primarily in the areas of cost of capital and depreciation. I am a Certified Depreciation Professional with the Society of Depreciation Professionals. I am also a Certified Rate of Return Analyst with the Society of Utility and Regulatory Financial Analysts. A more complete description of my qualifications and regulatory experience is included in my curriculum vitae.[1]

[1] Exhibit DJG-1.

Q. DESCRIBE THE PURPOSE AND SCOPE OF YOUR TESTIMONY IN THIS PROCEEDING.

A. I am testifying on behalf of the Maryland Office of People's Counsel ("OPC") in response to the application for a rate increase filed by Washington Gas Light Company ("WGL" or the "Company"). Specifically, I address the cost of capital and fair rate of return for WGL in response to the direct testimony of Company witness Dylan W. D'Ascendis. I also address WGL's proposed capital structure, as discussed in the direct testimony of Company witness Douglas I. Bonawitz.

II. EXECUTIVE SUMMARY

A. Overview

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS TO THE COMMISSION.

A. I recommend the Commission authorize a return on equity of 9.0%. I also recommend the Commission impute a capital structure consisting of 48% long-term debt, 3.7% short-term debt, and 48.3% equity. These recommendations equate to an overall, weighted average awarded rate of return of 6.67%, as shown in the figure below.[2]

[2] *See also* Exhibit DJG-18.

Figure 1:
Awarded ROEs vs. Market Cost of Equity

Capital Component	Proposed Ratio	Cost Rate	Weighted Cost
Long Term Debt	48.0%	4.69%	2.25%
Short-Term Debt	3.7%	1.98%	0.07%
Common Equity	48.3%	9.00%	4.35%
Total	100.0%		6.67%

These recommendations will be discussed in more detail later in my testimony.

Q. EXPLAIN THE CONCEPT OF THE "WEIGHTED AVERAGE COST OF CAPITAL."

A. The term "cost of capital" refers to the weighted average cost of all types of components within a company's capital structure, including debt and equity. Determining the cost of debt is relatively straight-forward. Interest cost rates on bonds are contractual, derived, "embedded costs" that are generally calculated by dividing total interest payments by the book value of outstanding debt. In contrast, determining the cost of equity is more complex. Unlike the known contractual cost of debt, there is no explicit "cost" of equity; thus, the cost of equity must be estimated through various financial models. The overall weighted average cost of capital ("WACC") includes the cost of debt and the estimated cost of equity. It is a "weighted average," because it is based upon the Company's relative levels of debt and equity, or "capital structure." Companies in the competitive market often use their WACC as the discount rate to determine the value of capital projects, so it is

important that this figure be closely estimated. The basic WACC equation used in regulatory proceedings is presented as follows:

Equation 1:
Weighted Average Cost of Capital

$$WACC = \left(\frac{D}{D+E}\right) C_D + \left(\frac{E}{D+E}\right) C_E$$

where: $WACC$ = *weighted average cost of capital*
D = *book value of debt*
C_D = *embedded cost of debt capital*
E = *book value of equity*
C_E = *market-based cost of equity capital*

Thus, the three components of the weighted average cost of capital include the following:

1. Cost of Equity
2. Cost of Debt
3. Capital Structure

The term "cost of capital" is necessarily synonymous with the "weighted average cost of capital," and the terms are used interchangeably throughout this testimony.

Q. DESCRIBE THE RELATIONSHIP BETWEEN THE COST OF EQUITY, REQUIRED RETURN ON EQUITY ("ROE"), EARNED ROE, AND AWARDED ROE.

A. While "cost of equity," "required ROE," "earned ROE," and "awarded ROE" are interrelated factors and concepts, they are all technically different from each other. The financial models presented in this case were created as tools for estimating the "cost of equity," which is synonymous to the "required ROE" that investors expect based on the amount of risk inherent in the equity investment. In other words, the cost of equity from the company's perspective equals the required ROE from the investor's perspective.

The "earned ROE" is a historical return that is measured from a company's accounting statements, and it is used to measure how much shareholders earned for investing in a company. A company's earned ROE is not the same as the company's cost of equity. For example, an investor who invests in a risky company may *require* a return on investment of 10%. If the company used the same estimates as the investor, then the company will estimate that its *cost* of equity is also 10%. If the company performs poorly and the investor *earns* a return of only 7%, this does not mean that the investor required only 7%, or that the investor will not still require a 10% return the following period. Thus, the cost of equity is not the same as the earned ROE.

Finally, the "awarded" return on equity is unique to the regulatory environment; it is the return authorized by a regulatory commission pursuant to legal guidelines. As discussed later in this testimony, the awarded ROE should be based on the utility's *cost* of equity. The relationship between the terms and concepts discussed thus far could be summarized in the following sentence: If the awarded ROE reflects a utility's cost of equity, then it should allow the utility to achieve an earned ROE that is sufficient to satisfy the required return of its equity investors. Thus, the "required" or "expected" return from an investor's standpoint is not simply what the investor wishes he could get. Likewise, the expected return of a utility investor has nothing to do with what the investor "expects" the ROE awarded by a regulatory commission to be. Rather, the expected return/cost of equity is estimated through objective, mathematical financial modeling based on risk.

Q. DESCRIBE THE COMPANY'S POSITION REGARDING ITS COST OF EQUITY IN THIS CASE.

A. In this case, Mr. D'Ascendis proposes an awarded return on equity of 10.45% for the Company.[3] Mr. D'Ascendis relies on the Discounted Cash Flow ("DCF") Model, the Capital Asset Pricing Model ("CAPM"), and other models in making his recommendation.

Q. SUMMARIZE YOUR ANALYSES AND CONCLUSIONS REGARDING THE COMPANY'S COST OF EQUITY.

A. Analysis of an appropriate awarded ROE for a utility should begin with a reasonable estimation of the utility's cost of equity capital. In estimating the Company's cost of equity, I performed a cost of equity analysis on a proxy group of utility companies with relatively similar risk profiles. Based on this proxy group, I evaluated the results of the two most common financial models for calculating cost of equity in utility rate proceedings: the CAPM and DCF Model. Applying reasonable inputs and assumptions to these models indicates that the Company's estimated cost of equity is approximately 7.2%.[4]

Q. PLEASE SUMMARIZE YOUR RECOMMENDATION TO THE COMMISSION.

A. Pursuant to the legal and technical standards guiding this issue, the awarded ROE should be based on, or reflective of, the utility's cost of equity. As I explain in more detail below, the Company's estimated cost of equity is approximately 7.2%. However, these legal standards do not mandate the awarded ROE be set exactly equal to the cost of equity.

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[3] Direct Testimony of Dylan W. D'Ascendis, p. 5, line 7.

[4] Exhibit DJG-12.

Rather, in *Federal Power Commission v. Hope Natural Gas Co.*,[5] the U.S. Supreme Court ("Court" or "Supreme Court") found that, although the awarded return should be based on a utility's cost of capital, it also indicated that the "end result" should be just and reasonable. If the Commission were to award WGL a return equal to my estimated cost of equity of 7.2%, it would be accurate from a technical standpoint, and it would also significantly reduce the excess wealth transfer from ratepayers to shareholders that would otherwise occur if the Company's proposal were adopted. This is because when the awarded return unreasonably exceeds the cost of equity, it results in an excess wealth transfer from ratepayers to shareholders. I recommend, however, the Commission award an ROE to the Company's shareholders that is higher than the WGL's cost of equity in this case. Specifically, I recommend an awarded ROE of 9.0%.

The ratemaking concept of "gradualism," though usually applied from the customer's standpoint to minimize rate shock, could also be applied to shareholders.[6] An awarded return as low as 7.2% in any current rate proceeding would represent a substantial change from the "status quo," which as I prove later in this testimony, involves awarded ROEs that clearly exceed market-based cost of equity for utilities. However, while generally reducing awarded ROEs for utilities would move awarded returns closer to market-based costs and reduce part of the transfer of excess wealth from ratepayers to shareholders, I believe it is advisable to do so gradually. One of the primary reasons the

[5] *See Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944). Here, the Court states that it is not mandating the various permissible ways in which the rate of return may be determined, but instead indicates that the end result should be just and reasonable. This is sometimes called the "end result" doctrine.

[6] The Commission has applied the ratemaking principle of gradualism in other cases. See generally e.g., Order No. 87591, Case No. 9406, In re Application of Baltimore Gas and Electric Co., 2016 WL 3181205 (Md.P.S.C.).

Company's cost of equity is so low is because the Company is a very low-risk asset. In general, utility stocks are low-risk investments because movements in their stock prices are relatively involatile. If the Commission were to make a significant, sudden change in the awarded ROE anticipated by regulatory stakeholders, it could have the undesirable effect of notably increasing the Company's risk profile and would arguably be at odds with the *Hope* Court's "end result" doctrine. An awarded ROE of 9.0% represents a good balance between the Supreme Court's indications that awarded ROEs should be based on cost, while also recognizing that the end result must be reasonable under the circumstances. An awarded ROE of 9.0% also represents a gradual move toward the Company's market-based cost of equity, and it would be fair to the Company's shareholders because 9.0% is nearly 200 basis points above the Company's market-based cost of equity. Nonetheless, it is clear that the Company's proposed ROE of 10.45% is excessive and unreasonable, as further discussed below.

Q. HAVE YOU CONSIDERED YOUR PROPOSED ROE IN LIGHT OF THE EXTRAORDINARY ECONOMIC CIRCUMSTANCES CAUSED BY THE COVID-19 PANDEMIC?

A. Yes. First, I should be clear that I have not specifically altered the results of any of my cost of equity modeling in this case to account for the economic impact caused by the COVID-19 pandemic. My cost of equity analysis in this case was conducted using financial figures and metrics that have already been impacted by the pandemic, including recent stock prices and dividends, as well as Treasury bond yields and equity risk premium data. In that regard, my 7.2% cost of equity estimate for WGL has already incorporated the most updated economic impacts of the pandemic. In addition, I believe it would be

reasonable for the Commission to consider the extraordinary economic circumstances created by the pandemic when assessing a fair ROE for WGL. As discussed in my testimony, even if the Commission were to award WGL a 9.0% ROE as I have recommended, such awarded ROE would most definitely *exceed* any reasonable estimate for WGL's *cost* of equity. Given the economic hardships imposed by the pandemic, it is especially imperative for the Commission to minimize any unnecessary and excess wealth transfer from customers to shareholders, while also employing the concept of gradualism in adjusting the awarded ROE. To that end, I believe the 9.0% ROE I have proposed is fair and reasonable.

B. Response to Mr. D'Ascendis's Testimony

Q. PLEASE PROVIDE AN OVERVIEW OF THE PROBLEMS YOU HAVE IDENTIFIED WITH MR. D'ASCENDIS'S TESTIMONY REGARDING COST OF EQUITY AND THE AWARDED ROE.

A. Mr. D'Ascendis proposes a return on equity of 10.45%.[7] Mr. D'Ascendis's recommendations are based on the CAPM, DCF Model, and other models. However, several of his key assumptions and inputs to these models violate fundamental, widely-accepted tenants in finance and valuation, while other assumptions and inputs are simply unrealistic. The key areas of concern are summarized as follows:

1. Terminal Growth Rate

In his DCF Model, Mr. D'Ascendis's average long-term growth rate applied to the Company exceeds the long-term growth rate for the entire U.S. economy. In fact, Mr.

[7] Direct Testimony of Dylan W. D'Ascendis, p. 3.

D'Ascendis's projected growth rates for his proxy companies are as high as 10.2%,[8] which is more than two times the projected U.S. GDP growth. It is a fundamental concept in finance that, in the long run, a company cannot fundamentally grow at a faster rate than the aggregate economy in which it operates; this is especially true for a regulated utility with a defined service territory. Thus, the results of Mr. D'Ascendis's DCF Model are upwardly biased and are not reflective of current market conditions.

2. Equity Risk Premium

Mr. D'Ascendis's estimate for the Equity Risk Premium ("ERP"), the single most important factor in estimating the cost of equity and a key input to the CAPM, is 12.44%.[9] The ERP is essentially the return required by investors in the stock market beyond the risk-free rate. Mr. D'Ascendis's ERP estimate is significantly higher than the estimates reported by thousands of experts across the country.[10] Thus, Mr. D'Ascendis's CAPM cost of equity estimate is overstated, unsupported, and unreasonable.

3. Non-Price Regulated Model

In addition to conducting the CAPM and DCF model on the proxy group of utility companies, Mr. D'Ascendis also used a non-price regulated proxy group.[11] This approach is flawed because the risk inherent in the non-regulated proxy group is higher than that of the utility proxy group. Moreover, this model suffers from the same overestimated equity

[8] Exhibit DWD-2.

[9] Exhibit DWD-4.

[10] Exhibit DJG-10.

[11] *See* Direct Testimony of Dylan W. D'Ascendis, pp. 30-34.

risk premium and risk-free rate as Mr. D'Ascendis's CAPM for the proxy group of regulated utilities.

4. Using Projected Bond Yields

As part of Mr. D'Ascendis's CAPM analysis, he incorporated projected yields on 30-year U.S. Treasury bonds of 2.08%.[12] These projected yields are higher than the current yields, which are about 1.53%.[13] However, in a recent press release, the Federal Reserve "the Fed") decided to keep the target range for the federal funds rate at 0% - 0.25%.[14] Projections from individual members also indicated that rates could stay anchored near zero through 2023.[15] Thus, despite Mr. D'Ascendis's projections, there is no indication from the Fed that Treasury bond rates are projected to rise in the foreseeable future.

Q. WOULD THE RESULT OF ANY OF MR. D'ASCENDIS' COST OF EQUITY MODELS BE REASONABLE FOR WGL'S AWARDED ROE IN THIS CASE?

A. Yes. Mr. D'Ascendis DCF Model produced a median result of 9.25%.[16] Although I do not agree with some of the inputs to his DCF Model, nor do I agree that it produces a reasonable estimate for WGL's cost of equity, a 9.0% ROE would nonetheless be a reasonable result for WGL's awarded return on equity in this case. A awarded ROE of 9.0% would also represent a gradual move towards market cost of equity (from WGL's current authorized ROE of 9.7%); however, I believe that my recommended ROE of 9.0%

[12] Direct Testimony of Dylan W. D'Ascendis, p. 28.

[13] Exhibit DJG-7.

[14] Federal Reserve press release, November 5, 2020.

[15] Jeff Cox, "Fed holds rates steady near zero and indicates it will stay there for years," CNBC (Sep. 16, 2020)

[16] Exhibit DWD-2, Sch. 3.

is more reasonable in that it still promotes the concept of gradualism, but it also represents a more meaningful move in the right direction, given the strong likelihood that WGL's market-based cost of equity is less than 7.5%.

III. LEGAL STANDARDS AND THE AWARDED RETURN

Q. DISCUSS THE LEGAL STANDARDS GOVERNING THE AWARDED RATE OF RETURN ON CAPITAL INVESTMENTS FOR REGULATED UTILITIES.

A. In *Wilcox v. Consolidated Gas Co. of New York*,[17] the U.S. Supreme Court first addressed the meaning of a fair rate of return for public utilities. The Court found that "the amount of risk in the business is a most important factor" in determining the appropriate allowed rate of return.[18] Later in two landmark cases, the Court set forth the standards by which public utilities are allowed to earn a return on capital investments. In *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*,[19] the Court held:

> 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 . . . but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably 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 the money necessary for the proper discharge of its public duties.

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[17] *Wilcox v. Consolidated Gas Co. of New York*, 212 U.S. 19 (1909).

[18] *Id*. at 48.

[19] *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679, 692-93 (1923).

In *Federal Power Commission v. Hope Natural Gas Company*,[20] the Court expanded on the guidelines set forth in *Bluefield* and 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 to attract capital.

(Emphasis added). The cost of capital models I have employed in this case are in accordance with the foregoing legal standards.

Q. IS IT IMPORTANT THAT THE AWARDED RATE OF RETURN BE BASED ON THE COMPANY'S ACTUAL COST OF CAPITAL?

A. Yes, it is. The *Hope* Court makes it clear that the allowed return should be based on the actual cost of capital. Under the rate base rate of return model, a utility should be allowed to recover all its reasonable expenses, its capital investments through depreciation, and a return on its capital investments sufficient to satisfy the required return of its investors. The "required return" from the investors' perspective is synonymous with the "cost of capital" from the utility's perspective. Scholars agree that the allowed rate of return should be based on the actual cost of capital:

> Since by definition the cost of capital of a regulated firm represents precisely the expected return that investors could anticipate from other investments while bearing no more or less risk, and since investors will not provide capital unless the investment is expected to yield its opportunity cost of capital, the correspondence of the definition of the cost of capital

[20] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944) (emphasis added).

with the court's definition of legally required earnings appears clear.[21]

The models I have employed in this case closely estimate WGL's true cost of equity. If the Commission sets the awarded return based on my lower, and more reasonable, rate of return, it will comply with the U.S. Supreme Court's standards, allow the Company to maintain its financial integrity, and satisfy the claims of its investors. On the other hand, if the Commission sets the allowed rate of return significantly *higher* than the true cost of capital, it arguably results in an inappropriate transfer of wealth from ratepayers to shareholders. As Dr. Morin notes:

> [I]f the allowed rate of return is greater than the cost of capital, capital investments are undertaken and investors' opportunity costs are more than achieved. Any excess earnings over and above those required to service debt capital accrue to the equity holders, and the stock price increases. In this case, the wealth transfer occurs from ratepayers to shareholders.[22]

Thus, it is important to understand that the *awarded* return and the *cost* of capital are different but related concepts. The two concepts are related in that the legal and technical standards encompassing this issue require that the awarded return reflect the true cost of capital. On the other hand, the two concepts are different in that the legal standards do not mandate that awarded returns exactly match the cost of capital. Awarded returns are set through the regulatory process and may be influenced by a number of factors other than objective market drivers. The cost of capital, on the other hand, should be evaluated objectively and be closely tied to economic realities. In other words, the cost of capital is driven by stock prices, dividends, growth rates, and — most importantly — it is driven by

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[21] A. Lawrence Kolbe, James A. Read, Jr. & George R. Hall, *The Cost of Capital: Estimating the Rate of Return for Public Utilities* 21 (The MIT Press 1984).

[22] Roger A. Morin, *New Regulatory Finance* 23-24 (Public Utilities Reports, Inc. 2006) (1994).

risk. The cost of capital can be estimated by financial models used by firms, investors, and academics around the world for decades. The problem is, with respect to regulated utilities, there has been a trend in which awarded returns fail to closely track with actual market-based cost of capital as further discussed below. To the extent this occurs, the results are detrimental to ratepayers and the State's economy.

Q. DESCRIBE THE ECONOMIC IMPACT THAT OCCURS WHEN THE AWARDED RETURN STRAYS TOO FAR FROM THE U.S. SUPREME COURT'S COST OF EQUITY STANDARD.

A. As discussed further in the sections below, Mr. D'Ascendis's recommended awarded ROE is much higher than WGL's cost of capital based on objective market data. When the awarded ROE is set far above the *cost* of equity, it runs the risk of violating the U.S. Supreme Court's standards that the awarded return should be *based on the cost of capital*. If the Commission were to adopt the Company's position in this case, it would be permitting an excess transfer of wealth from WGL's customers to Company shareholders. Moreover, establishing an awarded return that far exceeds the true cost of capital effectively prevents the awarded returns from changing along with economic conditions. This is especially true given the fact that regulators tend to be influenced by the awarded returns in other jurisdictions, regardless of the various unknown factors influencing those awarded returns. This is yet another reason why it is crucial for regulators to focus on the target utility's actual *cost* of equity, rather than awarded returns from other jurisdictions. Awarded returns may be influenced by settlements and other political factors not based on true market conditions. In contrast, the true cost of equity as estimated through objective models is not influenced by these factors but is instead driven by market-based factors.

Regulators who rely too heavily on the awarded returns from other jurisdictions and are reluctant to decrease ROEs when a correction is warranted can create a cycle over time that bears little relation to the market-based cost of equity. In fact, this is exactly what we have observed since 1990 across the country in most jurisdictions.

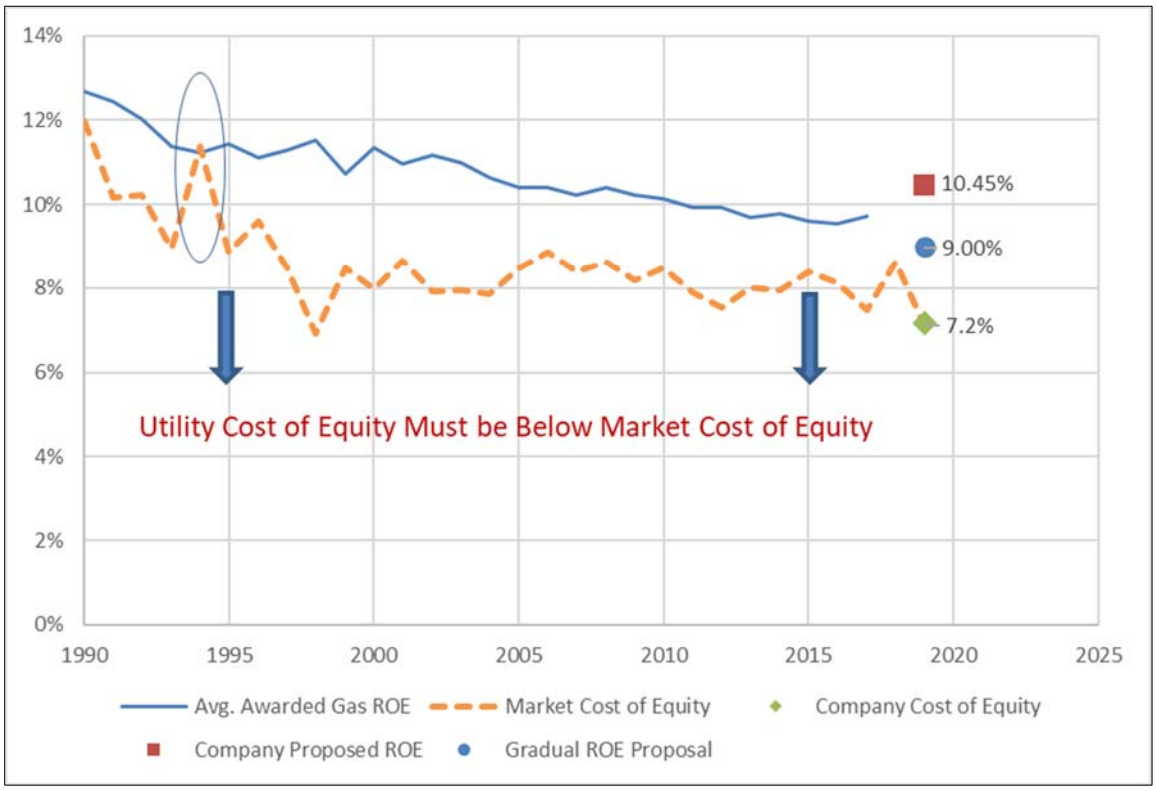
Q. ILLUSTRATE AND COMPARE THE RELATIONSHIP BETWEEN AWARDED UTILITY RETURNS AND MARKET COST OF EQUITY SINCE 1990.

