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June 30, 2025

Adam J. Teitzman, Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: Docket No. 20250029 GU-EI- Petition for rate increase by Peoples Gas System Inc.

Dear Mr. Teitzman:

Please find enclosed for filing in the above referenced docket the Direct Testimony and Exhibits of David J.Garrett. This filing is being made via the Florida Public Service Commission's web-based electronic filing portal.

If you have any questions or concerns, please do not hesitate to contact me. Thank you for your assistance in this matter.

Sincerely,

Walt Trierweiler
Public Counsel

/s/ Charles J. Rehwinkel
Charles J. Rehwinkel
Deputy Public Counsel
Florida Bar No.: 527599

CERTIFICATE OF SERVICE
DOCKET NO. 20250029-GU

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic mail on this 30th day of June, 2025, to the following:

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition for Rate Increase by Peoples Gas System, Inc.	Docket No. 20250029-GU Filed: June 30, 2025

DIRECT TESTIMONY

OF

DAVID J. GARRETT

ON BEHALF

OF

THE CITIZENS OF THE STATE OF FLORIDA

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DIRECT TESTIMONY

OF

DAVID J. GARRETT

On Behalf of the Office of Public Counsel

before the

Florida Public Service Commission

DOCKET NO: 20250029-GU

I. INTRODUCTION

Q. PLEASE 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. PLEASE 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 Oklahoma 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 Oklahoma 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. I am a member of the Oklahoma Bar, but I am not providing legal advice in this proceeding or the State of Florida. A more complete description of my qualifications and regulatory experience is included in my curriculum vitae.[1]

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

A. I am testifying on behalf of the Florida Office of Public Counsel ("OPC") in response to the petition for rate increase by Peoples Gas System ("PGS" or the "Company"). Specifically, I address the cost of capital and fair rate of return for PGS in response to the direct testimony of Company witness Dylan D'Ascendis.

II. EXECUTIVE SUMMARY

Q. DESCRIBE PGS'S POSITION REGARDING THE AWARDED RATE OF RETURN IN THIS CASE.

A. PGS proposes an awarded ROE of 11.1%.[2] PGS also proposes a capital structure consisting of approximately 55% equity and 45% debt.[3] Mr. D'Ascendis relies on the

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[1] Exhibit DJG-1.

[2] Direct Testimony of Dylan W. D'Ascendis, p. 5, lines 1-12.

[3] *Id.* PGS is proposing a capital structure with investor-provided funding sources consisting of 41.69% long-term debt, 3.61% short-term debt, and 54.70% equity. Throughout my testimony, I refer to these figures in rounded

Discounted Cash Flow Model ("DCF Model"), the Capital Asset Pricing Model ("CAPM"), and other risk premium models as part of his recommendation.

Q. PLEASE SUMMARIZE YOUR ANALYSES AND CONCLUSIONS REGARDING PGS'S COST OF EQUITY.

A. PGS has proposed an excessive awarded ROE in this case. Analysis of an appropriate awarded ROE for a utility should begin with a reasonable estimation of the utility's cost of equity. In estimating PGS'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 widely used and widely accepted financial models for calculating cost of equity in utility rate proceedings: the CAPM and DCF Model. I conducted two variations of both the CAPM and DCF Model. The results are shown in the figure below.

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numbers, and I refer to the Company's proposed total debt ratio as 45% and equity ratio as 55% from investor-supplied sources.

Figure 1:
Cost of Equity Model Results

Model	Cost of Equity
CAPM (at Proxy Debt Ratio)	9.0%
Hamada CAPM (at Company-Proposed Debt Ratio)	8.6%
DCF Model (Analyst Growth)	7.8%
DCF Model (Sustainable Growth)	7.4%
Model Average	**8.2%**
Model Range	**7.4% -- 9.0%**
Recommended ROE	**9.0%**

As shown in this figure, the results of my modeling range from 7.4% - 9.0%.[4]

Q. BASED ON YOUR COST OF EQUITY ANALYSES, WHAT IS YOUR PROPOSED ROE FOR PGS?

A. I propose an authorized ROE of 9.0% for PGS, which represents the top end of my cost of equity modeling range. The result of my traditional CAPM is 9.0%. However, in order for this result to be accurate, an adjustment must be made to PGS's ratemaking capital structure, as further discussed below.

[4] Exhibit DJG-12.

Q. WHAT RATEMAKING CAPITAL STRUCTURE DO YOU PROPOSE FOR PGS?

A. In the process of determining a fair rate of return for PGS, not only must the authorized ROE be considered, but also the ratemaking capital structure. PGS's proposed debt ratio of 45% is notably lower than the average debt ratio of the proxy group, which is 51%. This means that PGS has less financial risk relative to the proxy group. Thus, in order for the indicated cost of equity under the CAPM to be correct, we must adjust the result based on PGS's lower risk profile. We can accomplish this through a mathematical model called the Hamada model. Application of the Hamada model shows that PGS's cost of equity under its equity-rich capital structure is only 8.6% once its lower debt ratio is accounted for.

Q. BASED ON THE RESULTS OF YOUR COST OF EQUITY ANALYSES, WHAT IS YOUR RECOMMENDATION TO THE COMMISSION PGS'S AUTHORIZED RATE OF RETURN.

A. PGS's cost of equity estimate of 9.0% under the CAPM is only accurate if it is assumed the Company's total debt ratio is 51%. Otherwise, under PGS's proposed capital structure, its indicated cost of equity under the CAPM is only 8.6%. Thus, along with my recommended ROE of 9.0%, I also recommend a ratemaking capital structure for

PGS consisting of 51% total debt, and 49% common equity. My recommendations are presented in the following figure.[5]

Figure 2:
Awarded Return Recommendation

Capital Component	Proposed Ratio	Cost Rate	Weighted Cost
Long-Term Debt	47.39%	5.64%	2.67%
Short-Term Debt	3.61%	4.55%	0.16%
Common Equity	49.00%	9.00%	4.41%
Total	100.00%		7.25%

These issues are discussed in more detail in my testimony.

III. REGULATORY STANDARDS

Q. PLEASE 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*, the U.S. Supreme Court first addressed the meaning of a fair rate of return for public utilities.[6] The Court found that "the amount of risk in the business is a most important factor" in determining the appropriate

[5] *See also* Exhibit DJG-16. This weighted average cost of capital is based on investor-supplied sources of capital and reflects PGS's requested costs of short-term and long-term debt. For OPC's recommended cost of debt and consolidation of all OPC cost of capital adjustments, please see the direct testimony of OPC witness Lane Kollen, who presents a recommended weighted average cost of capital based on all capital components.

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

allowed rate of return.[7] In the two landmark cases that followed, the Court set forth the standards by which public utilities are allowed to earn a return on capital investments. First, in *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, 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.[8]

Second, in *Federal Power Commission v. Hope Natural Gas Company*, 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.[9]

While I am not testifying as an attorney, I believe the cost of capital models I have employed in this case are in accordance with the foregoing legal standards.

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[7] *Id.* at 48.

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

[9] *Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944) (emphasis added) (internal citations omitted).

Q. SHOULD THE AWARDED RATE OF RETURN BE BASED ON THE COMPANY'S ACTUAL COST OF CAPITAL?

A. Yes. The *Hope* Court makes it clear that the awarded return should be based on the actual cost of capital. Moreover, the awarded return must also be fair, just, and reasonable under the circumstances of each case. 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 with the court's definition of legally required earnings appears clear.[10]

The models I have employed in this case closely estimate the Company's market-based 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

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

return *higher* than the true cost of capital, it arguably results in an inappropriate transfer of wealth from ratepayers to the utility's shareholders.

Q. WHAT DOES THIS LEGAL STANDARD MEAN FOR DETERMINING THE AWARDED RETURN AND THE COST OF CAPITAL?

A. It is important to understand that the *awarded* return and the *cost* of capital are related but different 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 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 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. 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 customers to 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 market-based cost of equity as estimated through objective models is not influenced by these factors but is instead driven by market-based factors. If regulators rely too heavily on the awarded returns from other jurisdictions, it can create a cycle over time that bears little relation to the market-based cost of equity.

IV. COST OF EQUITY 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 DCF Model and the 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 running 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.[11] 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 excessive cost of equity estimate in this case.

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[11] *See* Exhibit DJG-2.

V. RISK AND RETURN CONCEPTS

Q. DISCUSS THE GENERAL RELATIONSHIP BETWEEN RISK AND RETURN.

A. As discussed above, risk is the most important factor for the Commission to consider when determining the allowed return and 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."[12] 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,

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

market risk affects all companies in the market 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.[13]

Analysis of the U.S. market in 2001 provides a good example for contrasting firm-specific risk and market risk. During 2001, Enron Corp.'s stock fell from $80 per share to less than $1 per share, and the company filed for 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 the 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 her 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.

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

Q. CAN INVESTORS MINIMIZE FIRM-SPECIFIC RISK?

A. Yes. A fundamental concept in finance is that firm-specific risk can be eliminated through diversification.[14] If someone irrationally invested all their funds in one firm (such as Enron), 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.[15]

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.[16] Firm-specific risk is also called "diversifiable risk" because it can be easily eliminated through diversification.

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[14] *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).

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

[16] *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?

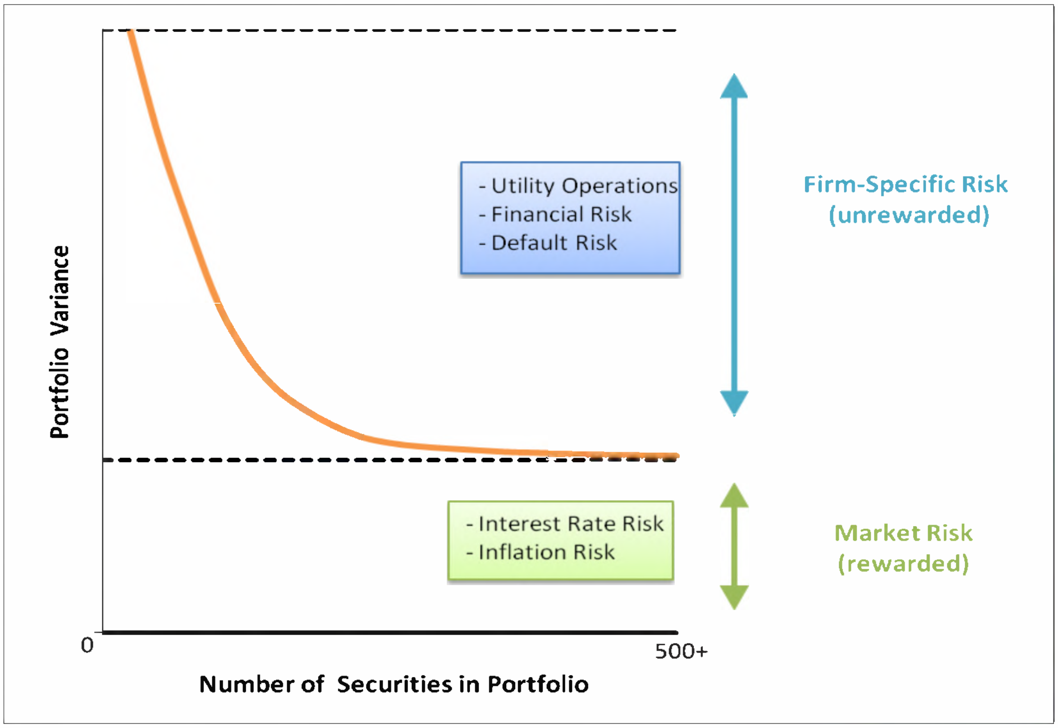
A. Yes. Because investors eliminate firm-specific risk through diversification, they know they cannot expect a higher return for assuming the firm-specific risk in any one company. Thus, the risks associated with an individual firm's operations are not rewarded by the market. In fact, firm-specific risk 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).[17]