A. As shown in Figure 2 below, awarded returns for gas utilities have been above the average required market return since 1990.[23] Because utility stocks are consistently far less risky than the average stock in the marketplace, the cost of equity for utility companies is *less* than the market cost of equity. This is a fact, not an opinion. The graph below shows two trend lines. The top (solid blue) line is the average annual awarded returns since 1990 for U.S. regulated utilities. The bottom (orange dotted) line is the required market return over the same period. As discussed in more detail later in my testimony, the required market return is essentially the return that investors would require if they invested in the entire market. In other words, the required market return is essentially the cost of equity of the entire market. Since it is undisputed (even by utility witnesses) that utility stocks are less risky than the average stock in the market, then the utilities' actual cost of equity must be less than the market cost of equity.[24] Thus, awarded returns should generally be *below* the market cost of equity, since awarded returns are supposed to be based on true cost of equity.

[23] *See* Exhibit DJG-14.

[24] This fact can be objectively measured through a term called "beta," as discussed later in the testimony. Utility betas are less than one, which means utility stocks are less risky than the "average" stock in the market.

Figure 2:
Awarded ROEs vs. Market Cost of Equity



Because utility stocks are less risky than the average stock in the market, utility cost of equity is *below* market cost of equity (the orange dotted line in this graph). However, as shown in this graph, awarded ROEs have been consistently *above* the market cost of equity for many years. As shown in the graph, since 1990 there was only one year in which the average awarded ROE was below the market cost of equity — 1994. In other words, 1994 was the year that regulators awarded ROEs that were the closest to utilities' market-based cost of equity. In my opinion, when awarded ROEs for utilities are below the market cost of equity, they more closely conform to the standards set forth by *Hope* and *Bluefield* and minimize the excess wealth transfer from ratepayers to shareholders.

Q. HAVE OTHER ANALYSTS COMMENTED ON THIS NATIONAL PHENOMENON OF AWARDED ROES EXCEEDING THE MARKET-BASED COST EQUITY FOR UTILITIES?

A. Yes. In his article published in Public Utilities Fortnightly in 2016, Steve Huntoon observed that even though utility stocks are less risky than the stocks of competitive industries, utility stocks have nonetheless outperformed the broader market.[25] Specifically, Huntoon notes the following three points which lead to a problematic conclusion:

> 1. Jack Bogle, the founder of Vanguard Group and a Wall Street legend, provides rigorous analysis that the long-term total return for the broader market will be around 7 percent going forward. Another Wall Street legend, Professor Burton Malkiel, corroborates that 7 percent in the latest edition of his seminal work, *A Random Walk Down Wall Street*.
>
> 2. Institutions like pension funds are validating [the first point] by piling on risky investments to try and get to a 7.5 percent total return, as reported by the Wall Street Journal.
>
> 3. Utilities are being granted returns on equity around 10 percent.[26]

In a follow-up article analyzing and agreeing with Mr. Huntoon's findings, Leonard Hyman and William Tilles found that utility equity investors expect about a 7.5% annual return.[27]

Other scholars have also observed that awarded ROEs have not appropriately tracked with declining interest rates over the years, and that excessive awarded ROEs have negative economic impacts. In a 2017 white paper, Charles S. Griffey stated:

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[25] Steve Huntoon, "Nice Work If you can Get It," Public Utilities Fortnightly (Aug. 2016).

[26] *Id*.

[27] Leonard Hyman & William Tilles, "Don't Cry for Utility Shareholders, America," Public Utilities Fortnightly (October 2016).

> The "risk premium" being granted to utility shareholders is now higher than it has ever been over the last 35 years. Excessive utility ROEs are detrimental to utility customers and the economy as a whole. From a societal standpoint, granting ROEs that are higher than necessary to attract investment creates an inefficient allocation of capital, diverting available funds away from more efficient investments. From the utility customer perspective, if a utility's awarded and/or achieved ROE is higher than necessary to attract capital, customers pay higher rates without receiving any corresponding benefit.[28]

It is interesting that both Mr. Huntoon and Mr. Griffey use the word "sticky" in their articles to describe the fact that awarded ROEs have declined at a much slower rate than interest rates and other economic factors resulting in a decline in capital costs and expected returns on the market. It is not hard to see why this phenomenon of sticky ROEs has occurred. Because awarded ROEs are often based primarily on a comparison with other awarded ROEs around the country, the average awarded returns effectively fail to adapt to true market conditions, and regulators seem reluctant to deviate from the average. Once utilities and regulatory commissions become accustomed to awarding rates of return higher than market conditions actually require, this trend becomes difficult to reverse. Nevertheless, the fact is that utility stocks are *less risky* than the average stock in the market, and thus, awarded ROEs should be less than the expected return on the market. However, that is rarely the case. "Sooner or later, *regulators may see the gap between allowed returns and cost of capital*."[29]

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[28] Charles S. Griffey, "When 'What Goes Up' Does Not Come Down: Recent Trends in Utility Returns," White Paper (February 2017).

[29] Leonard Hyman & William Tilles, "Don't Cry for Utility Shareholders, America," Public Utilities Fortnightly (October 2016) (emphasis added).

Q. SUMMARIZE THE LEGAL STANDARDS GOVERNING THE AWARDED ROE ISSUE.

A. The Commission should strive to move the awarded return to a level more closely aligned with the Company's actual, market-derived cost of capital while keeping in mind the following legal principles:

1. Risk is the most important factor when determining the awarded return. The awarded return should be commensurate with those on investments of corresponding risk.

The legal standards articulated in *Hope* and *Bluefield* demonstrate that the Court understands one of the most basic, fundamental concepts in financial theory: the more (less) risk an investor assumes, the more (less) return the investor requires. Since utility stocks are very low risk, the return required by equity investors should be relatively low. I have used financial models in this case to closely estimate WGL's cost of equity, and these financial models account for risk. The public utility industry is one of the least risky industries in the entire country. The cost of equity models confirm this fact in that they produce relatively low cost of equity results. In turn, the awarded ROE in this case should reflect the fact that WGL is a low-risk firm.

2. The awarded return should be sufficient to assure financial soundness under efficient management.

Because awarded returns in the regulatory environment have not closely tracked market-based trends and commensurate risk, utility companies have been able to remain more than financially sound, perhaps despite management inefficiencies. In fact, the transfer of wealth from ratepayers to shareholders has been so far removed from actual cost-based drivers that even under relatively inefficient management a utility could remain financially sound. Therefore, regulatory commissions should strive to set the awarded return for a

regulated utility at a level based on accurate market conditions to promote prudent and efficient management and minimize economic waste.

IV. GENERAL CONCEPTS AND METHODOLOGY

Q. DISCUSS YOUR APPROACH TO ESTIMATING THE COST OF EQUITY IN THIS CASE.

A. While a competitive firm must estimate its own cost of capital to assess the profitability of competing capital projects, regulators determine a utility's cost of capital to establish a fair rate of return. The legal standards set forth above do not include specific guidelines regarding the models that must be used to estimate the cost of equity. Over the years, however, regulatory commissions have consistently relied on several models. The models I have employed in this case have been the two most widely used and accepted in regulatory proceedings for many years. These models are the Discounted Cash Flow Model ("DCF Model") and the Capital Asset Pricing Model ("CAPM"). The specific inputs and calculations for these models are described in more detail below.

Q. PLEASE EXPLAIN WHY MULTIPLE MODELS ARE USED TO ESTIMATE THE COST OF EQUITY.

A. The models used to estimate the cost of equity attempt to measure the return on equity required by investors by estimating several different inputs. It is preferable to use multiple models because the results of any one model may contain a degree of imprecision, especially depending on the reliability of the inputs used at the time of conducting the model. By using multiple models, the analyst can compare the results of the models and look for outlying results and inconsistencies. Likewise, if multiple models produce a similar result, it may indicate a narrower range for the cost of equity estimate.

Q. PLEASE DISCUSS THE BENEFITS OF CHOOSING A PROXY GROUP OF COMPANIES IN CONDUCTING COST OF CAPITAL ANALYSES.

A. The cost of equity models in this case can be used to estimate the cost of capital of any individual, publicly-traded company. There are advantages, however, to conducting cost of capital analysis on a "proxy group" of companies that are comparable to the target company. First, it is better to assess the financial soundness of a utility by comparing it to a group of other financially sound utilities. Second, using a proxy group provides more reliability and confidence in the overall results because there is a larger sample size. Finally, the use of a proxy group is often a pure necessity when the target company is a subsidiary that is not publicly traded. This is because the financial models used to estimate the cost of equity require information from publicly-traded firms, such as stock prices and dividends.

Q. DESCRIBE THE PROXY GROUP YOU SELECTED IN THIS CASE.

A. In this case, I chose to use the same proxy group used by Mr. D'Ascendis. There could be reasonable arguments made for the inclusion or exclusion of a particular company in a proxy group; however, the cost of equity results are influenced far more by the underlying assumptions and inputs to the various financial models than the composition of the proxy groups.[30] By using the same proxy group, we can remove a relatively insignificant variable from the equation and focus on the primary factors driving the Company's cost of equity estimate in this case.

[30] *See* Exhibit DJG-2.

V. RISK AND RETURN CONCEPTS

Q. DISCUSS THE GENERAL RELATIONSHIP BETWEEN RISK AND RETURN.

A. Risk is among the most important factors for the Commission to consider when determining the allowed return. Thus, it is necessary to understand the relationship between risk and return. There is a direct relationship between risk and return: the more (or less) risk an investor assumes, the larger (or smaller) return the investor will demand. There are two primary types of risk: firm-specific risk and market risk. Firm-specific risk affects individual companies, while market risk affects all companies in the market to varying degrees.

Q. DISCUSS THE DIFFERENCES BETWEEN FIRM-SPECIFIC RISK AND MARKET RISK.

A. Firm-specific risk affects individual companies, rather than the entire market. For example, a competitive firm might overestimate customer demand for a new product, resulting in reduced sales revenue. This is an example of a firm-specific risk called "project risk."[31] There are several other types of firm-specific risks, including: (1) "financial risk" — the risk that equity investors of leveraged firms face as residual claimants on earnings; (2) "default risk" — the risk that a firm will default on its debt securities; and (3) "business risk" — which encompasses all other operating and managerial factors that may result in investors realizing less than their expected return in that particular company. While firm-specific risk affects individual companies, market risk affects all companies in the market

[31] Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 62-63 (3rd ed., John Wiley & Sons, Inc. 2012).

to varying degrees. Examples of market risk include interest rate risk, inflation risk, and the risk of major socio-economic events. When there are changes in these risk factors, they affect all firms in the market to some extent.[32]

Analysis of the U.S. market in 2001 provides a good example for contrasting firm-specific risk and market risk. During that year, Enron Corp.'s stock fell from $80 per share to less than $1 per share, and the company filed bankruptcy at the end of the year. If an investor's portfolio had held only Enron stock at the beginning of 2001, this irrational investor would have lost his or her entire investment by the end of the year due to assuming the full exposure of Enron's firm-specific risk (in that case, imprudent management). On the other hand, a rational, diversified investor who invested the same amount of capital in a portfolio holding every stock in the S&P 500 would have had a much different result that year. The rational investor would have been relatively unaffected by the fall of Enron because his portfolio included about 499 other stocks. Each of those stocks, however, would have been affected by various *market* risk factors that occurred that year, including the terrorist attacks on September 11th, which affected all stocks in the market. Thus, the rational investor would have incurred a relatively minor loss due to market risk factors, while the irrational investor would have lost everything due to firm-specific risk factors.

[32] *See* Zvi Bodie, Alex Kane & Alan J. Marcus, *Essentials of Investments* 149 (9th ed., McGraw-Hill/Irwin 2013).

Q. CAN INVESTORS EASILY MINIMIZE FIRM-SPECIFIC RISK?

A. Yes. A fundamental concept in finance is that firm-specific risk can be eliminated through diversification.[33] If someone irrationally invested all their funds in one firm, they would be exposed to all the firm-specific risk *and* the market risk inherent in that single firm. Rational investors, however, are risk-averse and seek to eliminate risk they can control. Investors can essentially eliminate firm-specific risk by adding more stocks to their portfolio through a process called "diversification." There are two reasons why diversification eliminates firm-specific risk. First, each stock in a diversified portfolio represents a much smaller percentage of the overall portfolio than it would in a portfolio of just one or a few stocks. Thus, any firm-specific action that changes the stock price of one stock in the diversified portfolio will have only a small impact on the entire portfolio.[34]

The second reason why diversification eliminates firm-specific risk is that the effects of firm-specific actions on stock prices can be either positive or negative for each stock. Thus, in large diversified portfolios, the net effect of these positive and negative firm-specific risk factors will be essentially zero and will not affect the value of the overall portfolio.[35] Firm-specific risk is also called "diversifiable risk" because it can be easily eliminated through diversification.

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[33] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 179-80 (3rd ed., South Western Cengage Learning 2010).

[34] *See* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 64 (3rd ed., John Wiley & Sons, Inc. 2012).

[35] *Id.*

Q. IS IT WELL-KNOWN AND ACCEPTED THAT, BECAUSE FIRM-SPECIFIC RISK CAN BE EASILY ELIMINATED THROUGH DIVERSIFICATION, THE MARKET DOES NOT REWARD SUCH RISK THROUGH HIGHER RETURNS?

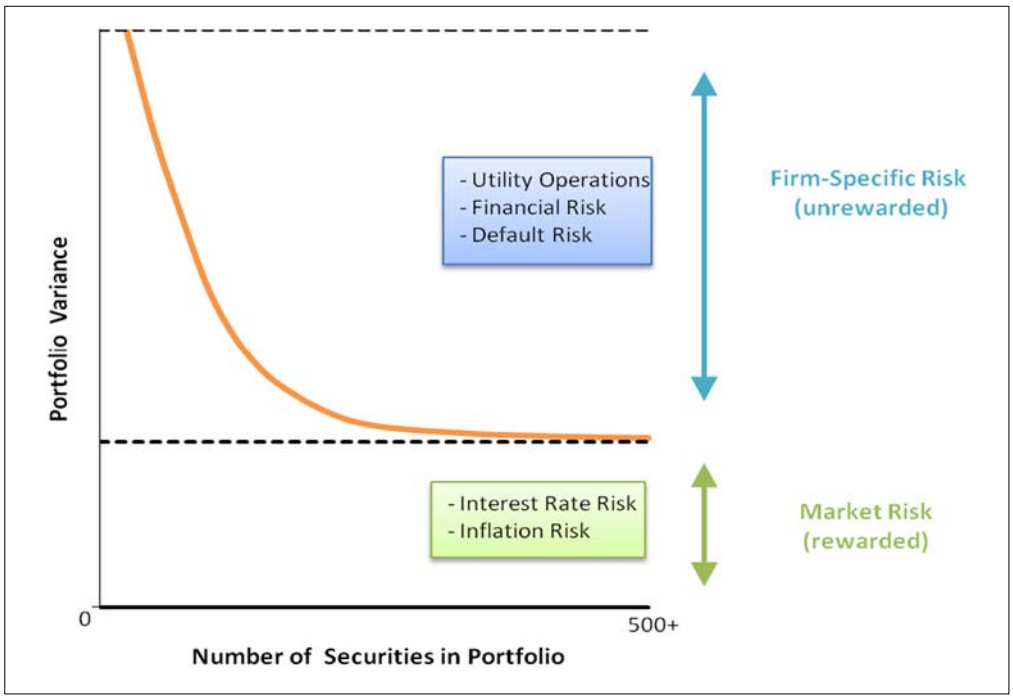
A. Yes. Because investors eliminate firm-specific risk through diversification, they know they cannot expect a higher return for assuming the firm-specific risk in any one company. Thus, the risks associated with an individual firm's operations are not rewarded by the market. In fact, firm-specific risk is also called "unrewarded" risk for this reason. Market risk, on the other hand, cannot be eliminated through diversification. Because market risk cannot be eliminated through diversification, investors expect a return for assuming this type of risk. Market risk is also called "systematic risk." Scholars recognize the fact that market risk, or "systematic risk," is the only type of risk for which investors expect a return for bearing:

> If investors can cheaply eliminate some risks through diversification, then we should not expect a security to earn higher returns for risks that can be eliminated through diversification. Investors can expect compensation *only* for bearing systematic risk (i.e., risk that cannot be diversified away).[36]

These important concepts are illustrated in figure 3 below. Some form of this figure is found in many financial textbooks.

[36] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 180 (3rd ed., South Western Cengage Learning 2010).

Figure 3:
Effects of Portfolio Diversification



This figure shows that as stocks are added to a portfolio, the amount of firm-specific risk is reduced until it is essentially eliminated. No matter how many stocks are added, however, there remains a certain level of fixed market risk. The level of market risk will vary from firm to firm. Market risk is the only type of risk that is rewarded by the market and is thus the primary type of risk the Commission should consider when determining the allowed return in this case.

Q. DESCRIBE HOW MARKET RISK IS MEASURED.

A. Investors who want to eliminate firm-specific risk must hold a fully diversified portfolio. To determine the amount of risk that a single stock adds to the overall market portfolio, investors measure the covariance between a single stock and the market portfolio. The

result of this calculation is called "beta."[37] Beta represents the sensitivity of a given security to the market as a whole. The market portfolio of all stocks has a beta equal to one. Stocks with betas greater than one are relatively more sensitive to market risk than the average stock. For example, if the market increases (decreases) by 1.0%, a stock with a beta of 1.5 will, on average, increase (decrease) by 1.5%. In contrast, stocks with betas of less than one are less sensitive to market risk, such that if the market increases (decreases) by 1.0%, a stock with a beta of 0.5 will, on average, only increase (decrease) by 0.5%. Thus, stocks with low betas are relatively insulated from market conditions. The beta term is used in the CAPM to estimate the cost of equity, which is discussed in more detail later.[38]

Q. ARE PUBLIC UTILITIES CHARACTERIZED AS DEFENSIVE FIRMS THAT HAVE LOW BETAS, LOW MARKET RISK, AND ARE RELATIVELY INSULATED FROM OVERALL MARKET CONDITIONS?

A. Yes. Although market risk affects all firms in the market, it affects different firms to varying degrees. Firms with high betas are affected more than firms with low betas, which is why firms with high betas are riskier. Stocks with betas greater than one are generally known as "cyclical stocks." Firms in cyclical industries are sensitive to recurring patterns of recession and recovery known as the "business cycle."[39] Thus, cyclical firms are exposed to a greater level of market risk. Securities with betas less than one, on the other hand, are known as "defensive stocks." Companies in defensive industries, such as public

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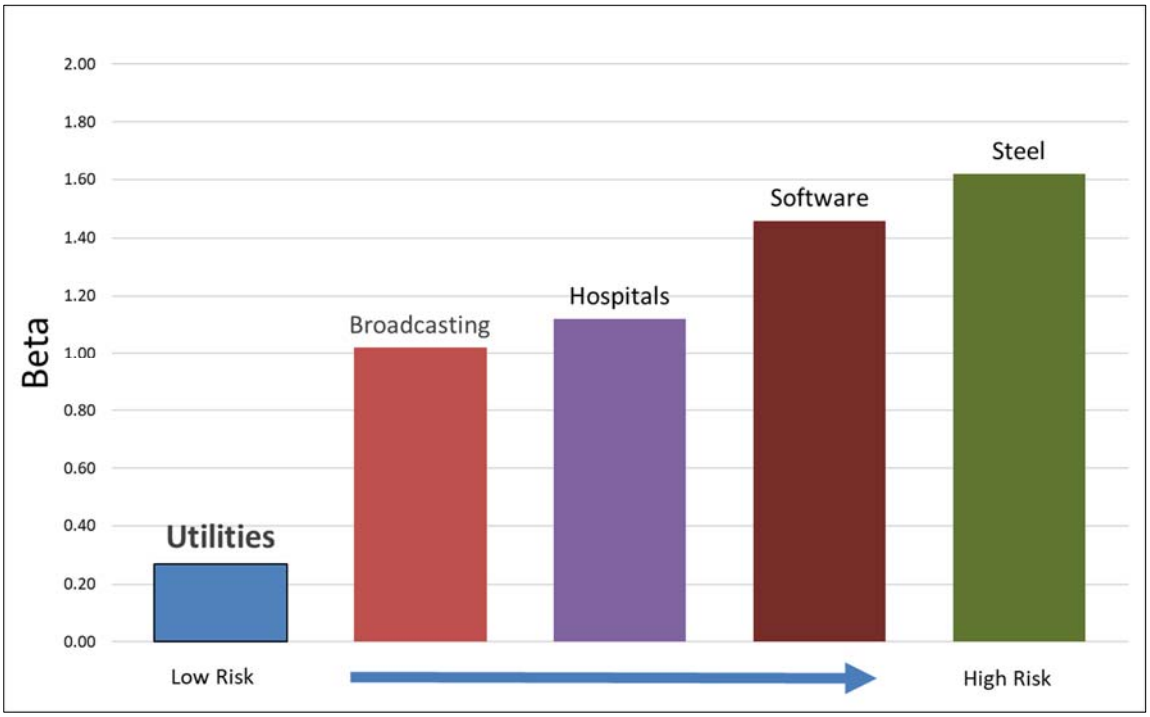
[37] *Id*. at 180-81.

[38] Though it will be discussed in more detail later, Exhibit DJG-8 shows that the average beta of the proxy group was less than 1.0. This confirms the well-known concept that utilities are relatively low-risk firms.

[39] *See* Zvi Bodie, Alex Kane & Alan J. Marcus, *Essentials of Investments* 382 (9th ed., McGraw-Hill/Irwin 2013).

utility companies, "will have low betas and performance that is comparatively unaffected by overall market conditions."[40] In fact, financial textbooks often use utility companies as prime examples of low-risk, defensive firms. The figure below compares the betas of several industries and illustrates that the utility industry is one of the least risky industries in the U.S. market.[41]

Figure 4:
Beta by Industry



[40] *Id*. at 383.