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

[17] *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 type of risk the Commission should consider when determining the allowed return.

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."[18] 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.[19]

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."[20] Thus,

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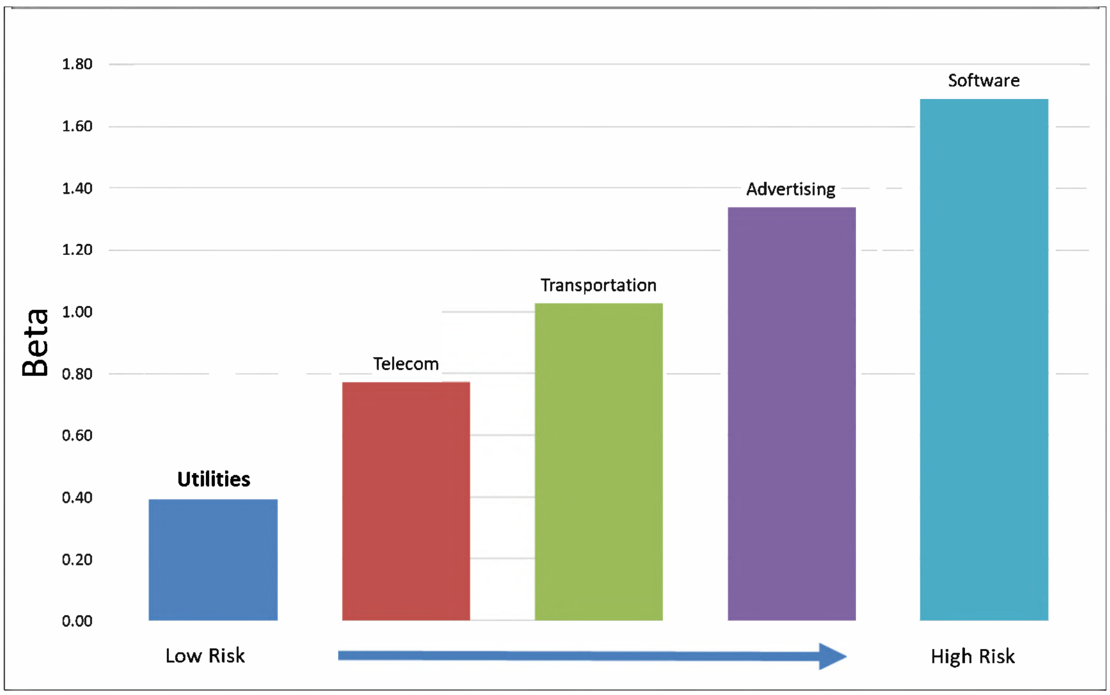
[18] *Id.* at 180-81.

[19] Though it will be discussed in more detail later, Exhibit DJG-9 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.

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

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 utility companies, "will have low betas and performance that is comparatively unaffected by overall market conditions."[21] 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.[22]

Figure 4:
Beta by Industry



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[21] *Id.* at 383.

[22] *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 PGS, like other utilities, is a relatively low-risk company means that its cost of equity will be lower than the higher-beta firms in other industries.

VI. <u>DISCOUNTED CASH FLOW ANALYSIS</u>

Q. DESCRIBE THE DCF MODEL.

A. The 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. The various assumptions, theories, and equations involved in the DCF Model are discussed further in the supplemental material provided in Appendix A.

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.

A. <u>Stock Price</u>

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

A. For the stock price (P_0), I used 30-day averages of adjusted closing stock prices for each company in the proxy group.[23] 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.[24] 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

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[23] Exhibit DJG-3.

[24] 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 Corporate Finance: Linking Theory to What Companies Do*, p. 357. The efficient market hypothesis was formally presented by Eugene Fama in 1970 and is a cornerstone of modern financial theory and practice.

significant length of time from when an application or advice letter is filed and testimony is due. Choosing a current 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.[25]

Q. WHY DID YOU USE ADJUSTED CLOSING STOCK PRICES FOR YOUR DCF ANALYSIS?

A. 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.

[25] Exhibit DJG-3.

B. Dividend

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

A. The dividend term in the DCF Model represents dividends per share (d_0). I used forward-looking annualized dividends published by Yahoo! Finance for the dividend input to my constant growth DCF Model.[26] Dividing these dividends by the stock prices for each proxy company results in the dividend yield for each company.

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 because of their low-risk nature. 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 the DCF Model results in this case are primarily affected by the difference in growth rate estimates.

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[26] Exhibit DJG-4.

C. <u>Growth Rate</u>

Q. PLEASE 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 (g) must be estimated. As a result, the growth rate is often the most contentious issue related to DCF Model inputs in utility rate cases. The DCF Model used in this case is based on the sustainable 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 sustainable 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 sustainable rate forever. 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 sustainable growth rate is more transparent. The growth term of the DCF Model is one of the most important, yet least understood, aspects of cost of equity estimations in utility regulatory proceedings. I provide a more detailed explanation on the various determinants of growth below.

Q. DESCRIBE THE VARIOUS DETERMINANTS OF GROWTH THAT CAN BE CONSIDERED FOR THE GROWTH RATE INPUT IN THE DCF MODEL.

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 a long-term growth rate in dividends. This is also known as a "sustainable" growth rate, since this is the growth rate assumed for the company's dividends in perpetuity. That is not to say that these growth determinants cannot be considered when estimating sustainable growth; however, as discussed below, sustainable growth must be constrained much more than short-term growth, especially for young firms with high growth opportunities. Additionally, I briefly discuss these growth determinants here because it may reveal some of the sources of confusion in this area.

(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 a historical growth in revenues, operating income, and net income. Since dividends are paid from earnings, historical earnings growth may provide an indication of future earnings and dividend growth.

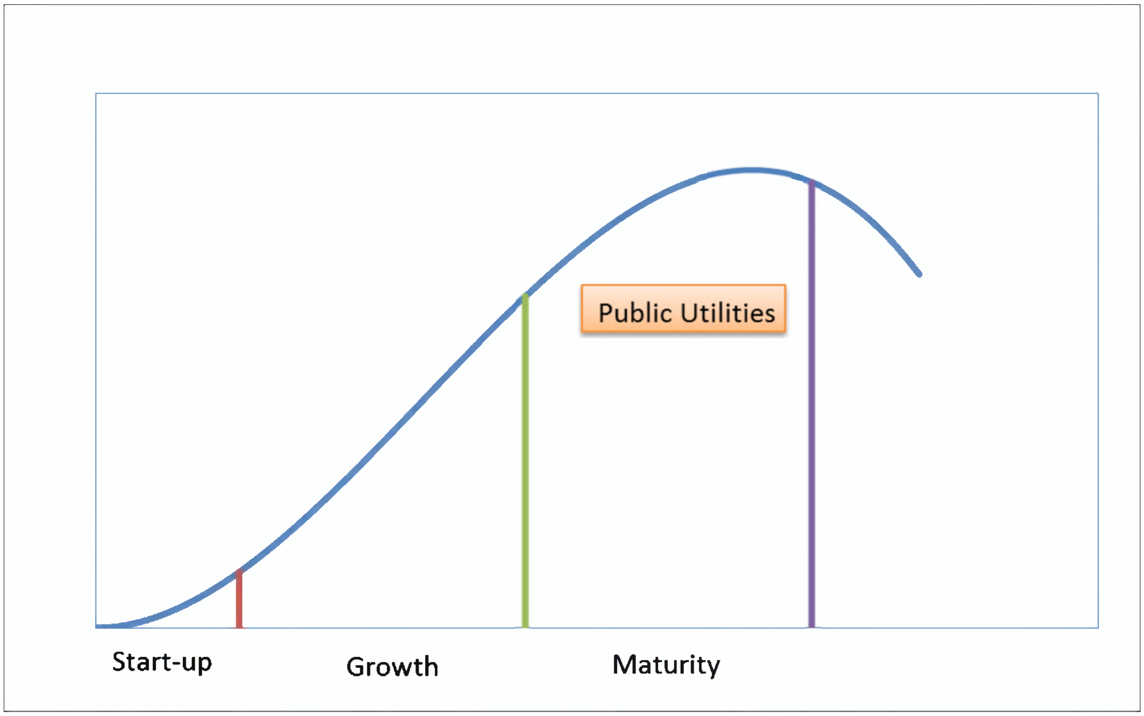
(2) *Analyst Growth Rates*

Analyst growth rates refer to short-term projections of earnings growth published by institutional research analysts such as Value Line and Bloomberg. Analyst growth rates, including the limitations with using them in the DCF Model to estimate utility cost of equity, are discussed in more detail below.

(3) Sustainable Growth Rates

In order to make the DCF Model 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 sustainable. 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 "sustainable," low growth stage. Unlike most competitive firms, the growth of regulated utilities is constrained by physical service territories and limited primarily by ratepayer 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 sustainable growth rate.

Q. SHOULD THE ANNUAL SUSTAINABLE GROWTH RATE USED IN THE DCF MODEL EXCEED THE ANNUAL GROWTH RATE OF THE AGGREGATE ECONOMY?