[41] *See* Betas by Sector (US) available at http://pages.stern.nyu.edu/~adamodar/ (2018). (After clicking the link, click "Data" then "Current Data" then "Risk / Discount Rate" from the drop down menu, then "Total Beta by Industry Sector"). The exact beta calculations are not as important as illustrating the well-known fact that utilities are very low-risk companies. The fact that the utility industry is one of the lowest risk industries in the country should not change from year to year.

The fact that utilities are defensive firms that are exposed to little market risk is beneficial to society. When the business cycle enters a recession, consumers can be assured that their utility companies will be able to maintain normal business operations and provide safe and reliable service under prudent management. Likewise, utility investors can be confident that utility stock prices will not widely fluctuate. So, while it is recognized and accepted that utilities are defensive firms that experience little market risk and are relatively insulated from market conditions, this fact should also be appropriately reflected in the Company's awarded return.

VI. DISCOUNTED CASH FLOW ANALYSIS

Q. DESCRIBE THE DISCOUNTED CASH FLOW ("DCF") MODEL.

A. The Discounted Cash Flow ("DCF") Model is based on a fundamental financial model called the "dividend discount model," which maintains that the value of a security is equal to the present value of the future cash flows it generates. Cash flows from common stock are paid to investors in the form of dividends. There are several variations of the DCF Model. These versions, along with other formulas and theories related to the DCF Model are discussed in more detail in Appendix A. For this case, I chose to use the Quarterly Approximation DCF Model, in the interest of reasonableness.

Q. DESCRIBE THE INPUTS TO THE DCF MODEL.

A. There are three primary inputs in the DCF Model: (1) stock price; (2) dividend; and (3) the long-term growth rate. The stock prices and dividends are known inputs based on recorded data, while the growth rate projection must be estimated. I discuss each of these inputs separately below.

C. Stock Price

Q. HOW DID YOU DETERMINE THE STOCK PRICE INPUT OF THE DCF MODEL?

A. For the stock price (P_0), I used a 30-day average of stock prices for each company in the proxy group.[42] Analysts sometimes rely on average stock prices for longer periods (e.g., 60, 90, or 180 days). According to the efficient market hypothesis, however, markets reflect all relevant information available at a particular time, and prices adjust instantaneously to the arrival of new information.[43] Past stock prices, in essence, reflect outdated information. The DCF Model used in utility rate cases is a derivation of the dividend discount model, which is used to determine the current value of an asset. Thus, according to the dividend discount model and the efficient market hypothesis, the value for the "P_0" term in the DCF Model should technically be the current stock price, rather than an average.

Q. WHY DID YOU USE A 30-DAY AVERAGE FOR THE CURRENT STOCK PRICE INPUT?

A. Using a short-term average of stock prices for the current stock price input adheres to market efficiency principles while avoiding any irregularities that may arise from using a single current stock price. In the context of a utility rate proceeding, there is a significant length of time from when an application is filed, and testimony is due. Choosing a current

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[42] Exhibit DJG-3.

[43] *See* Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, Vol. 25, No. 2 The Journal of Finance 383 (1970); *see also* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 357 (3rd ed., South Western Cengage Learning 2010). The efficient market hypothesis was formally presented by Eugene Fama in 1970 and is a cornerstone of modern financial theory and practice.

stock price for one particular day could raise a separate issue concerning which day was chosen to be used in the analysis. In addition, a single stock price on a particular day may be unusually high or low. It is arguably ill-advised to use a single stock price in a model that is ultimately used to set rates for several years, especially if a stock is experiencing some volatility. Thus, it is preferable to use a short-term average of stock prices, which represents a good balance between adhering to well-established principles of market efficiency while avoiding any unnecessary contentions that may arise from using a single stock price on a given day. The stock prices I used in my DCF analysis are based on 30-day averages of adjusted closing stock prices for each company in the proxy group.[44]

D. Dividend

Q. DESCRIBE HOW YOU DETERMINED THE DIVIDEND INPUT OF THE DCF MODEL.

A. The dividend term in the Quarterly Approximation DCF Model is the current quarterly dividend per share. I obtained the most recent quarterly dividend paid for each proxy company.[45] The Quarterly Approximation DCF Model assumes that the company increases its dividend payments each quarter. Thus, the model assumes that each quarterly dividend is greater than the previous one by $(1 + g)^{0.25}$. This expression could be described as the dividend quarterly growth rate, where the term "g" is the growth rate and the exponential term "0.25" signifies one quarter of the year.

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[44] Exhibit DJG-3. Adjusted closing prices, rather than actual closing prices, are ideal for analyzing historical stock prices. The adjusted price provides an accurate representation of the firm's equity value beyond the mere market price because it accounts for stock splits and dividends.

[45] Exhibit DJG-4. Nasdaq Dividend History, available at http://www.nasdaq.com/quotes/dividend-history.aspx.

Q. DOES THE QUARTERLY APPROXIMATION DCF MODEL RESULT IN THE HIGHEST COST OF EQUITY IN THIS CASE RELATIVE TO OTHER DCF MODELS, ALL ELSE HELD CONSTANT?

A. Yes. The DCF Model I employed in this case results in a higher DCF cost of equity estimate than the annual or semi-annual DCF Models due to the quarterly compounding of dividends inherent in the model. In essence, the Quarterly Compounding DCF Model I used results in the *highest* cost of equity estimate, all else held constant.

Q. ARE THE STOCK PRICE AND DIVIDEND INPUTS FOR EACH PROXY COMPANY A SIGNIFICANT ISSUE IN THIS CASE?

A. No. Although my stock price and dividend inputs are more recent than those used by Mr. D'Ascendis, there is not a statistically significant difference between them because utility stock prices and dividends are generally quite stable. This is another reason that cost of capital models such as the CAPM and the DCF Model are well-suited to be conducted on utilities. The differences between my DCF Model and Mr. D'Ascendis's DCF Model are primarily driven by differences in our growth rate estimates, which are further discussed below.

E. Growth Rate

Q. SUMMARIZE THE GROWTH RATE INPUT IN THE DCF MODEL.

A. The most critical input in the DCF Model is the growth rate. Unlike the stock price and dividend inputs, the growth rate input must be estimated. As a result, the growth rate is often the most contentious DCF input in utility rate cases. The DCF used in utility rate cases is essentially based on the constant growth valuation model. Under this model, a stock is valued by the present value of its future cash flows in the form of dividends. Before

future cash flows are discounted by the cost of equity, however, they must be "grown" into the future by a long-term growth rate. As stated above, one of the inherent assumptions of this model is that these cash flows in the form of dividends grow at a constant rate forever. Thus, the growth rate term in the constant growth DCF model is often called the "constant," "stable," or "terminal" growth rate. For young, high-growth firms, estimating the growth rate to be used in the model can be especially difficult, and may require the use of multi-stage growth models. For mature, low-growth firms such as utilities, however, estimating the terminal growth rate is less complex. The growth term of the DCF Model is one of the most important, yet apparently most misunderstood aspects of cost of equity estimations in utility regulatory proceedings. Therefore, I have devoted a more detailed explanation of this issue in the following sections, which are organized as follows:

(1) The Various Determinants of Growth

(2) Reasonable Estimates for Long-Term Growth

(3) Quantitative vs. Qualitative Determinants of Utility Growth: Circular References, "Flatworm" Growth, and the Problem with Analysts' Growth Rates

(4) Growth Rate Recommendation

1. <u>The Various Determinants of Growth</u>

Q. DESCRIBE THE VARIOUS DETERMINANTS OF GROWTH.

A. Although the DCF Model directly considers the growth of dividends, there are a variety of growth determinants that should be considered when estimating growth rates. It should be noted that these various growth determinants are used primarily to determine the short-term growth rates in multi-stage DCF models. For utility companies, it is necessary to focus primarily on long-term growth rates, which are discussed in the following section.

1. Historical Growth

Looking at a firm's actual historical experience may theoretically provide a good starting point for estimating short-term growth. However, past growth is not always a good indicator of future growth. Some metrics that might be considered here are historical growth in revenues, operating income, and net income. Since dividends are paid from earnings, estimating historical earnings growth may provide an indication of future earnings and dividend growth. In general, however, revenue growth tends to be more consistent and predictable than earnings growth because it is less likely to be influenced by accounting adjustments.[46]

2. Analyst Growth Rates

Analyst growth rates refer to short-term projections of earnings growth published by institutional research analysts such as Value Line and Bloomberg. A more detailed discussion of analyst growth rates, including the problems with using them in the DCF Model to estimate utility cost of equity, is provided in a later section.

3. Fundamental Determinants of Growth

Fundamental growth determinants refer to firm-specific financial metrics that arguably provide better indications of near-term sustainable growth. One such metric for fundamental growth considers the return on equity and the retention ratio. The idea behind

[46] *See* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 279 (3rd ed., John Wiley & Sons, Inc. 2012).

this metric is that firms with high ROEs and retention ratios should have higher opportunities for growth.[47]

Q. DID YOU USE ANY OF THESE GROWTH DETERMINANTS IN YOUR DCF MODEL?

A. No. Primarily, the growth determinants discussed above would provide better indications of short to mid-term growth for firms with average to high growth opportunities. However, utilities are mature, low-growth firms. While it may not be unreasonable on its face to use any of these growth determinants for the growth input in the DCF Model, we must keep in mind that the stable growth DCF Model considers only *long-term* growth rates, which are constrained by certain economic factors, as discussed further below.

2. <u>Reasonable Estimates for Long-Term Growth</u>

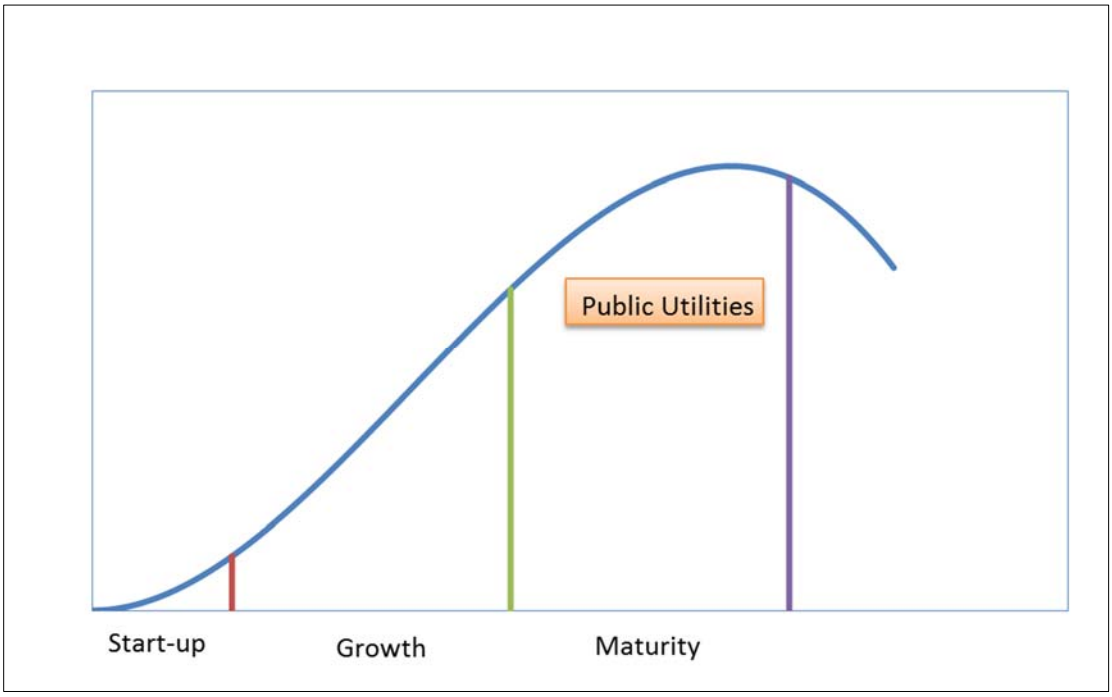
Q. DESCRIBE WHAT IS MEANT BY LONG-TERM GROWTH.

A. In order to make the DCF a viable, practical model, an infinite stream of future cash flows must be estimated and then discounted back to the present. Otherwise, each annual cash flow would have to be estimated separately. Some analysts use "multi-stage" DCF Models to estimate the value of high-growth firms through two or more stages of growth, with the final stage of growth being constant. However, it is not necessary to use multi-stage DCF Models to analyze the cost of equity of regulated utility companies. This is because regulated utilities are already in their "terminal," low growth stage. Unlike most

[47] *Id*. at 291-292.

competitive firms, the growth of regulated utilities is constrained by physical service territories and limited primarily by the customer and load growth within those territories. The figure below illustrates the well-known business/industry life-cycle pattern.

Figure 5:
Industry Life Cycle



In an industry's early stages, there are ample opportunities for growth and profitable reinvestment. In the maturity stage however, growth opportunities diminish, and firms choose to pay out a larger portion of their earnings in the form of dividends instead of reinvesting them in operations to pursue further growth opportunities. Once a firm is in the maturity stage, it is not necessary to consider higher short-term growth metrics in multi-stage DCF Models; rather, it is sufficient to analyze the cost of equity using a stable growth DCF Model with one terminal, long-term growth rate. Because utilities are in their

maturity stage, their real growth opportunities are primarily limited to the population growth within their defined service territories, which is usually less than 2%.

Q. IS IT TRUE THAT THE TERMINAL GROWTH RATE CANNOT EXCEED THE GROWTH RATE OF THE ECONOMY, ESPECIALLY FOR A REGULATED UTILITY COMPANY?

A. Yes. A fundamental concept in finance is that no firm can grow forever at a rate higher than the growth rate of the economy in which it operates.[48] Thus, the terminal growth rate used in the DCF Model should not exceed the aggregate economic growth rate. This is especially true when the DCF Model is conducted on public utilities because these firms have defined service territories. As stated by Dr. Aswath Damodaran:

> "If a firm is a purely domestic company, either because of internal constraints . . . or external constraints (such as those imposed by a government), the growth rate in the domestic economy will be the limiting value."[49]

In fact, it is reasonable to assume that a regulated utility would grow at a rate that is *less* than the U.S. economic growth rate. Unlike competitive firms, which might increase their growth by launching a new product line, franchising, or expanding into new and developing markets, utility operating companies with defined service territories cannot do any of these things to grow. Gross domestic product ("GDP") is one of the most widely used measures of economic production and is used to measure aggregate economic growth. According to the Congressional Budget Office's Budget Outlook, the long-term forecast for nominal

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[48] *See generally* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 306 (3rd ed., John Wiley & Sons, Inc. 2012).

[49] *Id.*

U.S. GDP growth is 3.9%, which includes an inflation rate of 2%.[50] For mature companies in mature industries, such as utility companies, the terminal growth rate will likely fall between the expected rate of inflation and the expected rate of nominal GDP growth. Thus, WGL's terminal growth rate is realistically between 2% and 4%.

Q. IS IT REASONABLE TO ASSUME THAT THE TERMINAL GROWTH RATE WILL NOT EXCEED THE RISK-FREE RATE?

A. Yes. In the long term, the risk-free rate will converge on the growth rate of the economy. For this reason, financial analysts sometimes use the risk-free rate for the terminal growth rate value in the DCF model.[51] I discuss the risk-free rate in further detail later in this testimony.

Q. PLEASE SUMMARIZE THE VARIOUS LONG-TERM GROWTH RATE ESTIMATES THAT CAN BE USED AS THE TERMINAL GROWTH RATE IN THE DCF MODEL.

A. The reasonable long-term growth rate determinants are summarized as follows:

1. Nominal GDP Growth
2. Real GDP Growth
3. Inflation
4. Current Risk-Free Rate

Any of the foregoing growth determinants could provide a reasonable input for the terminal growth rate in the DCF Model for a utility company, including WGL. In general, we should

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[50] Congressional Budget Office – The 2019 Long-Term Budget Outlook p. 54, https://www.cbo.gov/publication/55331.

[51] Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 307 (3rd ed., John Wiley & Sons, Inc. 2012).

expect that utilities will, at the very least, grow at the rate of projected inflation. However, the long-term growth rate of any U.S. company, especially utilities, will be constrained by nominal U.S. GDP growth.

3. Qualitative Growth: The Problem with Analysts' Growth Rates

Q. DESCRIBE THE DIFFERENCES BETWEEN "QUANTITATIVE" AND "QUALITATIVE" GROWTH DETERMINANTS.

A. Assessing "quantitative" growth simply involves mathematically calculating a historic metric for growth (such as revenues or earnings) or calculating various fundamental growth determinants using various figures from a firm's financial statements (such as ROE and the retention ratio). However, any thorough assessment of company growth should be based upon a "qualitative" analysis. Such an analysis would consider specific strategies that company management will implement to achieve a sustainable growth in earnings. Therefore, it is important to begin the analysis of WGL's growth rate with this simple, qualitative question: How is this regulated utility going to achieve a sustained growth in earnings? If this question were asked of a competitive firm, there could be several answers depending on the type of business model, such as launching a new product line, franchising, rebranding to target a new demographic, or expanding into a developing market. Regulated utilities, however, cannot engage in these potential growth opportunities.

Q. WHY IS IT ESPECIALLY IMPORTANT TO EMPHASIZE REAL, QUALITATIVE GROWTH DETERMINANTS WHEN ANALYZING THE GROWTH RATES OF REGULATED UTILITIES?

A. While qualitative growth analysis is important regardless of the entity being analyzed, it is especially important in the context of utility ratemaking. This is because the rate base rate of return model inherently possesses two factors that can contribute to distorted views of

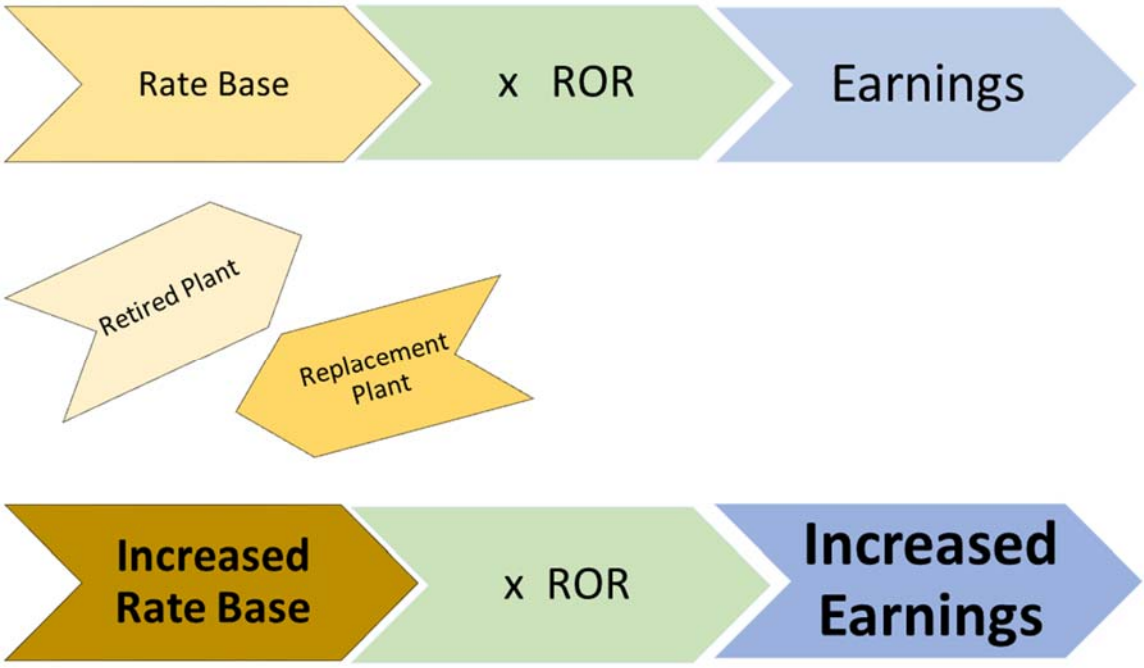
utility growth when considered exclusively from a quantitative perspective. These two factors are (1) rate base and (2) the awarded ROE. I will discuss each factor further below. It is important to keep in mind that the ultimate objective of this analysis is to provide a foundation upon which to base the fair rate of return for the utility. Thus, we should strive to ensure that each individual component of the financial models used to estimate the cost of equity are also "fair." If we consider only quantitative growth determinants, it may lead to projected growth rates that are overstated and ultimately unfair, because they result in inflated cost of equity estimates.

Q. HOW DOES RATE BASE RELATE TO GROWTH DETERMINANTS FOR UTILITIES?

A. Under the rate base rate of return model, a utility's rate base is multiplied by its awarded rate of return to produce the required level of operating income. Therefore, increases to rate base generally result in increased earnings. Thus, utilities have a natural financial incentive to increase rate base. In short, utilities have a financial incentive to increase rate base regardless of whether such increases are driven by a corresponding increase in demand. Under these circumstances, utilities have been able to increase their rate bases by a far greater extent than what any concurrent increase in demand would have required. In other words, utilities "grew" their earnings by simply retiring old assets and replacing them with new assets. If the tail of a flatworm is removed and regenerated, it does not mean the flatworm actually grew. Likewise, if a competitive, unregulated firm announced plans to close production plants and replace them with new plants, it would not be considered a real determinant of growth unless analysts believed this decision would directly result in increased market share for the company and a real opportunity for sustained increases in

revenues and earnings. In the case of utilities, the mere replacement of old plant with new plant does not increase market share, attract new customers, create franchising opportunities, or allow utilities to penetrate developing markets, but may result in short-term, quantitative earnings growth. This "flatworm growth" in earnings was merely the quantitative byproduct of the rate base rate of return model, and not an indication of real, fair, or qualitative growth. The following diagram illustrates this concept.