A. No. 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.[27] Thus, the sustainable 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. Damodaran: "[i]f 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."[28]

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 are comparatively limited in their growth opportunities. 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

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

[28] *Id.*

Budget Office's 2025 Long-Term Budget Outlook, the long-term forecast for nominal U.S. GDP growth is 3.7%.[29]

Q. PLEASE DESCRIBE THE SUSTAINABLE GROWTH RATES YOU USED IN YOUR DCF MODELS.

A. For my "sustainable growth" variation of the DCF Model, I used the projected long-term, nominal GDP growth rate of 3.7%. As discussed above, it is reasonable to conclude that the long-term growth of a domestic firm cannot outpace the growth rate of the aggregate economy in which it operates (as measured by U.S. GDP in this case). For the sustainable growth variation of the DCF Model, it is reasonable to consider nominal GDP as a limit or "ceiling" for long-term earnings or dividend growth. This is because nominal GDP, unlike real GDP, accounts for inflation. So in nominal terms, it is reasonable to assume that a company's earnings and/or dividend growth would be limited by the growth rate of the aggregate economy including inflation, as measured by nominal GDP.

Q. DID YOU CONSIDER ANY OTHER TYPES OF GROWTH RATES OTHER THAN THE SUSTAINABLE GROWTH RATES DETAILED ABOVE?

A. Yes. I also conducted the "analyst growth" variation of the DCF Model. To do so, I considered projected short-term dividend growth rate estimates published by Value

[29] https://www.crfb.org/blogs/cbo-releases-march-2025-long-term-budget-and-economic-outlook.

Line.[30] I show this variation of the DCF Model because it is often presented in rate cases by ROE witnesses and considered by regulators when assessing the awarded ROE.

Q. WHAT ARE THE FINAL RESULTS OF YOUR DCF MODELS?

A. For my DCF Models, I considered two variations: one using a sustainable growth rate and one using analysts' growth rates. The sustainable growth rate DCF Model indicates a cost of equity for PGS of 7.4%. The analyst growth variation of the DCF produced a result of 7.8%.[31]

D. <u>Response to Mr. D'Ascendis's DCF Model</u>

Q. PLEASE SUMMARIZE THE RESULTS OF MR. D'ASCENDIS'S DCF MODEL.

A. The DCF Model conducted by Mr. D'Ascendis produced a median result of 10.50%.[32]

Q. DO THE RESULTS OF MR. D'ASCENDIS'S DCF MODEL INDICATE A REASONABLE COST OF EQUITY FOR PGS?

A. No. The results of Mr. D'Ascendis's DCF Model are overstated primarily because his reliance on non-sustainable growth rate assumptions. Mr. D'Ascendis used long-term

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[30] Exhibit DJG-6.

[31] Exhibit DJG-6.

[32] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. DD-1.

growth rates in his proxy group as high as 10.0%.[33] This growth rate is more than two times the rate of projected U.S. GDP growth. Many of his other growth rates are unsustainably high. 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. 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 considered a growth rate estimate as high as 10.0% for Southwest Gas Holdings ("SWG") from Value Line.[34] This means that an analyst at Value Line believes SWG's earnings will quantitatively increase by 10.0% each year over the next *several* years (*i.e.*, the short-term). However, it is Mr. D'Ascendis, not the commercial analyst, who is suggesting that SWG's earnings will grow by more than two times projected GDP growth each year, and every year for many decades into the future (*i.e.*, long-term growth).[35] Thus, Mr. D'Ascendis is extrapolating the analyst's conclusions well beyond what the analyst actually reported. Furthermore, this assumption is simply not realistic, and it contradicts fundamental concepts of long-term growth. Many of Mr. D'Ascendis's other short-term growth rate estimates also exceed projected GDP growth.

[33] *Id.*

[34] *Id.*

[35] *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.

VII. <u>CAPITAL ASSET PRICING MODEL ANALYSIS</u>

Q. DESCRIBE THE CAPM.

A. The CAPM is a market-based model founded on the principle that investors expect higher returns for incurring additional risk.[36] The CAPM estimates this expected return. The various assumptions, theories, and equations involved in the CAPM are discussed further in the supplemental material provided 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. The U.S. Supreme Court recognized that "the amount of *risk* in the business is a most important factor" in determining the allowed rate of return,[37] and that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding *risks*."[38] The CAPM is a useful model because it directly considers the amount of risk inherent in a business. It is arguably the strongest of the models usually presented in rate cases because, unlike the DCF Model, the CAPM directly measures the most important component of a fair rate of return analysis: *risk*.

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[36] William F. Sharpe, *A Simplified Model for Portfolio Analysis*, Management Science IX, pp. 277-93 (1963); *see also Corporate Finance: Linking Theory to What Companies Do*, p. 208.

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

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

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. <u>The Risk-Free Rate</u>

Q. EXPLAIN THE RISK-FREE RATE.

A. The first term in the CAPM is the risk-free rate. 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 risky asset. Even though no investment is technically free 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 to last indefinitely. Thus, short-term Treasury bill yields are rarely used in the CAPM to represent the risk-free rate, as 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 4.58%.[39]

B. <u>The Beta Coefficient</u>

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 (or less) than one is more (or 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.

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

A. In this case, I used two different sources for my beta estimates. First, I used adjusted betas published by Value Line. I also incorporated adjusted betas published by

[39] Exhibit DJG-7.

Bloomberg. Mr. D'Ascendis also used these sources for his beta estimates. As a result, the betas we both used in our CAPM analyses are substantially similar. Also like Mr. D'Ascendis, I took an average of the Value Line and Bloomberg betas and used the average beta for each proxy company in the final results of my CAPM analysis.