Figure 6:
Analysts' Earnings Growth Projections: The "Flatworm Growth" Problem

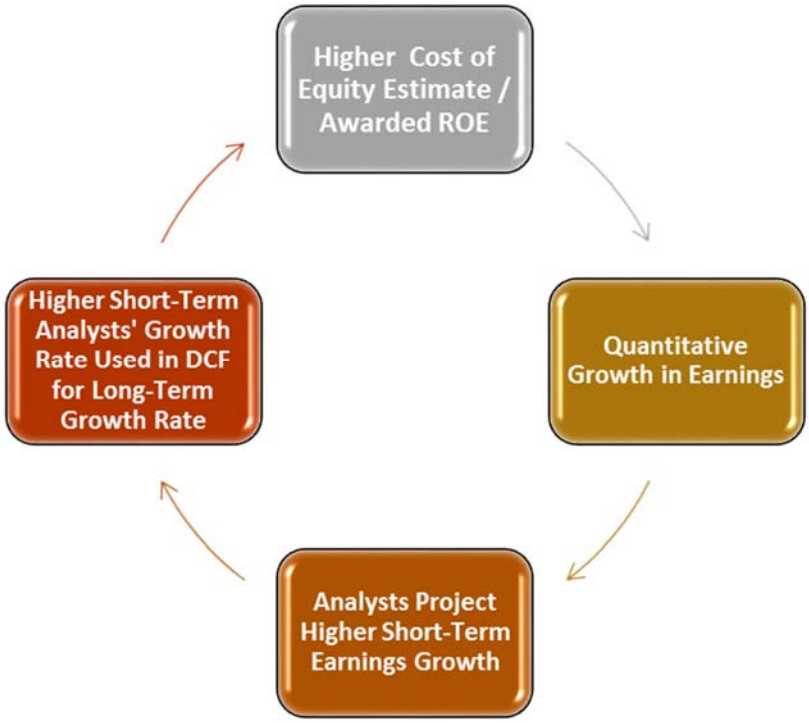


Of course, utilities might sometimes add new plant to meet a modest growth in customer demand. However, as the foregoing discussion demonstrates, it would be more appropriate to consider load growth projections and other qualitative indicators, rather than mere increases to rate base or earnings, to attain a fair assessment of growth.

Q. PLEASE DISCUSS THE OTHER WAY IN WHICH ANALYSTS' EARNINGS GROWTH PROJECTIONS DO NOT PROVIDE INDICATIONS OF FAIR, QUALITATIVE GROWTH FOR REGULATED UTILITIES.

A. If we give undue weight to analysts' projections for utilities' earnings growth, it will not provide an accurate reflection of real, qualitative growth because a utility's earnings are heavily influenced by the ultimate figure that all this analysis is supposed to help us estimate: the awarded return on equity. This creates a circular reference problem or feedback loop. In other words, if a regulator awards an ROE that is above market-based cost of capital (which is often the case, as discussed above), this could lead to higher short-term growth rate projections from analysts. If these same inflated, short-term growth rate estimates are used in the DCF Model (and they often are by utility witnesses), it could lead to higher awarded ROEs; and the cycle continues, as illustrated in the following figure:

Figure 7:
Analysts' Earnings Growth Projections: The "Circular Reference" Problem



Therefore, it is not advisable to simply consider the quantitative growth projections published by analysts, as this practice will not necessarily provide fair indications of real utility growth.

Q. ARE THERE ANY OTHER PROBLEMS WITH RELYING ON ANALYSTS' GROWTH PROJECTIONS?

A. Yes. While the foregoing discussion shows two reasons why we cannot rely on analysts' growth rate projections to provide fair, qualitative indicators of utility growth in a stable growth DCF Model, the third reason is perhaps the most obvious and indisputable. Various institutional analysts, such as Zacks, Value Line, and Bloomberg, publish estimated projections of earnings growth for utilities. These estimates, however, are *short-term* growth rate projections, ranging from 3 – 10 years. Many utility ROE analysts, however, disingenuously insert these short-term growth projections into the DCF Model as *long-term* growth rate projections. For example, assume that an analyst at Bloomberg estimates that a utility's earnings will grow by 7% per year over the next 3 years. This analyst may have based this short-term forecast on a utility's plans to replace depreciated rate base (i.e., "flatworm" growth) or on an anticipated awarded return that is above market-based cost of equity (i.e., "circular reference" problem). When a utility witness uses this figure in a DCF Model, however, it is the *witness*, not the Bloomberg analyst that is testifying to the regulator that the utility's earnings will qualitatively grow by 7% per year over the *long-term*, which is an unrealistic assumption.

4. Long-Term Growth Rate Recommendation

Q. DESCRIBE THE GROWTH RATE INPUT USED IN YOUR DCF MODEL.

A. I considered various qualitative determinants of growth for WGL, along with the maximum allowed growth rate under basic principles of finance and economics. The following chart shows the various long-term growth determinants discussed in this section.[52]

Figure 8:
Terminal Growth Rate Determinants

Terminal Growth Determinants	Rate
Nominal GDP	3.9%
Real GDP	1.9%
Inflation	2.0%
Risk Free Rate	1.5%
Highest	**3.9%**

For the long-term growth rate in my DCF model, I selected the maximum, reasonable long-term growth rate of 3.9%, which means my model assumes that the Company's qualitative growth in earnings will match the nominal growth rate of the entire U.S. economy over the long run – a very generous assumption.

Q. DID YOU ALSO CONSIDER COMPANY-SPECIFIC GROWTH INDICATORS FOR AN ASSESSMENT OF LONG-TERM GROWTH?

A. Yes. As discussed above, growth determinants such as load growth and customer growth could be used to assess qualitative, utility-specific growth, as opposed to revenue and

[52] Exhibit DJG-5.

earnings (which run the risk of promoting a circular reference problem). According to WGL, its annual growth rates in total load and customers over the past 10 years have been 0.1% and 1.1%, respectively, as illustrated in the figure below.[53]

Figure 9:
WGL-Specific Growth Determinants

WGL-Specific Growth Determinants	Rate
Total Load	0.1%
Total Customers	1.1%
Average	**0.6%**

This information reaffirms the fact that utilities like WGL are low-growth companies. Moreover, this shows that the long-term growth rate of 3.9% I used in my DCF Model is the highest reasonable long-term growth rate for WGL.

Q. PLEASE DESCRIBE THE FINAL RESULTS OF YOUR DCF MODEL.

A. I used the Quarterly Approximation DCF Model discussed above to estimate the Company's cost of equity capital. I obtained an average of reported dividends and stock prices from the proxy group, and I used a reasonable terminal growth rate estimate for the Company. Applying this model, my DCF cost of equity estimate for the Company is 7.7%.[54]

[53] *See* Exhibit DJG-5; *see also* response to OPC DR 4-11.

[54] Exhibit DJG-6.

F. Response to Mr. D'Ascendis's DCF Model

Q. MR. D'ASCENDIS'S DCF MODEL YIELDED MUCH HIGHER RESULTS. DID YOU FIND ANY ERRORS IN HIS ANALYSIS?

A. Yes, I found several errors. Mr. D'Ascendis's DCF Model produced a median cost of equity of 9.25%.[55] The results of Mr. D'Ascendis's DCF Model are overstated primarily because of a fundamental error regarding his growth rate inputs.

Q. DESCRIBE THE PROBLEMS WITH MR. D'ASCENDIS'S LONG-TERM GROWTH INPUT.

A. Mr. D'Ascendis used long-term growth rates in his proxy group as high as 10.2%,[56] which is more than two times higher than the projected, long-term nominal U.S. GDP growth rate (approximately 4.0%). This means Mr. D'Ascendis's growth rate assumption violates the basic principle that no company can grow at a greater rate than the economy in which it operates over the long-term, especially a regulated utility company with a defined service territory. Furthermore, Mr. D'Ascendis used short-term, quantitative growth estimates published by analysts to estimate equivalent long-term rates. As discussed above, these analysts' estimates are inappropriate to use in the DCF Model as long-term growth rates because they are estimates for short-term growth. For example, Mr. D'Ascendis incorporated a 10.2% growth rate for South Jersey Industries ("SJI"), which was reported by Yahoo! Finance.[57] This would mean that the analyst from Yahoo! Finance apparently thinks SJI's earnings will quantitatively increase by 10.2% each year over the next *several*

[55] Exhibit DWD-2

[56] *Id*.

[57] *Id*.

years. However, it is Mr. D'Ascendis, not the commercial analyst, who is suggesting to the Commission that SJI's earnings will grow by more than two times the amount of U.S. GDP growth every year for many decades into the future.[58] This assumption is simply not realistic, and it contradicts fundamental concepts of long-term growth. The growth rate assumptions used by Mr. D'Ascendis for many of the proxy companies incorporate the same misleading assumptions.[59]

VII. CAPITAL ASSET PRICING MODEL ANALYSIS

Q. DESCRIBE THE CAPITAL ASSET PRICING MODEL.

A. The Capital Asset Pricing Model ("CAPM") is a market-based model founded on the principle that investors expect higher returns for incurring additional risk.[60] The CAPM estimates this expected return. The various assumptions, theories, and equations involved in the CAPM are discussed further in Appendix B. Using the CAPM to estimate the cost of equity of a regulated utility is consistent with the legal standards governing the fair rate of return. As discussed earlier, the U.S. Supreme Court has recognized that "the amount of *risk* in the business is a most important factor" in determining the allowed rate of return,[61] and that "the return to the equity owner should be commensurate with returns on

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[58] *Id*. Technically, the constant growth rate in the DCF Model grows dividends each year to "infinity." Yet, even if we assumed that the growth rate applied to only a few decades, the annual growth rate would still be too high to be considered realistic.

[59] *Id*.

[60] William F. Sharpe, *A Simplified Model for Portfolio Analysis* 277-93 (Management Science IX 1963); *see also* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 208 (3rd ed., South Western Cengage Learning 2010).

[61] *Wilcox*, 212 U.S. at 48 (emphasis added).

investments in other enterprises having corresponding *risks*."[62] The CAPM is a useful model because it directly considers the amount of risk inherent in a business and directly measures the most important component of a fair rate of return analysis: Risk.

Q. DESCRIBE THE INPUTS FOR THE CAPM.

A. The basic CAPM equation requires only three inputs to estimate the cost of equity: (1) the risk-free rate; (2) the beta coefficient; and (3) the equity risk premium. Each input is discussed separately below.

A. The Risk-Free Rate

Q. EXPLAIN THE RISK-FREE RATE.

A. The first term in the CAPM is the risk-free rate (R_F). The risk-free rate is simply the level of return investors can achieve without assuming any risk. The risk-free rate represents the bare minimum return that any investor would require on a given investment. Even though no investment is technically void of risk, investors often use U.S. Treasury securities to represent the risk-free rate because they accept that those securities essentially contain no default risk. The Treasury issues securities with different maturities, including short-term Treasury Bills, intermediate-term Treasury Notes, and long-term Treasury Bonds.

Q. IS IT PREFERABLE TO USE THE YIELD ON LONG-TERM TREASURY BONDS FOR THE RISK-FREE RATE IN THE CAPM?

A. Yes. In valuing an asset, investors estimate cash flows over long periods of time. Common stock is viewed as a long-term investment, and the cash flows from dividends are assumed

[62] *Hope Natural Gas Co.*, 320 U.S. at 603 (emphasis added).

to last indefinitely. As a result, short-term Treasury bill yields are rarely used in the CAPM to represent the risk-free rate. Short-term rates are subject to greater volatility and thus can lead to unreliable estimates. Instead, long-term Treasury bonds are usually used to represent the risk-free rate in the CAPM. I considered a 30-day average of daily Treasury yield curve rates on 30-year Treasury bonds in my risk-free rate estimate, which resulted in a risk-free rate of 1.53%.[63]

B. The Beta Coefficient

Q. HOW IS THE BETA COEFFICIENT USED IN THIS MODEL?

A. As discussed above, beta represents the sensitivity of a given security to movements in the overall market. The CAPM states that in efficient capital markets, the expected risk premium on each investment is proportional to its beta. Recall that a security with a beta greater (less) than one is more (less) risky than the market portfolio. An index such as the S&P 500 Index is used as a proxy for the market portfolio. The historical betas for publicly traded firms are published by various institutional analysts. Beta may also be calculated through a linear regression analysis, which provides additional statistical information about the relationship between a single stock and the market portfolio. As discussed above, beta also represents the sensitivity of a given security to the market as a whole. The market portfolio of all stocks has a beta equal to one. Stocks with betas greater than one are relatively more sensitive to market risk than the average stock. For example, if the market increases (decreases) by 1.0%, a stock with a beta of 1.5 will, on average, increase

[63] Exhibit DJG-7.

(decrease) by 1.5%. In contrast, stocks with betas of less than one are less sensitive to market risk. For example, if the market increases (decreases) by 1.0%, a stock with a beta of 0.5 will, on average, only increase (decrease) by 0.5%.

Q. DESCRIBE THE SOURCE FOR THE BETAS YOU USED IN YOUR CAPM ANALYSIS.

A. I used betas recently published by Value Line Investment Survey. The average beta for the proxy group is only 0.86, which is notably less than 1.0.[64] Thus, we have an objective measure to prove the well-known concept that utility stocks are less risky than the average stock in the market. While there is evidence suggesting that betas published by sources such as Value Line may actually overestimate the risk of utilities (and thus overestimate the CAPM), I used the betas published by Value Line in the interest of reasonableness.[65]

C. The Equity Risk Premium

Q. DESCRIBE THE EQUITY RISK PREMIUM.

A. The final term of the CAPM is the equity risk premium ("ERP"), which is the required return on the market portfolio less the risk-free rate ($R_M - R_F$). In other words, the ERP is the level of return investors expect above the risk-free rate in exchange for investing in risky securities. Many experts agree that "the single most important variable for making investment decisions is the equity risk premium."[66] Likewise, the ERP is arguably the single most important factor in estimating the cost of capital in this matter. There are three

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[64] Exhibit DJG-8.

[65] *See* Appendix B for a more detailed discussion of raw beta calculations and adjustments.

[66] Elroy Dimson, Paul Marsh & Mike Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns* 4 (Princeton University Press 2002).

basic methods that can be used to estimate the ERP: (1) calculating a historical average; (2) taking a survey of experts; and (3) calculating the implied ERP. I will discuss each method in turn, noting advantages and disadvantages of these methods.

1. HISTORICAL AVERAGE

Q. DESCRIBE THE HISTORICAL EQUITY RISK PREMIUM.

A. The historical ERP may be calculated by simply taking the difference between returns on stocks and returns on government bonds over a certain period of time. Many practitioners rely on the historical ERP as an estimate for the forward-looking ERP because it is easy to obtain. However, there are disadvantages to relying on the historical ERP.

Q. WHAT ARE THE LIMITATIONS OF RELYING SOLELY ON A HISTORICAL AVERAGE TO ESTIMATE THE CURRENT OR FORWARD-LOOKING ERP?

A. As I mentioned, many investors use the historic ERP because it is convenient and easy to calculate. What matters in the CAPM model, however, is not the actual risk premium from the past, but rather the current and forward-looking risk premium.[67] Some investors may think that a historic ERP provides some indication of what the prospective risk premium is; however, there is empirical evidence to suggest the prospective, forward-looking ERP is actually *lower* than the historical ERP. In what is considered a landmark publication on risk premiums around the world, *Triumph of the Optimists*, the authors suggest through extensive empirical research that the prospective ERP is lower than the historical ERP.[68]

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[67] John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 330 (3rd ed., South Western Cengage Learning 2010).

[68] Elroy Dimson, Paul Marsh & Mike Staunton, Triumph of the Optimists: 101 Years of Global Investment Returns 194 (Princeton University Press 2002).

This is due in large part to what is known as "survivorship bias" or "success bias" — a tendency for failed companies to be excluded from historical indices.[69] From their extensive analysis, the authors make the following conclusion regarding the prospective ERP:

> The result is a forward-looking, geometric mean risk premium for the United States . . . of around 2½ to 4 percent and an arithmetic mean risk premium . . . that falls within a range from a little below 4 to a little above 5 percent.[70]

Indeed, these results are lower than many reported historical risk premiums. Other noted experts agree:

> The historical risk premium obtained by looking at U.S. data is biased upwards because of survivor bias. . . . The true premium, it is argued, is much lower. This view is backed up by a study of large equity markets over the twentieth century (*Triumph of the Optimists*), which concluded that the historical risk premium is closer to 4%.[71]

Regardless of the variations in historic ERP estimates, many leading scholars and practitioners agree that simply relying on a historic ERP to estimate the risk premium going forward is not ideal. Fortunately, "a naïve reliance on long-run historical averages is not the only approach for estimating the expected risk premium."[72]

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[69] *Id*. at 34.

[70] *Id*. at 194.

[71] Aswath Damodaran, *Equity Risk Premiums: Determinants, Estimation and Implications – The 2015 Edition* 17 (New York University 2015).

[72] John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 330 (3rd ed., South Western Cengage Learning 2010).

Q. DID YOU RELY ON THE HISTORICAL ERP AS PART OF YOUR CAPM ANALYSIS IN THIS CASE?

A. No. Due to the limitations of this approach, I primarily relied on the ERP reported in expert surveys and the implied ERP method discussed below.

2. EXPERT SURVEYS

Q. DESCRIBE THE EXPERT SURVEY APPROACH TO ESTIMATING THE ERP.

A. As its name implies, the expert survey approach to estimating the ERP involves conducting a survey of experts including professors, analysts, chief financial officers and other executives around the country and asking them what they think the ERP is. Graham and Harvey have performed such a survey since 1996. In their 2018 survey, they found that experts around the country believe the current ERP is 4.4%.[73] The IESE Business School conducts a similar expert survey. Their 2020 expert survey reported an average ERP of 5.6%.[74]

3. IMPLIED EQUITY RISK PREMIUM

Q. DESCRIBE THE IMPLIED EQUITY RISK PREMIUM APPROACH.

A. The third method of estimating the ERP is arguably the best. The implied ERP relies on the stable growth model proposed by Myron Gordon, often called the "Gordon Growth

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[73] John R. Graham and Campbell R. Harvey, *The Equity Risk Premium in 2018*, at 3 (Fuqua School of Business, Duke University 2014), copy available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3151162.

[74] Pablo Fernandez, Pablo Linares & Isabel F. Acin, *Market Risk Premium used in 59 Countries in 2018: A Survey,* at 3 (IESE Business School 2018), copy available at http://www.valumonics.com/wp-content/uploads/2017/06/Discount-rate-Pablo-Fern%C3%A1ndez.pdf. IESE Business School is the graduate business school of the University of Navarra. IESE offers Master of Business Administration (MBA), Executive MBA and Executive Education programs. IESE is consistently ranked among the leading business schools in the world.

Model," which is a basic stock valuation model widely used in finance for many years.[75] This model is a mathematical derivation of the DCF Model. In fact, the underlying concept in both models is the same: The current value of an asset is equal to the present value of its future cash flows. Instead of using this model to determine the discount rate of one company, we can use it to determine the discount rate for the entire market by substituting the inputs of the model. Specifically, instead of using the current stock price (P_0), we will use the current value of the S&P 500 (V_{500}). Instead of using the dividends of a single firm, we will consider the dividends paid by the entire market. Additionally, we should consider potential dividends. In other words, stock buybacks should be considered in addition to paid dividends, as stock buybacks represent another way for the firm to transfer free cash flow to shareholders. Focusing on dividends alone without considering stock buybacks could understate the cash flow component of the model, and ultimately understate the implied ERP. The market dividend yield plus the market buyback yield gives us the gross cash yield to use as our cash flow in the numerator of the discount model. This gross cash yield is increased each year over the next five years by the growth rate. These cash flows must be discounted to determine their present value. The discount rate in each denominator is the risk-free rate (R_F) plus the discount rate (K). The following formula shows how the implied return is calculated. Since the current value of the S&P is known, we can solve for K: The implied market return.[76]

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[75] Myron J. Gordon and Eli Shapiro, *Capital Equipment Analysis: The Required Rate of Profit* 102-10 (Management Science Vol. 3, No. 1 Oct. 1956).

[76] *See* Exhibit DJG-9 for detailed calculation.

Equation 2:
Implied Market Return

$$V_{500} = \frac{CY_1(1+g)^1}{(1+R_F+K)^1} + \frac{CY_2(1+g)^2}{(1+R_F+K)^2} + \cdots + \frac{CY_5(1+g)^5 + TV}{(1+R_F+K)^5}$$

where: V_{500} = *current value of index (S&P 500)*
$CY_{1\text{-}5}$ = *average cash yield over last five years (includes dividends and buybacks)*
g = *compound growth rate in earnings over last five years*
R_F = *risk-free rate*
K = *implied market return (this is what we are solving for)*
TV = *terminal value* $= CY_5 (1+R_F) / K$

The discount rate is called the "implied" return here because it is based on the current value of the index as well as the value of free cash flow to investors projected over the next five years. Thus, based on these inputs, the market is "implying" the expected return; or in other words, based on the current value of all stocks (the index price) and the projected value of future cash flows, the market is telling us the return expected by investors for investing in the market portfolio. After solving for the implied market return (K), we simply subtract the risk-free rate from it to arrive at the implied ERP.

Equation 3:
Implied Equity Risk Premium

$$Implied\ Expected\ Market\ Return - R_F = Implied\ ERP$$

Q. DISCUSS THE RESULTS OF YOUR IMPLIED ERP CALCULATION.

A. After collecting data for the index value, operating earnings, dividends, and buybacks for the S&P 500 over the past six years, I calculated the dividend yield, buyback yield, and gross cash yield for each year. I also calculated the compound annual growth rate (g) from operating earnings. I used these inputs, along with the risk-free rate and current value of

the index to calculate a current expected return on the entire market of 7.5%.[77] I subtracted the risk-free rate to arrive at the implied equity risk premium of 6.0%.[78] Dr. Aswath Damodaran, arguably one of the world's leading experts on the ERP, promotes the implied ERP method discussed above. Using variations of this method, he calculates and publishes his ERP results each month. Dr. Damodaran's *highest* ERP estimate for October 2020 using several implied ERP variations was 5.9%.[79]

Q. WHAT ARE THE RESULTS OF YOUR FINAL ERP ESTIMATE?

A. For the final ERP estimate I used in my CAPM analysis, I considered the results of the ERP surveys, the implied ERP calculations discussed above, and the estimated ERP reported by Duff & Phelps.[80] The results are presented in the following figure:

[77] *Id*.

[78] *Id*.

[79] http://pages.stern.nyu.edu/~adamodar/

[80] *See also* Exhibit DJG-10.

Figure 10:
Equity Risk Premium Results

IESE Business School Survey	5.6%	[1]
Graham & Harvey Survey	4.4%	[2]
Duff & Phelps Report	6.0%	[3]
Damodaran (highest Oct. result)	5.9%	[4]
Damodaran (COVID Adjusted)	5.0%	[5]
Garrett	6.0%	[6]
Average	**5.5%**	
Highest	**6.0%**	

While it would be reasonable to select any one of these ERP estimates to use in the CAPM, I conservatively selected the *highest* ERP estimate of 6.0% to use in my CAPM analysis. All else held constant, a higher ERP used in the CAPM will result in a higher cost of equity estimate.

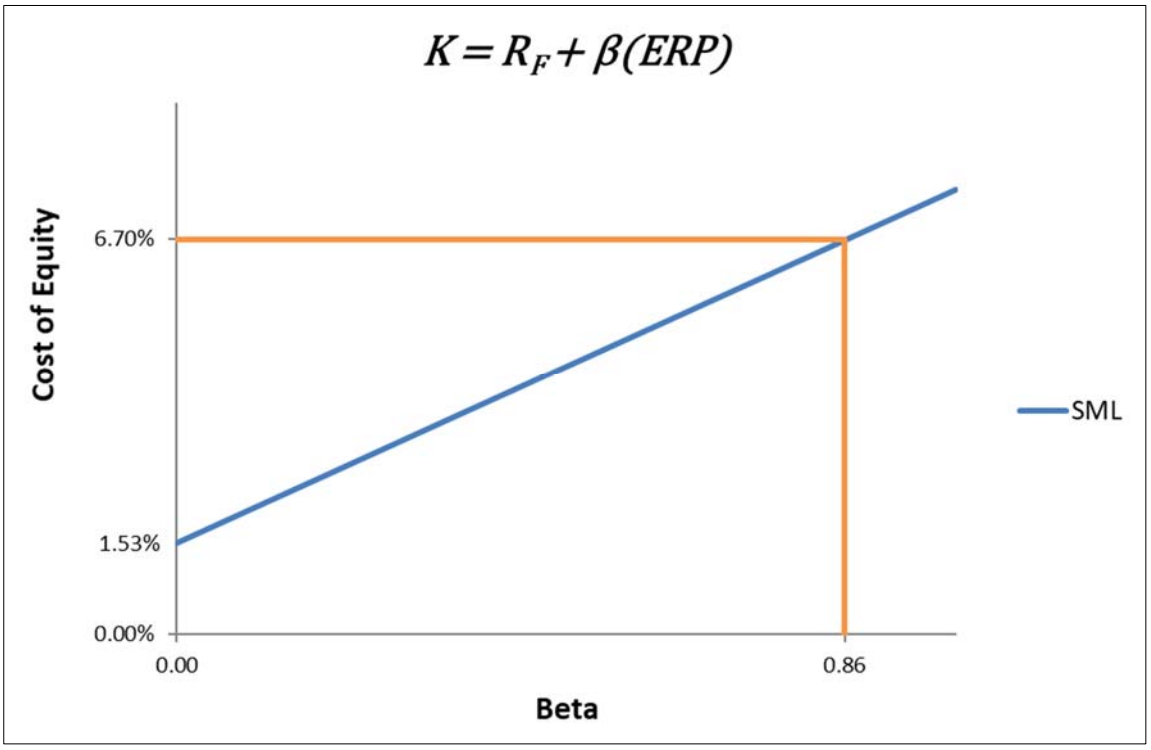
Q. PLEASE EXPLAIN THE FINAL RESULTS OF YOUR CAPM ANALYSIS.

A. Using the inputs for the risk-free rate, beta coefficient, and equity risk premium discussed above, I estimate that the Company's CAPM cost of equity is 6.7%.[81] The CAPM can be displayed graphically through what is known as the Security Market Line ("SML"). The following figure shows the expected return (cost of equity) on the y-axis, and the average

[81] Exhibit DJG-11.

beta for the proxy group on the x-axis. The SML intercepts the y-axis at the level of the risk-free rate. The slope of the SML is the equity risk premium.

Figure 11:
CAPM Graph



The SML provides the rate of return that will compensate investors for the beta risk of that investment. Thus, at an average beta of 0.86 for the proxy group, the estimated CAPM cost of equity for the Company is 6.7%.

D. Response to Mr. D'Ascendis's CAPM Analysis

Q. MR. D'ASCENDIS'S CAPM ANALYSIS YIELDS CONSIDERABLY HIGHER RESULTS. DID YOU FIND SPECIFIC PROBLEMS WITH MR. D'ASCENDIS'S CAPM ASSUMPTIONS AND INPUTS?

A. Yes. The median result of Mr. D'Ascendis's various CAPM evaluations is 13.1%,[82] which is considerably higher than my estimate. The main problem with Mr. D'Ascendis's CAPM cost of equity result stems primarily from his estimate of the ERP. In addition, his input for the risk-free rate is overestimated.

Q. DID MR. D'ASCENDIS RELY ON A REASONABLE MEASURE FOR THE ERP?

A. No, he did not. Mr. D'Ascendis used an ERP estimate of 12.44% in his CAPM.[83] The ERP is one of three inputs in the CAPM equation, and it is one of the most important factors for estimating the cost of equity in this case. As discussed above, I used three widely accepted methods for estimating the ERP, including consulting expert surveys, calculating the implied ERP based on aggregate market data, and considering the ERPs published by reputable analysts. The highest ERP found from my research and analysis is only 6.0%.[84] This means that Mr. D'Ascendis's ERP estimate is more than twice as high as the highest reasonable ERP I could either find or calculate. And, as noted, it is also considerably higher than that of reputable analysts.

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[82] Exhibit DWD-4.

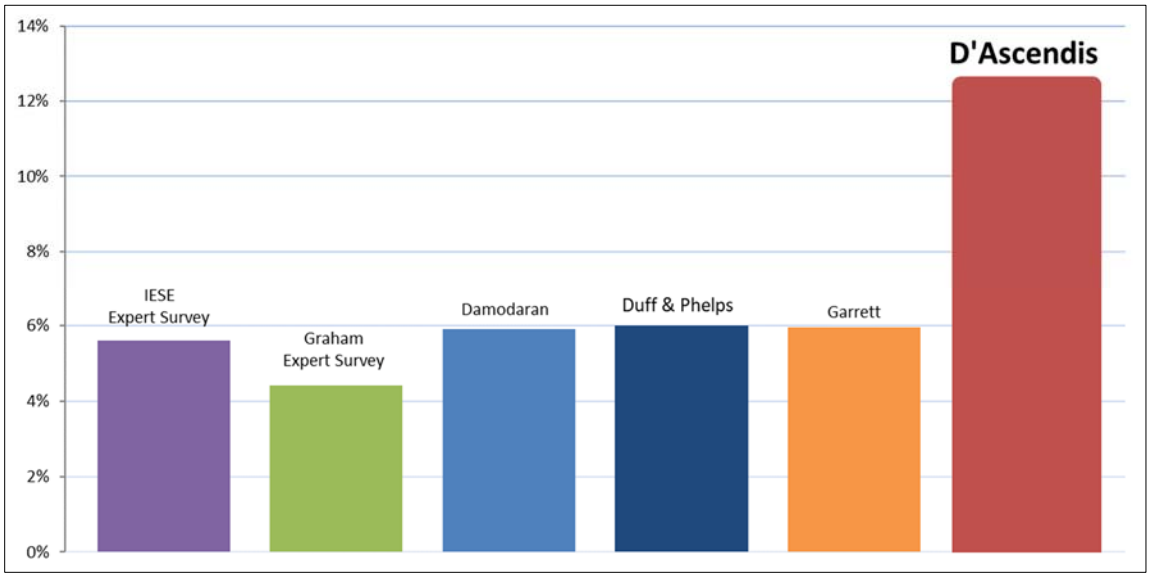
[83] *Id*.

[84] Exhibit DJG-10.

Q. PLEASE DISCUSS AND ILLUSTRATE HOW MR. D'ASCENDIS'S ERP COMPARES WITH OTHER ESTIMATES FOR THE ERP.

A. As discussed above, Graham and Harvey's 2018 expert survey reports an average ERP of 4.4%. The 2020 IESE Business School expert survey reports an average ERP of 5.6%. Similarly, Duff & Phelps recently estimated an ERP of 6.0%. The following chart illustrates that Mr. D'Ascendis's ERP estimate is far out of line with industry norms.[85]

Figure 12:
Equity Risk Premium Comparison



When compared with other independent sources for the ERP (as well as my estimate), which do not have a wide variance, Mr. D'Ascendis's ERP estimate is clearly not within the range of reasonableness. As a result, his CAPM cost of equity estimate is overstated and unreliable.

[85] *See* Exhibit DJG-10. The ERP estimated by Dr. Damodaran is the highest of several ERP estimates under varying assumptions.

Q. DID MR. D'ASCENDIS OVERESTIMATE HIS RISK-FREE RATE INPUT TO THE CAPM?

A. Yes. The current yield on 30-year Treasury bonds is only about 1.5%.[86] Mr. D'Ascendis, however, uses a risk-free rate of 2.08% in his CAPM.[87] All else held constant, a higher risk-free rate will result in a higher CAPM cost of equity estimate. Thus, Mr. D'Ascendis's CAPM cost of equity estimate is overstated.

VIII. OTHER COST OF EQUITY ISSUES

Q. DO YOU HAVE A RESPONSE TO OTHER COST OF EQUITY ISSUES RAISED BY MR. D'ASCENDIS?

A. Yes. Mr. D'Ascendis conducted a cost of equity model on a group of companies that are neither utility companies nor regulated. In addition, Mr. D'Ascendis suggests that WGL's relatively small size should have an effect on its cost of equity.

1. Non-Price Regulated Model

Q. PLEASE DESCRIBE MR. D'ASCENDIS' NON-PRICE REGULATED MODEL?

A. In addition to conducting the CAPM and DCF model on the proxy group of utility companies, Mr. D'Ascendis also used a non-price regulated proxy group.[88]

Q. DO YOU AGREE WITH THE RESULTS OF THIS MODEL?

A. No, I do not. In fact, I disagree with the entire premise of the model. There are three important reasons why the Commission should completely disregard this analysis. First, there is no marginal benefit received for conducting a CAPM and/or DCF Model on a

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[86] Exhibit DJG-7.

[87] Exhibit DWD-4.

[88] *See* Direct Testimony of Dylan W. D'Ascendis, pp. 30-34.

group of non-regulated, non-utility companies in this context. Typically, non-regulated, competitive firms have higher levels of market risk than regulated utility companies. As a result, their cost of equity estimates will be generally higher. Second, using a group of non-regulated, non-utility companies for a cost of equity analysis in a utility rate case does not help in reaching a fair awarded ROE according to the standards set forth by the *Hope* Court, which held that the "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks."[89] Using a group of non-regulated, non-utility companies will not indicate a required return on investments that is *commensurate* with returns on investments of *corresponding risks*. Finally, Mr. D'Ascendis's non-price regulated model suffers from the same overestimated equity risk premium and risk-free rate as his CAPM for the proxy group of regulated utilities, as discussed above. For all of these reasons, the Commission should reject Mr. D'Ascendis's approach regarding the non-price regulated model.

2. <u>Small Size Premium</u>

Q. PLEASE DESCRIBE MR. D'ASCENDIS' POSITION REGARDING THE SIZE PREMIUM.

A. Mr. D'Ascendis suggests that WGL's size should somehow have an increasing effect on its cost of equity estimate.[90] Mr. D'Ascendis adds a 0.2% upward adjustment to reflect a small size premium.[91]

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[89] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944).

[90] *See* Direct Testimony of Dylan W. D'Ascendis, pp. 35-42.

[91] *Id*. at p. 40.

Q. DO YOU AGREE WITH MR. D'ASCENDIS REGARDING THE SIZE PREMIUM OR SIZE EFFECT?

A. No, I do not. To the extent Mr. D'Ascendis is adjusting his CAPM result upward to account for the "size effect" phenomenon, I disagree with his position because numerous studies have shown that small cap stocks do not consistently outperform large-cap stocks. The "size effect" phenomenon arose from a 1981 study conducted by Banz, which found that "in the 1936 – 1975 period, the common stock of small firms had, on average, higher risk-adjusted returns than the common stock of large firms."[92] According to Ibbotson, Banz's size effect study was "[o]ne of the most remarkable discoveries of modern finance."[93] Perhaps there was some merit to this idea at the time, yet, the size effect phenomenon was short lived. Banz's 1981 publication generated much interest in the size effect and spurred the launch of significant new small cap investment funds. However, this "honeymoon period lasted for approximately two years. . . ." [94] After 1983, U.S. small-cap stocks actually underperformed relative to large cap stocks. In other words, the size effect essentially reversed. In the more recent study, *Triumph of the Optimists*, the authors conducted an extensive empirical study of the size effect phenomenon around the world. They found that after the size effect phenomenon was discovered in 1981, it disappeared within a few years:

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[92] Rolf W. Banz, *The Relationship Between Return and Market Value of Common Stocks* 3-18 (Journal of Financial Economics 9 (1981)).

[93] 2015 Ibbotson Stocks, Bonds, Bills, and Inflation Classic Yearbook 99 (Morningstar 2015).

[94] Elroy Dimson, Paul Marsh & Mike Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns* 131 (Princeton University Press 2002).

> It is clear . . . that there was a global reversal of the size effect in virtually every country, with the size premium not just disappearing but going into reverse. Researchers around the world universally fell victim to Murphy's Law, with the very effect they were documenting – and inventing explanations for – promptly reversing itself shortly after their studies were published.[95]

In other words, the authors assert that the very discovery of the size effect phenomenon likely caused its own demise. The authors ultimately concluded that it is "inappropriate to use the term 'size effect' to imply that we should automatically expect there to be a small-cap premium;" yet, this is exactly what utility witnesses often do in attempting to artificially inflate the cost of equity with a size premium. Other prominent sources have agreed that the size premium is a dead phenomenon. According to Ibbotson:

> The unpredictability of small-cap returns has given rise to another argument against the existence of a size premium: that markets have changed so that the size premium no longer exists. As evidence, one might observe the last 20 years of market data to see that the performance of large-cap stocks was basically equal to that of small cap stocks. In fact, large-cap stocks have outperformed small-cap stocks in five of the last 10 years.[96]

In addition to the studies discussed above, other scholars have concluded similar results. According to Kalesnik and Beck:

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[95] *Id*. at 133.

[96] 2015 Ibbotson Stocks, Bonds, Bills, and Inflation Classic Yearbook 112 (Morningstar 2015).

> Today, more than 30 years after the initial publication of Banz's paper, the empirical evidence is extremely weak even before adjusting for possible biases. . . . The U.S. long-term size premium is driven by the extreme outliers, which occurred three-quarters of a century ago. . . . Finally, adjusting for biases . . . makes the size premium vanish. If the size premium were discovered today, rather than in the 1980s, it would be challenging to even publish a paper documenting that small stocks outperform large ones.[97]

Thus, the size-effect phenomenon has been extinct for nearly 40 years, and it should have no application in this case.

Q. HAS THE COMMISSION PREVIOUSLY REJECTED THE TYPE OF SIZE PREMIUM ADJUSTMENT AS THE ONE PROPOSED BY WGL IN THIS CASE?

A. Yes. The Commission previously rejected a similar size premium adjustment for Potomac Edison.[98]

IX. COST OF EQUITY SUMMARY

Q. PLEASE SUMMARIZE THE RESULTS OF THE CAPM AND DCF MODEL DISCUSSED ABOVE.

A. The following table shows the cost of equity results from each model I employed in this case.[99]

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[97] Vitali Kalesnik and Noah Beck, *Busting the Myth About Size* (Research Affiliates 2014), available at https://www.researchaffiliates.com/Our%20Ideas/Insights/Fundamentals/Pages/284_Busting_the_Myth_About_Size.aspx (emphasis added).

[98] Order 89072, Case 9490, re: Potomac Edison Company, at p. 75.

[99] *See* Exhibit DJG-12.

Figure 13:
Cost of Equity Summary

Model	Cost of Equity
Discounted Cash Flow Model	7.7%
Capital Asset Pricing Model	6.7%
Average	**7.2%**

The cost of equity indicated by the results of the DCF Model and the CAPM is approximately 7.2%.

Q. IS THERE A MARKET INDICATOR THAT YOU CAN USE TO TEST THE REASONABLENESS OF YOUR COST OF EQUITY ESTIMATE?

A. Yes, there is. The CAPM is a risk premium model based on the fact that all investors will require, at a minimum, a return equal to the risk-free rate when investing in equity securities. Of course, the investors will also require a premium on top of the risk-free rate to compensate them for the risk they have assumed. If an investor bought every stock in the market portfolio, he would require the risk-free rate, plus the ERP discussed above. Recall that the risk-free rate plus the ERP is called the required return on the market portfolio. This could also be called the market cost of equity. It is undisputed that the cost of equity of utility stocks must be less than the total market cost of equity. This is because utility stocks are less risky than the average stock in the market. (We proved this above by showing that utility betas are less than one). Therefore, once we determine the market cost of equity, it gives us a "ceiling" below which WGL's actual cost of equity must lie.

Q. DESCRIBE HOW YOU ESTIMATED THE MARKET COST OF EQUITY.

A. The methods used to estimate the market cost of equity are necessarily related to the methods used to estimate the ERP discussed above. In fact, the ERP is calculated by taking the market cost of equity less the risk-free rate. Therefore, in estimating the market cost of equity, I relied on the same methods discussed above to estimate the ERP: (1) consulting expert surveys; and (2) calculating the implied ERP. The results of my market cost of equity analysis are presented in the following table:[100]

Figure 14:
Market Cost of Equity Summary

Source	Estimate
IESE Survey	7.1%
Graham Harvey Survey	6.0%
Damodaran	7.4%
Garrett	7.5%
Average	7.0%
Highest	7.5%

As shown in this table, the highest market cost of equity from these sources is only 7.5%. Therefore, it is not surprising that the CAPM and DCF Model indicate a cost of equity for the Company of only 7.2%. In other words, any cost of equity estimates for the Company

[100] *See* Exhibit DJG-13.

(or any regulated utility) that is *above* the market cost of equity should be viewed as an overestimate (again, the cost of equity is a different concept that the awarded ROE).

X. CAPITAL STRUCTURE

Q. DESCRIBE THE COMPANY'S PROPOSED CAPITAL STRUCTURE.

A. In his direct testimony, Mr. Bonawitz proposes a capital structure consisting of 41.75% long-term debt, 3.70% short-term debt, and 54.55% common equity.[101]

Q. DO YOU AGREE WITH WGL'S PROPOSED CAPITAL STRUCTURE?

A. No. For the reasons discussed below, I recommend the Commission reject WGL's proposed capital structure, and instead adopt a capital structure consisting of 48% long-term debt, 3.7% short-term debt, and 48.3% common equity.

Q. PLEASE SUMMARIZE THE EFFECT OF INCREASING THE EQUITY RATIO ON CUSTOMERS' RATES AND THE AWARDED ROE.

A. As discussed in more detail in this section of my testimony, since equity is more expensive than debt, ratepayers pay more when a utility's capital structure consists of high levels of equity. As discussed below, WGL's debt ratio is unreasonably low. If the Commission does not adjust WGL's capital structure to include higher amounts of debt, then it should award a *lower* ROE than the one I am proposing in this case. In part, this is because my proposed ROE is based on the financial metrics of the companies in the utility proxy group, which have higher debt ratios than that proposed by WGL.

[101] Direct Testimony of Douglas I. Bonawitz, p. 10, lines 11-13.

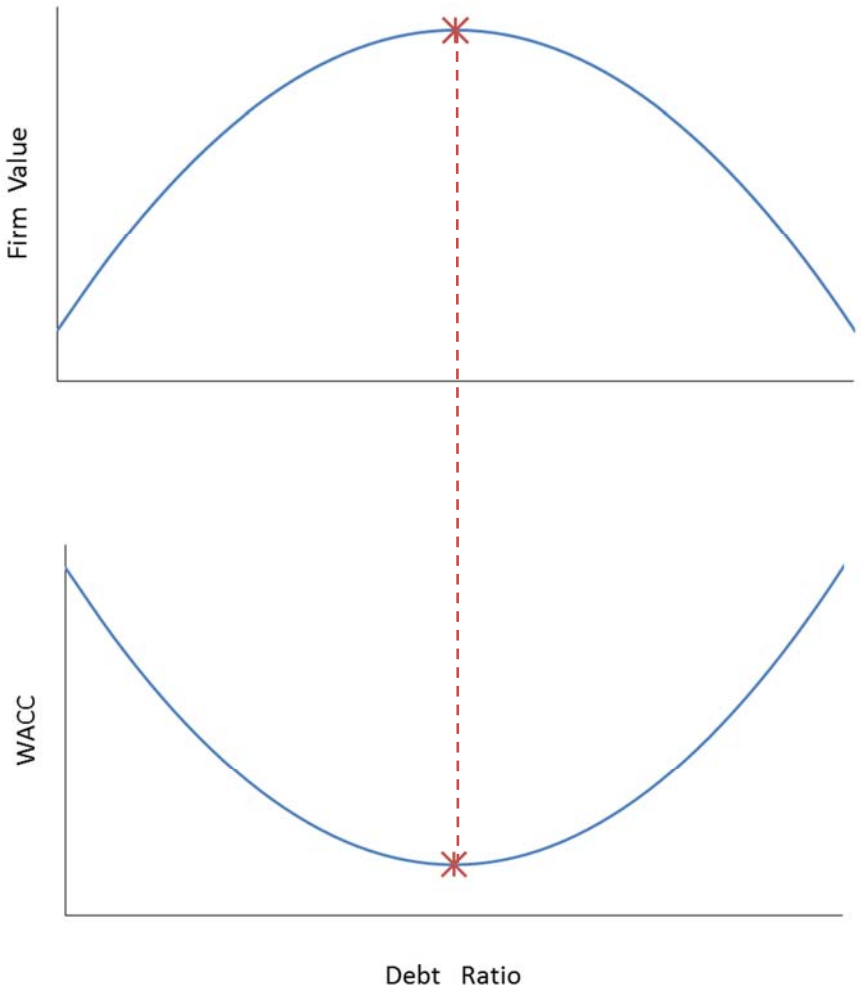
Q. DESCRIBE IN GENERAL THE CONCEPT OF A COMPANY'S "CAPITAL STRUCTURE."

A. "Capital structure" refers to the way a company finances its overall operations through external financing. The primary sources of long-term, external financing are debt capital and equity capital. Debt capital usually comes in the form of contractual bond issues that require the firm to make payments, while equity capital represents an ownership interest in the form of stock. Because a firm cannot pay dividends on common stock until it satisfies its debt obligations to bondholders, stockholders are referred to as "residual claimants." The fact that stockholders have a lower priority to claims on company assets increases their risk and the required return relative to bondholders. Thus, equity capital has a higher cost than debt capital. Firms can reduce their weighted average cost of capital ("WACC") by recapitalizing and increasing their debt financing. In addition, because interest expense is deductible, increasing debt also adds value to the firm by reducing the firm's tax obligation.

Q. IS IT TRUE THAT, BY INCREASING DEBT, COMPETITIVE FIRMS CAN ADD VALUE AND REDUCE THEIR WACC?

A. Yes, it is. A competitive firm can add value by increasing debt. After a certain point, however, the marginal cost of additional debt outweighs its marginal benefit. This is because the more debt the firm uses, the higher interest expense it must pay, and the likelihood of loss increases. This also increases the risk of non-recovery for both bondholders and shareholders, causing both groups of investors to demand a greater return on their investment. Thus, if debt financing is too high, the firm's WACC will increase instead of decrease. The following figure illustrates these concepts.