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. 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 would agree that "the single most important variable for making investment decisions is the equity risk premium."[40] Likewise, the ERP is arguably the single most important factor in estimating the cost of capital in this matter. There are three 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.

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

(1) Historical Average

Q. DESCRIBE THE HISTORICAL ERP.

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. Many investors use the historic ERP because it is convenient and easy to calculate. But what matters in the CAPM model is the *current* and *forward-looking* risk premium, not the actual risk premium from the past.[41] And there is empirical evidence to suggest the forward-looking ERP is actually *lower* than the historical ERP.

In *Triumph of the Optimists*, a landmark publication on risk premiums around the world, the authors suggest through extensive empirical research that the prospective ERP is lower than the historical ERP.[42] This is due in large part to what is known as "survivorship bias," or "success bias," a tendency for failed companies to be excluded

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[41] *Corporate Finance: Linking Theory to What Companies Do*, p. 330.

[42] *Triumph of the Optimists: 101 Years of Global Investment Returns*, p. 194.

from historical indices.[43] 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.[44]

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 cf the Cptimists*), which concluded that the historical risk premium is closer to 4%.[45]

Regardless of the variations in historic ERP estimates, many scholars and practitioners agree that simply relying on a historic ERP to estimate the risk premium going forward is not ideal.

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 relied on the ERP reported in expert surveys and the implied ERP method, both of which are discussed below.

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[43] *Id.* at 34.

[44] *Id.* at 194.

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

(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. The IESE Business School regularly conducts a survey of experts regarding the ERP. Its 2024 expert survey reported an average ERP of 5.5%.[46]

(3) Implied Equity Risk Premium

Q. DESCRIBE THE IMPLIED ERP APPROACH.

A. The third method of estimating the ERP is arguably the best. The implied ERP relies on the stable growth model proposed by Gordon, often called the "Gordon Growth Model," which is a basic stock valuation model widely used in finance for many years.[47] 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

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[46] Pablo Fernandez, et al., Survey: Market Risk Premium and Risk-Free Rate used for 96 countries in 2024, IESE Business School, p. 3 (2015), copy available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4754347. 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.

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

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}). Rather than 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, Equation DJG-1, 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.[48]

Equation 1:
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:

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* $= CY_5\,(1+R_F)\,/\,K$

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

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 from it the risk-free rate to arrive at the implied ERP.

Equation 2:
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 9.9%.[49] I subtracted the risk-free rate to arrive at the implied equity risk premium of 5.0%.[50] Dr. Damodaran, one of the world's leading experts on the ERP,[51] promotes the implied ERP method discussed above. He calculates monthly and annual implied

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[49] *See* Exhibit DJG-9.

[50] *Id.*

[51] Damodaran Online, New York University, http://pages.stern.nyu.edu/~adamodar/.

ERPs with this method and publishes his results. Dr. Damodaran's average ERP estimate for June 2025 using several implied ERP variations was 4.3%.[52]

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 along with the implied ERP calculations and the ERP reported by Kroll (formerly Duff & Phelps).[53] In addition, I included the results of my own independent analyses as well as the ERP estimate published by Dr. Damodaran. The results are presented in the following figure:

Figure 6:
Equity Risk Premium Results

IESE Business School Survey	5.5%
Kroll (Duff & Phelps) Report	5.5%
Damodaran (average)	4.3%
Garrett	5.0%
Average	**5.1%**

The average ERP from these sources is 5.1%, which is the ERP I used in my CAPM analysis.

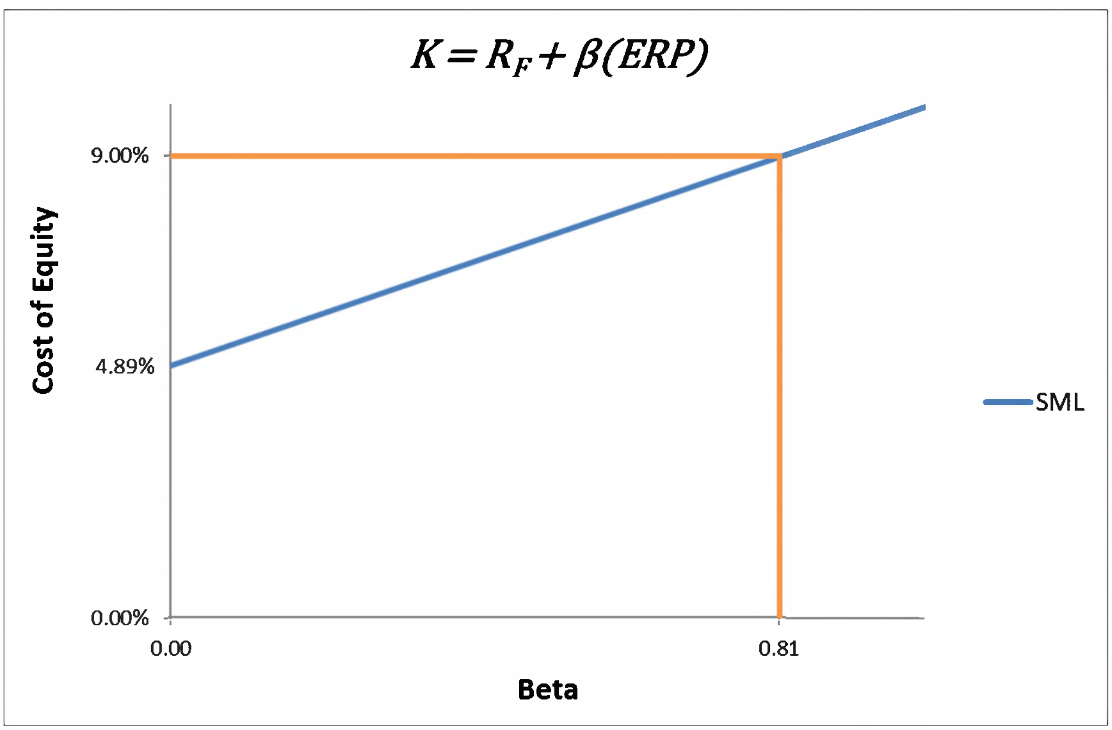
[52] Dr. Damodaran conducts several variations of the implied ERP analysis using various assumptions. The figure I incorporated into my analysis is based on an average of the results of his several implied ERP variations.