Figure 15:
Optimal Debt Ratio



As shown in this figure, a competitive firm's value is maximized when the WACC is minimized. In both graphs, the debt ratio is shown on the x-axis. By increasing its debt ratio, a competitive firm can minimize its WACC and maximize its value. At a certain point, however, the benefits of increasing debt do not outweigh the costs of the additional

risks to both bondholders and shareholders, as each type of investor will demand higher returns for the additional risk they have assumed.[102]

Q. DOES THE RATE BASE RATE OF RETURN MODEL EFFECTIVELY INCENTIVIZE UTILITIES TO OPERATE AT THE OPTIMAL CAPITAL STRUCTURE?

A. No. While it is true that competitive firms maximize their value by minimizing their WACC, this is not the case for regulated utilities. Under the rate base rate of return model, a higher WACC results in higher rates, all else held constant. The basic revenue requirement equation is as follows:

Equation 4:
Revenue Requirement for Regulated Utilities

$$RR = O + d + T + \boldsymbol{r}(A - D)$$

where:

RR	=	*revenue requirement*
O	=	*operating expenses*
d	=	*depreciation expense*
T	=	*corporate tax*
$\boldsymbol{r}$	=	***weighted average cost of capital (WACC)***
A	=	*plant investments*
D	=	*accumulated depreciation*

As shown in this equation, utilities can increase their revenue requirement by <u>increasing</u> their WACC, not by minimizing it. Thus, because there is no incentive for a regulated utility to minimize its WACC, a commission standing in the place of competition must ensure that the regulated utility is operating at the lowest reasonable WACC.

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[102] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 440-41 (3rd ed., South Western Cengage Learning 2010).

Q. CAN UTILITIES GENERALLY AFFORD TO HAVE HIGHER DEBT LEVELS THAN OTHER INDUSTRIES?

A. Yes. Because regulated utilities have large amounts of fixed assets, stable earnings, and low risk relative to other industries, they can afford to have relatively higher debt ratios (or "leverage"). As aptly stated by Dr. Damodaran:

> Since financial leverage multiplies the underlying business risk, it stands to reason that firms that have high business risk should be reluctant to take on financial leverage. It also stands to reason that firms that operate in stable businesses should be much more willing to take on financial leverage. Utilities, for instance, have historically had high debt ratios but have not had high betas, mostly because their underlying businesses have been stable and fairly predictable.[103]

Note that the author explicitly contrasts utilities with firms that have high underlying business risk. Because utilities have low levels of risk and operate a stable business, they should generally operate with relatively high levels of debt to achieve their optimal capital structure. There are objective methods available to estimate the optimal capital structure, as discussed further below.

Q. IS IT APPROPRIATE TO CONSIDER ONLY THE CAPITAL STRUCTURES OF THE PROXY GROUP IN ASSESSING A PRUDENT CAPITAL STRUCTURE?

A. No. While the capital structures of the proxy group might provide some indication of an appropriate capital structure for the utility being studied, it would not be appropriate to consider that analysis by itself, for the following reasons.

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[103] Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 196 (3rd ed., John Wiley & Sons, Inc. 2012) (emphasis added).

1. Utilities do not have a financial incentive to operate at the optimal capital structure.

Under the rate base rate of return model, utilities do not have a natural financial incentive to minimize their cost of capital; in fact, they have a financial incentive to do the opposite. Competitive firms, in contrast, can maximize their value by minimizing their cost of capital. Competitive firms minimize their cost of capital by including a sufficient amount of debt in their capital structures. They do not do this because it required by a regulatory body, rather, they do it because their shareholders demand it in order to maximize value. Simply comparing the debt ratios of other regulated utilities will not necessarily indicate an appropriate capital structure for the Company in this proceeding. Rather, it is likely to justify debt ratios that are far too low. It is the Commission's role to act as a surrogate for competition and thereby ensure that the capital structure of a regulated monopoly is similar to what would be appropriate in a competitive environment, not a regulated environment. This cannot be accomplished by simply looking at the capital structures of other regulated utilities or the target utility's test-year capital structure.

2. The optimal capital structure is unique to each firm.

As discussed further below, the optimal capital structure for a firm is dependent on several unique financial metrics for *that* firm. The other companies in the proxy group have different financial metrics than the target utility, and thus, they have different optimal capital structures. An objective analysis should be performed using the financial metrics of the target utility to estimate its unique optimal capital structure.

3. The capital structures of the proxy group may not have been approved by their regulatory commissions.

The actual capital structure of any utility falls within the realm of managerial discretion. That is, a utility's management has the discretion to choose the relative proportions of debt and equity used to finance the utility's operations. Regulatory commissions, however, have a duty to examine those decisions, and to impute a proper capital structure if the company's actual capital structure is inappropriate. Thus, the actual capital structures of other utilities may have been deemed inappropriate by their own commission. For all the foregoing reasons, simply comparing the capital structures of other regulated utilities is insufficient to determine a prudent capital structure.

Q. PLEASE DESCRIBE AN OBJECTIVE APPROACH IN ASSESSING AN OPTIMAL, FAIR CAPITAL STRUCTURE FOR A UTILITY.

A. My analysis of the optimal capital structure includes objective methods to measure the effects of increasing debt on both the cost of debt and cost of equity. I will discuss the effects of increasing the debt ratio on each type of security separately.

Cost of Debt

As discussed above, increasing the debt ratio will increase the cost of debt. To objectively measure how much the cost of debt increases, I considered the spreads above the risk-free rate for various levels of bond ratings and interest coverage ratios. The following table shows increasing interest rates for debt based on different bond rating levels.[104]

[104] *See* Exhibit DJG-15.

Figure 16:
Bond Rating Spreads

Ratings Table			
Coverage Ratio	Bond Rating	Spread	Interest Rate
8.5 - 10.00	Aaa/AAA	0.63%	2.16%
6.5 - 8.49	Aa2/AA	0.78%	2.31%
5.5 - 6.49	A1/A+	0.98%	2.51%
4.25 - 5.49	A2/A	1.08%	2.61%
3.0 - 4.24	A3/A-	1.22%	2.75%
2.5 - 2.99	Baa2/BBB	1.56%	3.09%
2.25 - 2.49	Ba1/BB+	2.00%	3.53%
2.0 - 2.24	Ba2/BB	2.40%	3.93%
1.75 - 1.99	B1/B+	3.51%	5.04%
1.5 - 1.74	B2/B	4.21%	5.74%
1.25 - 1.49	B3/B-	5.15%	6.68%
0.8 - 1.24	Caa/CCC	8.20%	9.73%

As shown in this table, the spreads over the risk-free rate gradually increase as bond ratings fall.[105] The spread is added to the risk-free rate to obtain the interest rates shown in the far-right column. This concept is somewhat comparable to the interest rate a mortgage lender would charge a borrower. The mortgage lender's advertised rate is usually the lowest rate, or the "prime" rate, which is available to borrowers with stellar credit scores. As credit scores decrease, however, the offered interest rate will increase. The bond ratings in this figure are based on various levels of interest coverage ratios shown in the far-left column. The interest coverage ratio, as its name implies, is a metric used by financial analysts to gauge a firm's ability to pay its interest expense from its available earnings before interest and taxes (EBIT). (Likewise, the mortgage lender would consider the borrower's personal

[105] The link between interest coverage ratios and ratings was developed by looking at all rated companies in the U.S. The default spreads are obtained from traded bonds. The spreads are added to the risk-free rate to obtain the interest rates in the table. http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ratings.htm.

income-debt ratio.) As the debt ratio rises, the interest coverage ratio falls, the bond ratings increase, and the cost of debt increases. Now that we have an objective way of measuring how increasing the debt ratio affects the cost of debt, we need to measure how increasing the debt ratio affects the cost of equity.

Cost of Equity

As with the cost of debt, increasing the debt ratio also increases the cost of equity. To objectively measure how much the cost of equity increases, I first calculated the Company's unlevered beta. The unlevered beta is determined by the assets owned by the firm and removes the effects of financial leverage. As leverage increases, equity investors bear increasing amounts of risk, leading to higher betas. Before the effects of financial leverage can be accounted for, however, the effects of leverage must first be removed, which is accomplished through the unlevered beta calculation. The beta for the firm can then be "re-levered" based on various debt ratios. So, by using the Bond Rating Spreads table and the unlevered beta equation, the costs of both debt and equity can be increased in correspondence with increasing the debt ratio, until the ideal capital structure is found: where the weighted average cost of capital is minimized.

Q. DESCRIBE WGL'S OPTIMAL CAPITAL STRUCTURE.

A: WGL proposes a long-term debt ratio of only 41.75% and a total debt ratio of only 45.45% in this case.[106] I analyzed the Company's optimal capital structure based on the approach discussed above to determine whether this proposal is reasonable. The following table

[106] Schedule DIB-1 (Bonawitz).

presents different levels of WGL's weighted average cost of capital based on increasing debt ratios.[107]

Figure 17:
WGL's WACC at Various Debt Ratios

Debt Ratio	Levered Beta	Cost of Equity	Proposed ROE	Coverage Ratio	After-tax Debt Cost	Optimal WACC	WACC at 9.0% ROE
0%	0.499	4.52%	9.00%	∞	1.71%	4.52%	9.00%
20%	0.597	5.11%	9.00%	6.68	1.82%	4.46%	7.56%
30%	0.667	5.54%	9.00%	4.45	2.06%	4.49%	6.92%
40%	0.761	6.10%	9.00%	3.34	2.17%	4.53%	6.27%
50%	0.893	6.89%	9.00%	2.67	2.44%	4.66%	5.72%
52%	0.925	7.08%	9.00%	2.57	2.44%	4.67%	5.59%
55%	0.980	7.41%	9.00%	2.43	2.79%	4.87%	5.58%

In the figure above, the column on the far-left shows increasing levels of debt ratios. At a debt ratio of zero percent, the utility's beta is completely unlevered. As the debt ratio in the far-left column increases, both the cost of equity and the cost of debt increase; however, the weighted average cost of capital decreases. Utility witnesses often suggest that regulators should not impute a higher debt ratio because the costs of debt and equity could increase. As discussed above, this statement by itself is true, but it is also misleading because it fails to include the most pertinent point – the WACC will <u>decrease</u>. Notice in the table above that when the debt ratio is 20%, the estimated cost of equity is only 5.11%, and the estimated cost of debt (after-tax) is only 1.82%. When the debt ratio is increased from 20% to 40%, we can see that the utility's argument is correct – the cost of equity increases (from 5.11% to 6.10%), and the cost of debt also increases (from 1.82% to 2.17%). *However*, the weighted average cost of capital <u>decreases</u> from 7.56% to 6.27%

[107] See Exhibit DJG-15.

(far-right column). This is due to the basic algebra involved in the WACC formula, and the fact that debt is cheaper than equity.

This model is not necessarily designed to calculate the Company's cost of equity or WACC as exact numbers; rather, it provides a tool for illustrating the idea that WACC can decrease when the debt ratio increases to a certain extent. The model also provides an indication (rather than exact calculation) of WGL's optimal debt ratio. This model should be considered along with the other models discussed in this section to provide indications of WGL's optimal debt ratio – one that would exist in a competitive environment. The table above indicates that that if we used a cost of equity (the third column from the left) that was more reflective of WGL's actual, market-based cost of equity, then WGL's optimal debt ratio may actually be lower than 50%. However, no witness in this case (even myself) is likely to recommend an awarded return that actually equals WGL's market-based cost of equity (which is about 7.2%). At a "cost" of equity of 9.0% (my recommended ROE), we can see that the WACC is minimized at a higher debt ratio – about 52%.[108] This is not surprising. When awarded returns exceed cost of equity, it is more beneficial to have a greater percentage of low-cost debt in the capital structure. In that regard, the Company's request of a 10.45% awarded ROE and a total debt ratio of only 45.45% is simply unreasonable. While my capital structure model is meant to be an estimate more than a specific calculation, it provides an objective, mathematical indication that WGL should have a higher debt ratio and a lower overall weighted average cost of

[108] According to this basic model, higher debt ratios would technically produce lower WACCs, but they would be associated with debt coverage ratio and bond rating that are below investment grade.

capital. Additionally, there is other evidence supporting the argument that WGL should have a higher debt ratio, as further discussed below.

Q. IS YOUR OPINION BASED IN PART ON THE FACT THAT THOUSANDS OF COMPETITIVE FIRMS AROUND THE COUNTRY USE HIGH DEBT RATIOS TO MAXIMIZE PROFITS?

A: Yes. In fact, there are currently more than 3,700 firms in U.S. industries with higher debt ratios than that requested by WGL in this case. Moreover, these firms have an average debt ratio of greater than 60%.[109] The following figure shows a sample of these industries with debt ratios higher than 55%.

[109] *See* Exhibit DJG-16.

Figure 18:
Industries with Debt Ratios Greater than 55%

Industry	# Firms	Debt Ratio
Tobacco	17	96%
Financial Svcs.	232	95%
Retail (Building Supply)	17	90%
Hospitals/Healthcare Facilities	36	88%
Advertising	47	80%
Retail (Automotive)	26	79%
Brokerage & Investment Banking	39	77%
Auto & Truck	13	75%
Food Wholesalers	17	70%
Bank (Money Center)	7	69%
Transportation	18	67%
Hotel/Gaming	65	67%
Packaging & Container	24	66%
Retail (Grocery and Food)	13	66%
Broadcasting	27	65%
R.E.I.T.	234	64%
Retail (Special Lines)	89	64%
Green & Renewable Energy	22	**64%**
Recreation	63	63%
Software (Internet)	30	63%
Air Transport	18	**63%**
Retail (Distributors)	80	62%
Computers/Peripherals	48	61%
Telecom (Wireless)	18	**61%**
Farming/Agriculture	31	61%
Cable TV	14	**60%**
Computer Services	106	60%
Beverage (Soft)	34	60%
Telecom. Services	67	**60%**
Trucking	33	59%
Power	52	**59%**
Office Equipment & Services	22	58%
Chemical (Diversified)	6	58%
Retail (Online)	70	58%
Aerospace/Defense	77	58%
Oil/Gas Distribution	24	58%
Business & Consumer Services	165	57%
Construction Supplies	44	57%
Real Estate (Operations & Services)	57	56%
Household Products	127	56%
Environmental & Waste Services	82	56%
Rubber& Tires	4	56%
Total / Average	**2,215**	**66%**

Many of the industries shown here are, like public utilities, generally well-established industries with large amounts of capital assets. The shareholders of these industries demand higher debt ratios to maximize their profits. There are several notable industries that are relatively comparable to public utilities (highlighted in the figure above). For example, Green and Renewable Energy has an average debt ratio of 64% and Telecom Services has an average debt ratio of 60%. These debt ratios are significantly higher than WGL's proposed debt ratio of only 46.47%.

Q. DID YOU ALSO LOOK AT THE DEBT RATIOS OF THE PROXY GROUP?

A. Yes. According to the most recent reported data from Value Line, the average long-term debt ratio of the proxy group is 48%.[110]

Q. WHAT IS YOUR RECOMMENDATION REGARDING WGL'S CAPITAL STRUCTURE?

A. I analyzed the Company's optimal capital structure based on the approach discussed above. In my opinion, WGL's proposed capital structure consists of an insufficient amount of debt, especially since WGL's awarded ROE in this case will certainly be above its market-based cost of equity (even if my recommendation is adopted). I recommend the Commission adopt a capital structure consisting of 48% long-term debt ratio for WGL for the following reasons:

[110] Exhibit DJG-17.

1. My objective capital structure model shows that WGL's optimal capital structure (where capital costs are minimized) could consist of a debt ratio 52% or higher, especially considering that WGL's awarded ROE in this case will exceed the Company's market-based cost of equity.

2. An analysis of dozens of competitive industries shows that there are thousands of firms across the U.S. that operate with higher debt ratios than WGL's proposed debt ratio. Notably, the industries of renewable energy, power, cable TV, and telecommunication services all have average debt ratios higher than 58%.

3. The average debt ratio of the proxy group is 48%.

For all the foregoing reasons, I recommend the Commission adopt a capital structure for WGL consisting of 48% long-term debt for purposes of computing the Company's awarded rate of return. The table below compares the various the debt ratios discussed in my testimony.

Q. IS YOUR RECOMMENDED CAPITAL STRUCTURE CONSISTENT WITH THE COMMISSION'S CONDITION REGARDING CAPITAL STRUCTURE AS STATED IN THE ATLAGAS AND WGL HOLDINGS MERGER CASE?

A. Yes. In the Commission's Order in the AtlaGas and WGL Holdings merger case, the Commission held:

> We have added to this Condition that Washington Gas will maintain a separate capital structure to finance the activities and operations of Washington Gas and maintain a 12-month rolling average equity ratio of no less than 48% and no more than 55%, barring future Commission orders to the contrary.[111]

The equity ratio I am proposing in this case is 48.3%.[112]

[111] Order 88631, Case No. 9449, In re Merger of AtlaGas LTD and WGL Holdings, Inc., pp. 55-56.

[112] Exhibit DJG-18.

Figure 19:
Debt Ratio Comparison

Source	Long-Term Debt Ratio
Green & Renewable Energy	64%
Telecom (Wireless)	61%
Cable TV	60%
Telecom. Services	60%
Power Industry	59%
DJG Optimal Model Indication	52%
Proxy Group of Utilities	48%
Garrett Proposal	**48%**
Company's Proposal	**42%**

Based on these findings, it is clear that WGL's proposed debt ratio is far too low, and if adopted, would result in an unreasonably high weighted average rate of return burden on ratepayers.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes. I reserve the right to supplement this testimony as needed with any additional information that has been requested from the Company but not yet provided. To the extent I have not addressed an issue, method, calculation, account, or other matter relevant to the Company's proposals in this proceeding, it should not be construed that I agree with the same.

APPENDIX A:

DISCOUNTED CASH FLOW MODEL THEORY

The Discounted Cash Flow ("DCF") Model is based on a fundamental financial model called the "dividend discount model," which maintains that the value of a security is equal to the present value of the future cash flows it generates. Cash flows from common stock are paid to investors in the form of dividends. There are several variations of the DCF Model. In its most general form, the DCF Model is expressed as follows:[113]

Equation 5:
General Discounted Cash Flow Model

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_n}{(1+k)^n}$$

where: P_0 = *current stock price*
$D_1 \ldots D_n$ = *expected future dividends*
k = *discount rate / required return*

The General DCF Model would require an estimation of an infinite stream of dividends. Since this would be impractical, analysts use more feasible variations of the General DCF Model, which are discussed further below.

The DCF Models rely on the following four assumptions:

1. Investors evaluate common stocks in the classical valuation framework; that is, they trade securities rationally at prices reflecting their perceptions of value;

2. Investors discount the expected cash flows at the same rate (K) in every future period;

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[113] *See* Zvi Bodie, Alex Kane & Alan J. Marcus, *Essentials of Investments* 410 (9th ed., McGraw-Hill/Irwin 2013).

3. The K obtained from the DCF equation corresponds to that specific stream of future cash flows alone; and

4. Dividends, rather than earnings, constitute the source of value.

The General DCF can be rearranged to make it more practical for estimating the cost of equity. Regulators typically rely on some variation of the Constant Growth DCF Model, which is expressed as follows:

Equation 6:
Constant Growth Discounted Cash Flow Model

$$K = \frac{D_1}{P_0} + g$$

where: K = *discount rate / required return on equity*
D_1 = *expected dividend per share one year from now*
P_0 = *current stock price*
g = *expected growth rate of future dividends*

Unlike the General DCF Model, the Constant Growth DCF Model solves directly for the required return (K). In addition, by assuming that dividends grow at a constant rate, the dividend stream from the General DCF Model may be essentially substituted with a term representing the expected constant growth rate of future dividends (g). The Constant Growth DCF Model may be considered in two parts. The first part is the dividend yield (D_1/P_0), and the second part is the growth rate (g). In other words, the required return in the DCF Model is equivalent to the dividend yield plus the growth rate.

In addition to the four assumptions listed above, the Constant Growth DCF Model relies on four additional assumptions as follows:[114]

[114] *Id.* at 254-56.

1. The discount rate (K) must exceed the growth rate (g);
2. The dividend growth rate (g) is constant in every year to infinity;
3. Investors require the same return (K) in every year; and
4. There is no external financing; that is, growth is provided only by the retention of earnings.

Since the growth rate in this model is assumed to be constant, it is important not to use growth rates that are unreasonably high. In fact, the constant growth rate estimate for a regulated utility with a defined service territory should not exceed the growth rate for the economy in which it operates.

The basic form of the Constant Growth DCF Model described above is sometimes referred to as the "Annual" DCF Model. This is because the model assumes an annual dividend payment to be paid at the end of every year, as well as an increase in dividends once each year. In reality however, most utilities pay dividends on a quarterly basis. The Constant Growth DCF equation may be modified to reflect the assumption that investors receive successive quarterly dividends and reinvest them throughout the year at the discount rate. This variation is called the Quarterly Approximation DCF Model.[115]

Equation 7:
Quarterly Approximation Discounted Cash Flow Model

$$K = \left[\frac{d_0(1+g)^{1/4}}{P_0} + (1+g)^{1/4}\right]^4 - 1$$

where: K = *discount rate / required return*
d_0 = *current quarterly dividend per share*
P_0 = *stock price*
g = *expected growth rate of future dividends*

[115] *Id*. at 348.

The Quarterly Approximation DCF Model assumes that dividends are paid quarterly, and that each dividend is constant for four consecutive quarters. All else held constant, this model results in the *highest* cost of equity estimate for the utility in comparison to other DCF Models because it accounts for the quarterly compounding of dividends. There are several other variations of the Constant Growth (or Annual) DCF Model, including a Semi-Annual DCF Model which is used by the Federal Energy Regulatory Commission ("FERC"). These models, along with the Quarterly Approximation DCF Model, have been accepted in regulatory proceedings as useful tools for estimating the cost of equity.