[53] *See* Exhibit DJG-10.

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

A. Using the inputs for the risk-free rate, beta, and ERP discussed above, the CAPM indicates a cost of equity of 9.0% for PGS. However, this result is accurate only if the average capital structure of the proxy group is imputed for PGS, which consists of much higher debt than the debt ratio proposed by PGS. The CAPM may be displayed graphically through what is known as the Security Market Line ("SML"). The following figure shows the expected return (or cost of equity) on the y-axis, and the average 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 7:
CAPM Graph



The SML provides the rate of return that will compensate investors for the beta risk of that investment.

D. <u>Response to Mr. D'Ascendis's CAPM Analysis</u>

Q. PLEASE SUMMARIZE THE RESULTS OF MR. D'ASCENDIS'S CAPM ANALYSIS.

A. The traditional CAPM conducted by Mr. D'Ascendis produced a median result of 11.00%.[54]

Q. DO THE RESULTS OF MR. D'ASCENDIS'S CAPM ANALYSIS INDICATE A REASONABLE COST OF EQUITY FOR PGS?

A. No. The primary problem with Mr. D'Ascendis's CAPM cost of equity result stems from his ERP estimate. In addition, Mr. D'Ascendis conducts another variation of the CAPM called the "empirical" CAPM ("ECAPM"). Finally, Mr. D'Ascendis also presents another type of risk premium analysis. I will address each of these issues below.

1. <u>Equity Risk Premium</u>

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

A. No. Mr. D'Ascendis used an input as high as 8.41% for the ERP.[55] The ERP is one of only three inputs in the CAPM equation, and it is one of the single most important factors for estimating the cost of equity in this case. As discussed above, I used three

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[54] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. DD-1.

[55] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. DD-1.

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 average ERP calculated from my sources is 5.1%. This means that Mr. D'Ascendis's ERP is significantly higher than the ERP estimate reported by thousands of expert survey respondents and other sources.

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

A. As discussed above, the 2025 IESE Business School expert survey reports an average ERP of 5.5%. Similarly, Kroll recently estimated an ERP of 5.5%.[56] Dr. Damodaran, , recently estimated an average ERP of only 4.3%.[57] The following figure illustrates that Mr. D'Ascendis's ERP estimate is far out of line with other reasonable, objective estimates for the ERP.

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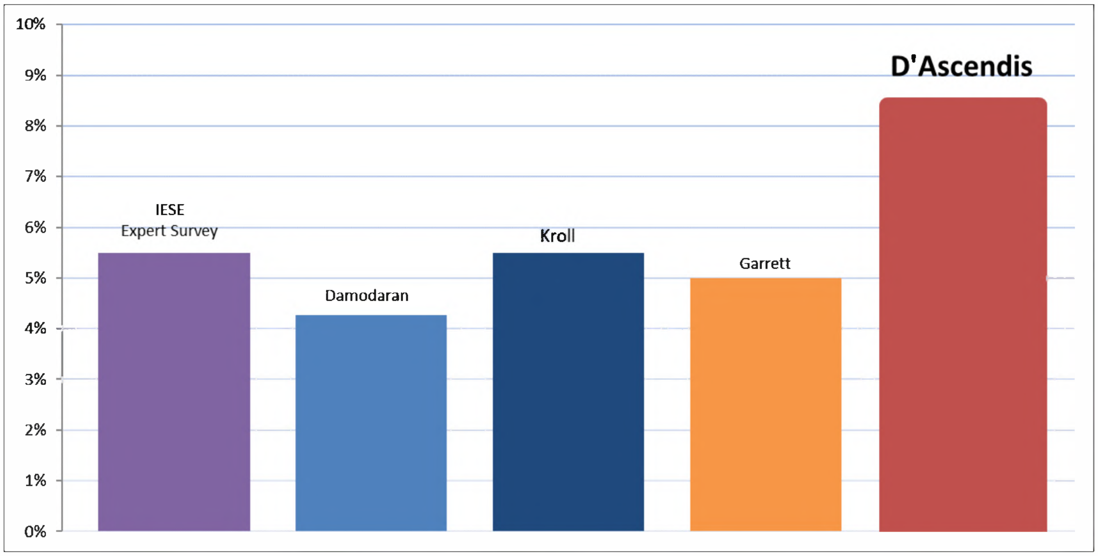
[56] Exhibit DJG-10.

[57] Damodaran Online, http://pages.stern.nyu.edu/~adamodar/. Dr. Damodaran estimates several ERPs using various assumptions.