APPENDIX B:

CAPITAL ASSET PRICING MODEL THEORY

The Capital Asset Pricing Model ("CAPM") is a market-based model founded on the principle that investors demand higher returns for incurring additional risk.[116] The CAPM estimates this required return. The CAPM relies on the following assumptions:

1. Investors are rational, risk-adverse, and strive to maximize profit and terminal wealth;
2. Investors make choices based on risk and return. Return is measured by the mean returns expected from a portfolio of assets; risk is measured by the variance of these portfolio returns;
3. Investors have homogenous expectations of risk and return;
4. Investors have identical time horizons;
5. Information is freely and simultaneously available to investors.
6. There is a risk-free asset, and investors can borrow and lend unlimited amounts at the risk-free rate;
7. There are no taxes, transaction costs, restrictions on selling short, or other market imperfections; and,
8. Total asset quality is fixed, and all assets are marketable and divisible.[117]

While some of these assumptions may appear to be restrictive, they do not outweigh the inherent value of the model. The CAPM has been widely used by firms, analysts, and regulators for decades to estimate the cost of equity capital.

The basic CAPM equation is expressed as follows:

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[116] William F. Sharpe, *A Simplified Model for Portfolio Analysis* 277-93 (Management Science IX 1963); *see also* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 208 (3rd ed., South Western Cengage Learning 2010).

[117] *Id*.

Equation 8:
Capital Asset Pricing Model

$$K = R_F + \beta_i(R_M - R_F)$$

where: K = *required return*
R_F = *risk-free rate*
β = *beta coefficient of asset i*
R_M = *required return on the overall market*

There are essentially three terms within the CAPM equation that are required to calculate the required return (K): (1) the risk-free rate (R_F); (2) the beta coefficient (β); and (3) the equity risk premium ($R_M - R_F$), which is the required return on the overall market less the risk-free rate.

Raw Beta Calculations and Adjustments

A stock's beta equals the covariance of the asset's returns with the returns on a market portfolio, divided by the portfolio's variance, as expressed in the following formula:[118]

Equation 9:
Beta

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2}$$

where: β_i = *beta of asset i*
σ_{im} = *covariance of asset i returns with market portfolio returns*
σ^2_m = *variance of market portfolio*

Betas that are published by various research firms are typically calculated through a regression analysis that considers the movements in price of an individual stock and movements in the price of the overall market portfolio. The betas produced by this regression analysis are considered "raw" betas. There is empirical evidence that raw betas should be adjusted to account

[118] John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 180-81 (3rd ed., South Western Cengage Learning 2010).

for beta's natural tendency to revert to an underlying mean.[119] Some analysts use an adjustment method proposed by Blume, which adjusts raw betas toward the market mean of one.[120] While the Blume adjustment method is popular due to its simplicity, it is arguably arbitrary, and some would say not useful at all. According to Dr. Damodaran: "While we agree with the notion that betas move toward 1.0 over time, the [Blume adjustment] strikes us as arbitrary and not particularly useful."[121] The Blume adjustment method is especially arbitrary when applied to industries with consistently low betas, such as the utility industry. For industries with consistently low betas, it is better to employ an adjustment method that adjusts raw betas toward an industry average, rather than the market average. Vasicek proposed such a method, which is preferable to the Blume adjustment method because it allows raw betas to be adjusted toward an industry average, and also accounts for the statistical accuracy of the raw beta calculation.[122] In other words, "[t]he Vasicek adjustment seeks to overcome one weakness of the Blume model by not applying the same adjustment to every security; rather, a security-specific adjustment is made depending on the statistical quality of the regression."[123] The Vasicek beta adjustment equation is expressed as follows:

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[119] *See* Michael J. Gombola and Douglas R. Kahl, *Time-Series Processes of Utility Betas: Implications for Forecasting Systematic Risk* 84-92 (Financial Management Autumn 1990).

[120] See Marshall Blume, *On the Assessment of Risk*, Vol. 26, No. 1 The Journal of Finance 1 (1971).

[121] *See* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 187 (3rd ed., John Wiley & Sons, Inc. 2012).

[122] Oldrich A. Vasicek, *A Note on Using Cross-Sectional Information in Bayesian Estimation of Security Betas* 1233-1239 (Journal of Finance, Vol. 28, No. 5, December 1973).

[123] 2012 Ibbotson Stocks, Bonds, Bills, and Inflation Valuation Yearbook 77-78 (Morningstar 2012).

Equation 10:
Vasicek Beta Adjustment

$$\beta_{i1} = \frac{\sigma^2_{\beta i0}}{\sigma^2_{\beta 0} + \sigma^2_{\beta_{i0}}}\beta_0 + \frac{\sigma^2_{\beta 0}}{\sigma^2_{\beta 0} + \sigma^2_{\beta_{i0}}}\beta_{i0}$$

where: β_{i1} = *Vasicek adjusted beta for security i*
β_{i0} = *historical beta for security i*
β_0 = *beta of industry or proxy group*
$\sigma^2_{\beta 0}$ = *variance of betas in the industry or proxy group*
$\sigma^2_{\beta i0}$ = *square of standard error of the historical beta for security i*

The Vasicek beta adjustment is an improvement on the Blume model because the Vasicek model does not apply the same adjustment to every security. A higher standard error produced by the regression analysis indicates a lower statistical significance of the beta estimate. Thus, a beta with a high standard error should receive a greater adjustment than a beta with a low standard error. As stated in Ibbotson:

> While the Vasicek formula looks intimidating, it is really quite simple. The adjusted beta for a company is a weighted average of the company's historical beta and the beta of the market, industry, or peer group. How much weight is given to the company and historical beta depends on the statistical significance of the company beta statistic. If a company beta has a low standard error, then it will have a higher weighting in the Vasicek formula. If a company beta has a high standard error, then it will have lower weighting in the Vasicek formula. An advantage of this adjustment methodology is that it does not force an adjustment to the market as a whole. Instead, the adjustment can be toward an industry or some other peer group. *This is most useful in looking at companies in industries that on average have high or low betas*.[124]

Thus, the Vasicek adjustment method is statistically more accurate, and is the preferred method to use when analyzing companies in an industry that has inherently low betas, such as the utility industry. The Vasicek method was also confirmed by Gombola, who conducted a study

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[124] *Id*. at 78 (emphasis added).

specifically related to utility companies. Gombola concluded that "[t]he strong evidence of auto-regressive tendencies in *utility* betas lends support to the application of adjustment procedures such as the . . . adjustment procedure presented by Vasicek."[125] Gombola also concluded that adjusting raw betas toward the market mean of 1.0 is *too high*, and that "[i]nstead, they should be adjusted toward a value that is less than one."[126] In conducting the Vasicek adjustment on betas in previous cases, it reveals that utility betas are even lower than those published by Value Line.[127] Gombola's findings are particular important here, because his study was conducted specifically on utility companies. This evidence indicates that using Value Line's betas in a CAPM cost of equity estimate for a utility company may lead to overestimated results. Regardless, adjusting betas to a level that is *higher* than Value Line's betas is not reasonable, and it would produce CAPM cost of equity results that are too high.

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[125] Michael J. Gombola and Douglas R. Kahl, *Time-Series Processes of Utility Betas: Implications for Forecasting Systematic Risk* 92 (Financial Management Autumn 1990) (emphasis added).

[126] *Id*. at 91-92.

[127] *See e.g.* Responsive Testimony of David J. Garrett, filed March 21, 2016 in Cause No. PUD 201500273 before the Corporation Commission of Oklahoma (the Company's 2015 rate case), at pp. 56 – 59.

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EDUCATION

University of Oklahoma — Norman, OK
Master of Business Administration — 2014
Areas of Concentration: Finance, Energy

University of Oklahoma College of Law — Norman, OK
Juris Doctor — 2007
Member, American Indian Law Review

University of Oklahoma — Norman, OK
Bachelor of Business Administration — 2003
Major: Finance

PROFESSIONAL DESIGNATIONS

Society of Depreciation Professionals
Certified Depreciation Professional (CDP)

Society of Utility and Regulatory Financial Analysts
Certified Rate of Return Analyst (CRRA)

The Mediation Institute
Certified Civil / Commercial & Employment Mediator

WORK EXPERIENCE

Resolve Utility Consulting PLLC — Oklahoma City, OK
Managing Member — 2016 – Present
Provide expert analysis and testimony specializing in depreciation and cost of capital issues for clients in utility regulatory proceedings.

Oklahoma Corporation Commission — Oklahoma City, OK
Public Utility Regulatory Analyst — 2012 – 2016
Assistant General Counsel — 2011 – 2012
Represented commission staff in utility regulatory proceedings and provided legal opinions to commissioners. Provided expert analysis and testimony in depreciation, cost of capital, incentive compensation, payroll and other issues.

Perebus Counsel, PLLC — Oklahoma City, OK
Managing Member — 2009 – 2011
Represented clients in the areas of family law, estate planning, debt negotiations, business organization, and utility regulation.

Moricoli & Schovanec, P.C. — Oklahoma City, OK
Associate Attorney — 2007 – 2009
Represented clients in the areas of contracts, oil and gas, business structures and estate administration.

TEACHING EXPERIENCE

University of Oklahoma — Norman, OK
Adjunct Instructor – "Conflict Resolution" — 2014 – Present
Adjunct Instructor – "Ethics in Leadership"

Rose State College — Midwest City, OK
Adjunct Instructor – "Legal Research" — 2013 – 2015
Adjunct Instructor – "Oil & Gas Law"

PUBLICATIONS

American Indian Law Review — Norman, OK
"Vine of the Dead: Reviving Equal Protection Rites for Religious Drug Use" — 2006
(31 Am. Indian L. Rev. 143)

VOLUNTEER EXPERIENCE

Calm Waters — Oklahoma City, OK
Board Member — 2015 – 2018
Participate in management of operations, attend meetings, review performance, compensation, and financial records. Assist in fundraising events.

Group Facilitator & Fundraiser — 2014 – 2018
Facilitate group meetings designed to help children and families cope with divorce and tragic events. Assist in fundraising events.

St. Jude Children's Research Hospital — Oklahoma City, OK
Oklahoma Fundraising Committee — 2008 – 2010
Raised money for charity by organizing local fundraising events.

PROFESSIONAL ASSOCIATIONS

Oklahoma Bar Association 2007 – Present

Society of Depreciation Professionals 2014 – Present
Board Member – President 2017
Participate in management of operations, attend meetings, review performance, organize presentation agenda.

Society of Utility Regulatory Financial Analysts 2014 – Present

SELECTED CONTINUING PROFESSIONAL EDUCATION

Society of Depreciation Professionals — Austin, TX
"Life and Net Salvage Analysis" — 2015
Extensive instruction on utility depreciation, including actuarial and simulation life analysis modes, gross salvage, cost of removal, life cycle analysis, and technology forecasting.

Society of Depreciation Professionals — New Orleans, LA
"Introduction to Depreciation" and "Extended Training" — 2014
Extensive instruction on utility depreciation, including average lives and net salvage.

Society of Utility and Regulatory Financial Analysts — Indianapolis, IN
46th Financial Forum. "The Regulatory Compact: Is it Still Relevant?" — 2014
Forum discussions on current issues.

New Mexico State University, Center for Public Utilities — Santa Fe, NM
Current Issues 2012, "The Santa Fe Conference" — 2012
Forum discussions on various current issues in utility regulation.

Michigan State University, Institute of Public Utilities — Clearwater, FL
"39th Eastern NARUC Utility Rate School" — 2011
One-week, hands-on training emphasizing the fundamentals of the utility ratemaking process.

New Mexico State University, Center for Public Utilities — Albuquerque, NM
"The Basics: Practical Regulatory Training for the Changing Electric Industries" — 2010
One-week, hands-on training designed to provide a solid foundation in core areas of utility ratemaking.

The Mediation Institute — Oklahoma City, OK
"Civil / Commercial & Employment Mediation Training" — 2009
Extensive instruction and mock mediations designed to build foundations in conducting mediations in civil matters.

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Railroad Commission of Texas	Texas Gas Services Company	GUD 10928	Depreciation rates, service lives, net salvage	Gulf Coast Service Area Steering Committee
Public Utilities Commission of the State of California	Southern California Edison	A.19-08-013	Depreciation rates, service lives, net salvage	The Utility Reform Network
Massachusetts Department of Public Utilities	NSTAR Gas Company	D.P.U. 19-120	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Georgia Public Service Commission	Liberty Utilities (Peach State Natural Gas)	42959	Depreciation rates, service lives, net salvage	Public Interest Advocacy Staff
Florida Public Service Commission	Florida Public Utilities Company	20190155-EI 20190156-EI 20190174-EI	Depreciation rates, service lives, net salvage	Florida Office of Public Counsel
Illinois Commerce Commission	Commonwealth Edison Company	20-0393	Depreciation rates, service lives, net salvage	The Office of the Illinois Attorney General
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 49831	Depreciation rates, service lives, net salvage	Alliance of Xcel Municipalities
South Carolina Public Service Commission	Blue Granite Water Company	2019-290-WS	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Railroad Commission of Texas	CenterPoint Energy Resources	GUD 10920	Depreciation rates and grouping procedure	Alliance of CenterPoint Municipalities
Pennsylvania Public Utility Commission	Aqua Pennsylvania Wastewater	A-2019-3009052	Fair market value estimates for wastewater assets	Pennsylvania Office of Consumer Advocate
New Mexico Public Regulation Commission	Southwestern Public Service Company	19-00170-UT	Cost of capital and authorized rate of return	The New Mexico Large Customer Group; Occidental Permian
Indiana Utility Regulatory Commission	Duke Energy Indiana	45253	Cost of capital, depreciation rates, net salvage	Indiana Office of Utility Consumer Counselor
Maryland Public Service Commission	Columbia Gas of Maryland	9609	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Washington Utilities & Transportation Commission	Avista Corporation	UE-190334	Cost of capital, awarded rate of return, capital structure	Washington Office of Attorney General

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Indiana Utility Regulatory Commission	Indiana Michigan Power Company	45235	Cost of capital, depreciation rates, net salvage	Indiana Office of Utility Consumer Counselor
Public Utilities Commission of the State of California	Pacific Gas & Electric Company	18-12-009	Depreciation rates, service lives, net salvage	The Utility Reform Network
Oklahoma Corporation Commission	The Empire District Electric Company	PUD 201800133	Cost of capital, authorized ROE, depreciation rates	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Arkansas Public Service Commission	Southwestern Electric Power Company	19-008-U	Cost of capital, depreciation rates, net salvage	Western Arkansas Large Energy Consumers
Public Utility Commission of Texas	CenterPoint Energy Houston Electric	PUC 49421	Depreciation rates, service lives, net salvage	Texas Coast Utilities Coalition
Massachusetts Department of Public Utilities	Massachusetts Electric Company and Nantucket Electric Company	D.P.U. 18-150	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 201800140	Cost of capital, authorized ROE, depreciation rates	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	D2018.9.60	Depreciation rates, service lives, net salvage	Montana Consumer Counsel and Denbury Onshore
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45159	Depreciation rates, grouping procedure, demolition costs	Indiana Office of Utility Consumer Counselor
Public Service Commission of the State of Montana	NorthWestern Energy	D2018.2.12	Depreciation rates, service lives, net salvage	Montana Consumer Counsel
Oklahoma Corporation Commission	Public Service Company of Oklahoma	PUD 201800097	Depreciation rates, service lives, net salvage	Oklahoma Industrial Energy Consumers and Wal-Mart
Nevada Public Utilities Commission	Southwest Gas Corporation	18-05031	Depreciation rates, service lives, net salvage	Nevada Bureau of Consumer Protection
Public Utility Commission of Texas	Texas-New Mexico Power Company	PUC 48401	Depreciation rates, service lives, net salvage	Alliance of Texas-New Mexico Power Municipalities
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 201700496	Depreciation rates, service lives, net salvage	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Maryland Public Service Commission	Washington Gas Light Company	9481	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Indiana Utility Regulatory Commission	Citizens Energy Group	45039	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	Entergy Texas, Inc.	PUC 48371	Depreciation rates, decommissioning costs	Texas Municipal Group
Washington Utilities & Transportation Commission	Avista Corporation	UE-180167	Depreciation rates, service lives, net salvage	Washington Office of Attorney General
New Mexico Public Regulation Commission	Southwestern Public Service Company	17-00255-UT	Cost of capital and authorized rate of return	HollyFrontier Navajo Refining; Occidental Permian
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 47527	Depreciation rates, plant service lives	Alliance of Xcel Municipalities
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	D2017.9.79	Depreciation rates, service lives, net salvage	Montana Consumer Counsel
Florida Public Service Commission	Florida City Gas	20170179-GU	Cost of capital, depreciation rates	Florida Office of Public Counsel
Washington Utilities & Transportation Commission	Avista Corporation	UE-170485	Cost of capital and authorized rate of return	Washington Office of Attorney General
Wyoming Public Service Commission	Powder River Energy Corporation	10014-182-CA-17	Credit analysis, cost of capital	Private customer
Oklahoma Corporation Commission	Public Service Co. of Oklahoma	PUD 201700151	Depreciation, terminal salvage, risk analysis	Oklahoma Industrial Energy Consumers
Public Utility Commission of Texas	Oncor Electric Delivery Company	PUC 46957	Depreciation rates, simulated analysis	Alliance of Oncor Cities
Nevada Public Utilities Commission	Nevada Power Company	17-06004	Depreciation rates, service lives, net salvage	Nevada Bureau of Consumer Protection
Public Utility Commission of Texas	El Paso Electric Company	PUC 46831	Depreciation rates, interim retirements	City of El Paso

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-16-24	Accelerated depreciation of North Valmy plant	Micron Technology, Inc.
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-16-23	Depreciation rates, service lives, net salvage	Micron Technology, Inc.
Public Utility Commission of Texas	Southwestern Electric Power Company	PUC 46449	Depreciation rates, decommissioning costs	Cities Advocating Reasonable Deregulation
Massachusetts Department of Public Utilities	Eversource Energy	D.P.U. 17-05	Cost of capital, capital structure, and rate of return	Sunrun Inc.; Energy Freedom Coalition of America
Railroad Commission of Texas	Atmos Pipeline - Texas	GUD 10580	Depreciation rates, grouping procedure	City of Dallas
Public Utility Commission of Texas	Sharyland Utility Company	PUC 45414	Depreciation rates, simulated analysis	City of Mission
Oklahoma Corporation Commission	Empire District Electric Company	PUD 201600468	Cost of capital, depreciation rates	Oklahoma Industrial Energy Consumers
Railroad Commission of Texas	CenterPoint Energy Texas Gas	GUD 10567	Depreciation rates, simulated plant analysis	Texas Coast Utilities Coalition
Arkansas Public Service Commission	Oklahoma Gas & Electric Company	160-159-GU	Cost of capital, depreciation rates, terminal salvage	Arkansas River Valley Energy Consumers; Wal-Mart
Florida Public Service Commission	Peoples Gas	160-159-GU	Depreciation rates, service lives, net salvage	Florida Office of Public Counsel
Arizona Corporation Commission	Arizona Public Service Company	E-01345A-16-0036	Cost of capital, depreciation rates, terminal salvage	Energy Freedom Coalition of America
Nevada Public Utilities Commission	Sierra Pacific Power Company	16-06008	Depreciation rates, net salvage, theoretical reserve	Northern Nevada Utility Customers
Oklahoma Corporation Commission	Oklahoma Gas & Electric Co.	PUD 201500273	Cost of capital, depreciation rates, terminal salvage	Public Utility Division
Oklahoma Corporation Commission	Public Service Co. of Oklahoma	PUD 201500208	Cost of capital, depreciation rates, terminal salvage	Public Utility Division

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Oklahoma Corporation Commission	Oklahoma Natural Gas Company	PUD 201500213	Cost of capital, depreciation rates, net salvage	Public Utility Division

Proxy Group Summary

Company	Ticker	[1] Market Cap. ($ millions)	[2] Market Category	[3] Value Line Safety Rank	[4] Financial Strength
Atmos Energy Corporation	ATO	12,800	Large Cap	1	A+
New Jersey Resources Corp.	NJR	3,100	Mid Cap	2	A+
Northwest Natural Gas Company	NWN	1,600	Small Cap	1	A
ONE Gas, Inc.	OGS	4,000	Mid Cap	2	A
South Jersey Inds.	SJI	2,400	Mid Cap	3	B++
Southwest Gas Holdings, Inc.	SWX	3,900	Mid Cap	3	A
Spire Inc.	SR	3,100	Mid Cap	2	B++

[1], [2], [4] Value Line Investment Survey

[2] Large Cap > $10 billion; Mid Cap > $2 billion; Small Cap > $200 million

DCF Stock and Index Prices

Ticker	^GSPC	ATO	NJR	NWN	OGS	SJI	SWX	SR
30-day Average	3389	95.18	28.35	45.30	71.16	19.76	65.51	55.33
Standard Deviation	82.6	1.56	1.26	1.21	2.39	0.60	2.44	2.16
09/22/20	3316	93.72	27.08	44.90	68.22	19.14	62.26	52.31
09/23/20	3237	92.87	26.28	42.94	66.55	18.48	60.08	51.52
09/24/20	3247	93.59	26.52	43.59	67.14	18.71	61.66	51.98
09/25/20	3298	95.25	26.59	43.84	68.54	18.93	62.54	52.52
09/28/20	3352	95.04	26.66	43.46	68.49	19.14	62.44	52.89
09/29/20	3335	95.10	26.66	43.22	68.44	19.17	62.08	52.92
09/30/20	3363	95.59	27.02	44.90	69.01	19.27	63.10	53.20
10/01/20	3381	95.47	26.93	44.29	68.88	19.02	62.85	52.56
10/02/20	3348	96.02	27.56	44.99	69.69	19.71	64.00	53.39
10/05/20	3409	95.22	27.37	44.81	70.29	19.69	64.80	53.53
10/06/20	3361	96.98	28.07	45.98	71.81	20.42	65.86	54.08
10/07/20	3419	96.38	28.43	45.80	72.15	20.24	66.07	54.87
10/08/20	3447	96.79	29.14	46.38	73.91	20.61	67.66	55.80
10/09/20	3477	96.51	28.84	46.40	73.72	20.33	67.06	55.77
10/12/20	3534	96.61	28.86	46.47	73.80	20.41	67.89	56.25
10/13/20	3512	95.41	28.73	46.54	73.70	20.18	67.30	56.32
10/14/20	3489	95.04	28.59	45.96	73.38	20.15	66.33	56.49
10/15/20	3483	94.50	28.61	45.99	73.39	19.97	66.33	57.20
10/16/20	3484	94.49	28.94	45.81	73.11	19.80	66.84	56.95
10/19/20	3427	94.24	28.36	44.86	72.42	19.60	65.92	56.86
10/20/20	3443	94.28	28.37	45.41	72.30	19.87	66.85	57.71
10/21/20	3436	95.54	28.89	47.01	72.95	20.03	67.35	57.57
10/22/20	3453	96.64	29.40	46.67	73.95	20.53	68.53	58.26
10/23/20	3465	97.69	29.55	46.51	73.93	20.48	69.20	58.68
10/26/20	3401	97.48	30.60	47.31	73.79	20.55	68.93	58.19
10/27/20	3391	97.07	30.51	46.64	72.48	20.25	68.17	57.59
10/28/20	3271	92.69	28.96	43.91	69.38	19.37	64.85	55.30
10/29/20	3310	92.08	28.96	44.72	68.82	19.44	64.84	56.16
10/30/20	3270	91.67	29.18	44.44	69.04	19.27	65.72	56.04
11/02/20	3310	95.51	30.89	45.35	71.49	20.05	67.67	57.02

All prices are adjusted closing prices reported by Yahoo! Finance, http://finance.yahoo.com

DCF Dividend Yields

Exhibit DJG-4

Company	Ticker	[1] Dividend	[2] Stock Price	[3] Dividend Yield
Atmos Energy Corporation	ATO	0.575	95.18	0.60%
New Jersey Resources Corp.	NJR	0.333	28.35	1.17%
Northwest Natural Gas Company	NWN	0.480	45.30	1.06%
ONE Gas, Inc.	OGS	0.540	71.16	0.76%
South Jersey Inds.	SJI	0.295	19.76	1.49%
Southwest Gas Holdings, Inc.	SWX	0.570	65.51	0.87%
Spire Inc.	SR	0.623	55.33	1.13%
Average		**$0.49**	**$54.37**	**1.01%**

[1] 2020 Q3 reported quarterly dividends per share. Nasdaq.com

[2] Average stock price from Exhibit DJG-3

[3] = [1] / [2] (quarterly dividend yield)

DCF Terminal Growth Rate Determinants

Terminal Growth Determinants	Rate	
Nominal GDP	3.9%	[1]
Real GDP	1.9%	[2]
Inflation	2.0%	[3]
Risk Free Rate	1.5%	[4]
Highest	**3.9%**	

[1], [2], [3] CBO, The 2019 Long-Term Budget Outlook, p. 54, June 2019
[4] From Exhibit DJG-7

WGL-Specific Growth Determinants	Rate	
Total Load	0.1%	[5]
Total Customers	1.1%	[6]
Average	**0.6%**	

[5] OPC DR 4-11(a) - annual total load growth (therms) 2010-2019
[6] OPC DR 4-11(b) - annual total customers 2010-2019

DCF Final Results

[1]	[2]	[3]	[4]
Dividend (d_0)	Stock Price (P_0)	Growth Rate (g)	**DCF Result**
$0.49	$54.37	3.90%	**7.7%**

[1] Average proxy dividend from Exhibit DJG-4

[2] Average proxy stock price from Exhibit DJG-3

[3] Highest growth determinant from Exhibit DJG-5

[4] Quarterly DCF Approximation = $[d_0(1 + g)^{0.25}/P_0 + (1 + g)^{0.25}]^4 - 1$

CAPM Risk-Free Rate

Date	Rate
08/10/20	1.43%
08/11/20	1.42%
08/12/20	1.42%
08/13/20	1.40%
08/14/20	1.40%
08/17/20	1.42%
08/18/20	1.41%
08/19/20	1.46%
08/20/20	1.45%
08/21/20	1.48%
08/24/20	1.57%
08/25/20	1.56%
08/26/20	1.60%
08/27/20	1.57%
08/28/20	1.58%
08/31/20	1.52%
09/01/20	1.50%
09/02/20	1.52%
09/03/20	1.52%
09/04/20	1.55%
09/08/20	1.60%
09/09/20	1.62%
09/10/20	1.67%
09/11/20	1.64%
09/14/20	1.59%
09/15/20	1.57%
09/16/20	1.56%
09/17/20	1.62%
09/18/20	1.65%
09/21/20	1.63%
Average	**1.53%**

*Daily Treasury Yield Curve Rates on 30-year T-bonds, http://www.treasury.gov/resources-center/data-chart-center/interest-rates/

CAPM Beta Coefficient

Company	Ticker	Beta
Atmos Energy Corporation	ATO	0.80
New Jersey Resources Corp.	NJR	0.90
Northwest Natural Gas Company	NWN	0.80
ONE Gas, Inc.	OGS	0.80
South Jersey Inds.	SJI	1.00
Southwest Gas Holdings, Inc.	SWX	0.90
Spire Inc.	SR	0.80
Average		0.86

Betas from Value Line Investment Survey

CAPM Implied Equity Risk Premium Estimate

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Year	Market Value	Operating Earnings	Dividends	Buybacks	Earnings Yield	Dividend Yield	Buyback Yield	Gross Cash Yield
2014	18,245	1,004	350	553	5.50%	1.92%	3.03%	4.95%
2015	17,900	885	382	572	4.95%	2.14%	3.20%	5.33%
2016	19,268	920	397	536	4.77%	2.06%	2.78%	4.85%
2017	22,821	1,066	420	519	4.67%	1.84%	2.28%	4.12%
2018	21,027	1,282	456	806	6.10%	2.17%	3.84%	6.01%
2019	26,760	1,305	485	729	4.88%	1.81%	2.72%	4.54%

Cash Yield	4.96%	[9]
Growth Rate	5.37%	[10]
Risk-free Rate	1.53%	[11]
Current Index Value	3,389	[12]

	[13]	[14]	[15]	[16]	[17]
Year	1	2	3	4	5
Expected Dividends	177	187	197	207	219
Expected Terminal Value					3725
Present Value	165	162	159	155	2748
Intrinsic Index Value	3389	[18]			
Required Return on Market	7.49%	[19]			
Implied Equity Risk Premium	**6.0%**	[20]			

[1-4] S&P Quarterly Press Releases, data found at https://us.spindices.com/indices/equity/sp-500, Q4 2018
[1] Market value of S&P 500
[5] = [2] / [1]
[6] = [3] / [1]
[7] = [4] / [1]
[8] = [6] + [7]
[9] = Average of [8]
[10] = Compound annual growth rate of [2] = (end value / beginning value)^ $^{1/4}$ -1
[11] Risk-free rate from DJG-1-7
[12] 30-day average of closing index prices from DJG-1-3 (^GSPC column)
[13-16] Expected dividends = [9]*[12]*(1+[10]) ^{n} ; Present value = expected dividend / (1+[11]+[19]) ^{n}
[17] Expected terminal value = expected dividend * (1+[11]) / [19] ; Present value = (expected dividend + expected terminal value) / (1+[11]+[19]) ^{n}
[18] = Sum([13-17]) present values.
[19] = [20] + [11]
[20] Internal rate of return calculation setting [18] equal to [12] and solving for the discount rate

CAPM Equity Risk Premium Results

IESE Business School Survey	5.6%	[1]
Graham & Harvey Survey	4.4%	[2]
Duff & Phelps Report	6.0%	[3]
Damodaran (highest Oct. result)	5.9%	[4]
Damodaran (COVID Adjusted)	5.0%	[5]
Garrett	6.0%	[6]
Average	**5.5%**	
Highest	**6.0%**	

[1] IESE Business School Survey 2020
[2] Graham and Harvey Survey 2018
[3] Duff & Phelps, 3-5-2020
[4], [5] http://pages.stern.nyu.edu/~adamodar/ , 11-1-20
[6] From Exhibit DJG-9

CAPM Final Results

Company	Ticker	[1] Risk-Free Rate	[2] Value Line Beta	[3] Risk Premium	[4] CAPM Results
Atmos Energy Corporation	ATO	1.53%	0.80	6.0%	6.3%
New Jersey Resources Corp.	NJR	1.53%	0.90	6.0%	6.9%
Northwest Natural Gas Company	NWN	1.53%	0.80	6.0%	6.3%
ONE Gas, Inc.	OGS	1.53%	0.80	6.0%	6.3%
South Jersey Inds.	SJI	1.53%	1.00	6.0%	7.5%
Southwest Gas Holdings, Inc.	SWX	1.53%	0.90	6.0%	6.9%
Spire Inc.	SR	1.53%	0.80	6.0%	6.3%
Average			0.86		**6.7%**

[1] From DJG-1-7, risk-free rate exhibit
[2] From DJG-1-8, beta exhibit
[3] From DJG-1-10, equity risk premium exhibit
[6] = [1] + [2] * [3]

Cost of Equity Summary

Model	Cost of Equity
Discounted Cash Flow Model	7.7%
Capital Asset Pricing Model	6.7%
Average	**7.2%**

Market Cost of Equity

Source	Estimate	
IESE Survey	7.1%	[1]
Graham Harvey Survey	6.0%	[2]
Damodaran	7.4%	[3]
Garrett	7.5%	[4]
Average	7.0%	
Highest	7.5%	

[1], [2], [3] Average reported ERP + riskfree rate from DJG-7

[4] From Exhibit DJG-9, Implied ERP exhibit

Market Cost of Equity vs. Awarded Returns

Exhibit DJG-14

	[1]		[2]		[3]		[4]	[5]	[6]	[7]
	Electric Utilities		Gas Utilities		Total Utilities		S&P 500	T-Bond	Risk	Market
Year	ROE	#	ROE	#	ROE	#	Returns	Rate	Premium	COE
1990	12.70%	38	12.68%	33	12.69%	71	-3.06%	8.07%	3.89%	11.96%
1991	12.54%	42	12.45%	31	12.50%	73	30.23%	6.70%	3.48%	10.18%
1992	12.09%	45	12.02%	28	12.06%	73	7.49%	6.68%	3.55%	10.23%
1993	11.46%	28	11.37%	40	11.41%	68	9.97%	5.79%	3.17%	8.96%
1994	11.21%	28	11.24%	24	11.22%	52	1.33%	7.82%	3.55%	11.37%
1995	11.58%	28	11.44%	13	11.54%	41	37.20%	5.57%	3.29%	8.86%
1996	11.40%	18	11.12%	17	11.26%	35	22.68%	6.41%	3.20%	9.61%
1997	11.33%	10	11.30%	12	11.31%	22	33.10%	5.74%	2.73%	8.47%
1998	11.77%	10	11.51%	10	11.64%	20	28.34%	4.65%	2.26%	6.91%
1999	10.72%	6	10.74%	6	10.73%	12	20.89%	6.44%	2.05%	8.49%
2000	11.58%	9	11.34%	13	11.44%	22	-9.03%	5.11%	2.87%	7.98%
2001	11.07%	15	10.96%	5	11.04%	20	-11.85%	5.05%	3.62%	8.67%
2002	11.21%	14	11.17%	19	11.19%	33	-21.97%	3.81%	4.10%	7.91%
2003	10.96%	20	10.99%	25	10.98%	45	28.36%	4.25%	3.69%	7.94%
2004	10.81%	21	10.63%	22	10.72%	43	10.74%	4.22%	3.65%	7.87%
2005	10.51%	24	10.41%	26	10.46%	50	4.83%	4.39%	4.08%	8.47%
2006	10.32%	26	10.40%	15	10.35%	41	15.61%	4.70%	4.16%	8.86%
2007	10.30%	38	10.22%	35	10.26%	73	5.48%	4.02%	4.37%	8.39%
2008	10.41%	37	10.39%	32	10.40%	69	-36.55%	2.21%	6.43%	8.64%
2009	10.52%	40	10.22%	30	10.39%	70	25.94%	3.84%	4.36%	8.20%
2010	10.37%	61	10.15%	39	10.28%	100	14.82%	3.29%	5.20%	8.49%
2011	10.29%	42	9.92%	16	10.19%	58	2.10%	1.88%	6.01%	7.89%
2012	10.17%	58	9.94%	35	10.08%	93	15.89%	1.76%	5.78%	7.54%
2013	10.03%	49	9.68%	21	9.93%	70	32.15%	3.04%	4.96%	8.00%
2014	9.91%	38	9.78%	26	9.86%	64	13.52%	2.17%	5.78%	7.95%
2015	9.85%	30	9.60%	16	9.76%	46	1.38%	2.27%	6.12%	8.39%
2016	9.77%	42	9.54%	26	9.68%	68	11.77%	2.45%	5.69%	8.14%
2017	9.74%	53	9.72%	24	9.73%	77	21.61%	2.41%	5.08%	7.49%
2018	9.64%	37	9.62%	26	9.63%	63	-4.23%	2.68%	5.96%	8.64%
2019	9.64%	67	9.77%		9.64%	67	31.22%	1.92%	5.20%	7.12%

[1], [2], [3] Average annual authorized ROE for electric and gas utilities, RRA Regulatory Focus: Major Rate Case Decisions

[3] = [1] + [2]

[4], [5], [6] Annual S&P 500 return, 10-year T-bond Rate, and equity risk premium published by NYU Stern School of Business

[7] = [5] + [6] ; Market cost of equity represents the required return for investing in all stocks in the market for a given year

Optimal Capital Structure

Inputs

Operating Income	181,411	[1]
Interest Expense	62,567	[2]
Book Debt	1,430,949	[3]
Book Equity	1,572,196	[4]
Debt / Capital	47.65%	[5]
Debt / Equity	91%	[6]
Debt Cost	4.52%	[7]
Tax Rate	21%	[8]
Unlevered Beta	0.50	[9]
Risk-free Rate	1.53%	[10]
Equity Risk Premium	6.0%	[11]
Coverage Ratio	2.90	[12]
Bond Rating	A3	[13]

Ratings Table

[14] Coverage Ratio	[15] Bond Rating	[16] Spread	[17] Interest Rate
8.5 - 10.00	Aaa/AAA	0.63%	2.16%
6.5 - 8.49	Aa2/AA	0.78%	2.31%
5.5 - 6.49	A1/A+	0.98%	2.51%
4.25 - 5.49	A2/A	1.08%	2.61%
3.0 - 4.24	A3/A-	1.22%	2.75%
2.5 - 2.99	Baa2/BBB	1.56%	3.09%
2.25 - 2.49	Ba1/BB+	2.00%	3.53%
2.0 - 2.24	Ba2/BB	2.40%	3.93%
1.75 - 1.99	B1/B+	3.51%	5.04%
1.5 - 1.74	B2/B	4.21%	5.74%
1.25 - 1.49	B3/B-	5.15%	6.68%
0.8 - 1.24	Caa/CCC	8.20%	9.73%

Optimal Capital Structure Calculation

[18] Debt Ratio	[19] D/E Ratio	[20] Levered Beta	[21] Cost of Equity	[22] Proposed ROE	[23] Debt Level	[24] Interest Expense	[25] Coverage Ratio	[26] Pre-tax Debt Cost	[27] After-tax Debt Cost	[28] Optimal WACC	[29] WACC at 9.0% ROE
0%	0%	0.499	4.52%	9.00%	0	0	∞	2.16%	1.71%	4.52%	9.00%
20%	25%	0.597	5.11%	9.00%	600,629	27,148	6.68	2.31%	1.82%	4.46%	7.56%
30%	43%	0.667	5.54%	9.00%	900,944	40,723	4.45	2.61%	2.06%	4.49%	6.92%
40%	67%	0.761	6.10%	9.00%	1,201,258	54,297	3.34	2.75%	2.17%	4.53%	6.27%
50%	100%	0.893	6.89%	9.00%	1,501,573	67,871	2.67	3.09%	2.44%	4.66%	5.72%
52%	108%	0.925	7.08%	9.00%	1,561,635	70,586	2.57	3.09%	2.44%	4.67%	5.59%
55%	122%	0.980	7.41%	9.00%	1,651,730	74,658	2.43	3.53%	2.79%	4.87%	5.58%

[1], [2] Response to OPC DR 4-15 (000's)
[3], [4] Response to OPC DR 4-15 (000's)
[5] = [3] / ([3] + [4])
[6] = [3] / [4]
[7] Response to OPC DR 4-15 (000's)
[8] Corporate tax rate, Sch. H-9
[9] Average beta / (1+(1 - [8])*[6])
[10] From DJG risk-free rate exhibit
[11] From DJG equity risk premium exhibit

[12] = [1] / [2]
[13] Company bond rating
[14] Ranges of coverage ratios
[15] Moody's / S&P bond ratings
[16] NYU spread over risk-free rate
[17] = [16] + [10] = est. debt cost
[18] = debt / total capital
[19] = [18] / (1 - [18])
[20] = [9] * (1 + (1 - [8]) * [6]

[21] = [10] + [20] * [11]
[22] Recommended awarded ROE
[23] = [18] * ([3] + [4]); (000's)
[24] = [22] * [7]; (000's)
[25] = [1] / [23]
[26] Debt cost given coverage ratio per Ratings Table
[27] = [25] * (1 - [8])
[28] = ([18] * [26]) + ((1 - [18]) * [21])
[29] = ([18] * [26]) + ((1 - [18]) * [22])

Competitive Industry Debt Ratios

Industry	# Firms	Debt Ratio
Tobacco	17	96%
Financial Svcs. (Non-bank & Insurance)	232	95%
Retail (Building Supply)	17	90%
Hospitals/Healthcare Facilities	36	88%
Advertising	47	80%
Retail (Automotive)	26	79%
Brokerage & Investment Banking	39	77%
Auto & Truck	13	75%
Food Wholesalers	17	70%
Bank (Money Center)	7	69%
Transportation	18	67%
Hotel/Gaming	65	67%
Packaging & Container	24	66%
Retail (Grocery and Food)	13	66%
Broadcasting	27	65%
R.E.I.T.	234	64%
Retail (Special Lines)	89	64%
Green & Renewable Energy	22	64%
Recreation	63	63%
Software (Internet)	30	63%
Air Transport	18	63%
Retail (Distributors)	80	62%
Computers/Peripherals	48	61%
Telecom (Wireless)	18	61%
Farming/Agriculture	31	61%
Cable TV	14	60%
Computer Services	106	60%
Beverage (Soft)	34	60%
Telecom. Services	67	60%
Trucking	33	59%
Power	52	59%
Office Equipment & Services	22	58%
Chemical (Diversified)	6	58%
Retail (Online)	70	58%
Aerospace/Defense	77	58%
Oil/Gas Distribution	24	58%
Business & Consumer Services	165	57%
Construction Supplies	44	57%
Real Estate (Operations & Services)	57	56%
Household Products	127	56%
Environmental & Waste Services	82	56%
Rubber& Tires	4	56%
Transportation (Railroads)	8	55%
Retail (General)	18	54%
Chemical (Basic)	43	54%
Utility (Water)	17	54%
Building Materials	42	54%
Apparel	51	52%
Real Estate (Development)	20	51%
Healthcare Support Services	128	50%
Drugs (Biotechnology)	503	49%
Electrical Equipment	113	49%
Food Processing	88	48%
Machinery	120	48%
Furn/Home Furnishings	35	48%
Beverage (Alcoholic)	21	48%
Drugs (Pharmaceutical)	267	48%
Auto Parts	46	47%
Total / Average	**3,735**	**62%**

http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/dbtfund.htm

Proxy Group Debt Ratios

Company	Ticker	Debt Ratio
Atmos Energy Corporation	ATO	41%
New Jersey Resources Corp.	NJR	45%
Northwest Natural Gas Company	NWN	48%
ONE Gas, Inc.	OGS	40%
South Jersey Inds.	SJI	61%
Southwest Gas Holdings, Inc.	SWX	50%
Spire Inc.	SR	49%
Average		48%

Debt ratios from Value Line Investment Survey - 2020 projected

Weighted Average Rate of Return Proposal

Capital Component	Proposed Ratio	Cost Rate	Weighted Cost
Long Term Debt	48.0%	4.69%	2.25%
Short-Term Debt	3.7%	1.98%	0.07%
Common Equity	48.3%	9.00%	4.35%
Total	100.0%		6.67%

WASHINGTON GAS LIGHT COMPANY'S APPLICATION FOR AUTHORITY TO INCREASE ITS RATES AND CHARGES

Case No. 9651

Data Responses referenced in the Direct Testimony of

David. J. Garrett

WGL Response to OPC DR 4-11

MARYLAND PUBLIC SERVICE COMMISSION

WASHINGTON GAS LIGHT COMPANY

CASE NO. 9651

WASHINGTON GAS COMPANY RESPONSE
AND/OR NOTICE OF OBJECTION/UNAVAILABILITY
DIRECTED TO THE OFFICE OF PEOPLE'S COUNSEL

OPC DATA REQUEST NO. 4

QUESTION NO. 4-11

Q. Please provide WGL's annual figures for the following items over the past 10 years and the source of such information:

a. Total load
b. Total customers
c. Total revenue
d. Operating income
e. Net income
f. Rate base

WASHINGTON GAS' RESPONSE **10/19/2020**

A. Please see the attached file for the requested information.

SPONSOR: Robert E. Tuoriniemi
Chief Regulatory Accountant

Washington Gas Light Company
Maryland Jurisdiction

WGL Annual figures

For the Periods Noted Below

(in thousands, except customer data)

Item	Description	Source	CY 2019	FY 2019 (3 months)	FY 2018	FY 2017	FY 2016	FY 2015
a.	Total Load (therms)	SEC Form 10-K	1,773,200	565,154	1,886,933	1,602,456	1,792,523	1,931,939
b.	Total customers	SEC Form 10-K	1,189,000	1,184,830	1,177,976	1,163,655	1,144,160	1,129,865
c.	Total revenue	SEC Form 10-K	$ 1,330,561	$ 402,101	$ 1,248,063	$ 1,166,968	$ 1,070,904	$ 1,328,191
d.	Operating revenue	SEC Form 10-K	171,933	69,232	24,875	268,312	228,367	222,384
e.	Net Income	SEC Form 10-K	98,087	48,843	(27,962)	130,472	111,794	107,358
f.	Rate base	Per Book Cost of Service analysis	$ 3,050,434	N/A	$ 2,710,311	$ 2,520,146	$ 2,199,100	$ 2,042,616

Item	Description	Source	FY 2014	FY 2013	FY 2012	FY 2011	FY 2010
a.	Total Load (therms)	SEC Form 10-K	1,888,290	1,780,862	1,714,807	1,772,503	1,758,457
b.	Total customers	SEC Form 10-K	1,117,043	1,105,123	1,094,109	1,082,983	1,073,722
c.	Total revenue	SEC Form 10-K	$ 1,443,800	$ 1,200,357	$ 1,137,666	$ 1,288,539	$ 1,321,521
d.	Operating revenue	SEC Form 10-K	182,123	151,133	215,268	163,244	208,685
e.	Net Income	SEC Form 10-K	97,004	71,002	108,726	68,270	101,029
f.	Rate base	Per Book Cost of Service analysis	$ 1,935,746	$ 1,788,010	$ 1,671,125	$ 1,664,987	$ 1,736,465

CY- Calendar year ending December 31st
FY - Fiscal year ending September 30th
N/A - Information not available for the period presented