Figure 8:
Equity Risk Premium Comparison



When compared with other independent sources for the ERP (as well as my estimate), 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.

2. <u>Empirical CAPM</u>

Q. PLEASE DESCRIBE MR. D'ASCENDIS'S ECAPM RESULTS.

A. Mr. D'Ascendis conducted a variation of the CAPM called the ECAPM, which is based on the premise that the traditional CAPM will underestimate the betas of low-beta securities such as utility stocks. The ECAPM conducted by Mr. D'Ascendis produced a median result of 11.46%.[58]

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[58] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. DD-1.

Q. DO THE RESULTS OF MR. D'ASCENDIS'S ECAPM INDICATE A REASONABLE COST OF EQUITY FOR PGS?

A. No. First, Mr. D'Ascendis's ECAPM relies on the same unreasonably high ERP input as does his traditional CAPM. For that reason alone, the Commission should reject the results of his ECAPM analysis. Furthermore, the premise of Mr. D'Ascendis's ECAPM is that the real CAPM underestimates the return required from low-beta securities, such as those of the proxy group. There are several problems with this concept, however. First, the betas both Mr. D'Ascendis and I used in the real CAPM already account for the theory that low-beta stocks might tend to be underestimated. In other words, the raw betas for each of the utility stocks in the proxy groups have already been adjusted by Value Line to be higher. Second, there is empirical evidence suggesting that the type of beta-adjustment method used by Value Line actually overstates betas from consistently low-beta industries like utilities.[59] For these reasons, the Commission should reject the results of the ECAPM conducted by Mr. D'Ascendis as indicating a reasonable cost of equity for PGS.

[59] *See* Appendix B.

3. **Other Risk Premium Analysis**

Q. PLEASE SUMMARIZE THE RESULTS OF MR. D'ASCENDIS'S OTHER RISK PREMIUM ANALYSIS.

A. In addition to the CAPM and ECAPM, Mr. D'Ascendis conducted an additional risk premium model, which produced a result of 10.84%.[60]

Q. DO THE RESULTS OF MR. D'ASCENDIS'S RISK PREMIUM MODEL INDICATE A REASONABLE COST OF EQUITY FOR PGS?

A. No. I disagree with the premise of the analysis itself, in that this model does not actually estimate cost of equity (like the CAPM and DCF Model do). As part of his risk premium analysis, Mr. D'Ascendis considered authorized ROEs dating back to 1980. Data nearly half-a-century old is not relevant for estimating the current and forward-looking cost of equity for PGS. Furthermore, relying on authorized ROEs from other jurisdictions as part of this model means that it is not entirely market-based. Unlike the CAPM, which is a risk premium model that has been used around the world for decades and resulted in a Nobel Prize, Mr. D'Ascendis's risk premium model does not actually estimate cost of equity. The CAPM starts with the risk-free rate, which is based on U.S. Treasury securities, then adds an estimated equity risk premium to develop the required return on the market; from there, a firm's individual beta is used to develop its cost of equity. In contrast, the risk premium model presented by Mr. D'Ascendis starts with a corporate bond yield (a rate higher than the risk-free rate),

[60] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. DD-1.

then adds a risk premium based on a number of factors (including authorized ROEs more than 40 years old) to ultimately arrive at a risk premium that is higher than the objective estimates I discuss earlier in my testimony. The cost of equity for a utility should be estimated using the same models used to estimate the cost of equity for any company, such as the CAPM and DCF Model, rather than the unusual model presented by Mr. D'Ascendis.

VIII. OTHER ISSUES

Q. ARE THERE OTHER ISSUES RAISED BY MR. D'ASCENDIS IN HIS TESTIMONY YOU WOULD LIKE TO ADDRESS?

A. Yes. Mr. D'Ascendis conducted cost of equity modeling on a group of non-utility companies. In addition, Mr. D'Ascendis added a flotation cost premium and a size premium to his cost of equity results. I will address these issues below.

A. Non-Utility Company Proxy Group

Q. PLEASE SUMMARIZE THE RESULTS OF MR. D'ASCENDIS'S COST OF EQUITY MODELS CONDUCTED ON A GROUP OF NON-UTILITY COMPANIES.

A. Mr. D'Ascendis conducted additional cost of equity modeling using a group of non-utility companies. This modeling produced a median result of 11.41%.[61]

[61] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. DD-1.

Q. DO THE RESULTS OF THE COST OF EQUITY MODELS CONDUCTED BY MR. D'ASCENDIS ON A GROUP OF NON-UTILITY COMPANIES INDICATE AN ACCURATE COST OF EQUITY ESTIMATE FOR PGS?

A. No. The result of his non-utility modeling is even higher than the results Mr. D'Ascendis arrived at using the utility proxy group. The same unreasonable assumptions and inputs employed by Mr. D'Ascendis on the utility proxy group modeling also apply to his non-utility group modeling. For that reason alone, the results of the non-utility modeling should be rejected. Moreover, this model adds no marginal value to the process of developing a reasonable estimate for PGS's cost of equity. The companies included in Mr. D'Ascendis's non-utility group are undoubtedly less comparable than those included in the utility proxy group. Some examples include Apple Inc., Microsoft Corp., and O'Reilly Automotive.[62] For these reasons, the Commission should reject the results of the non-utility modeling as not providing a meaningful indication of PGS's cost of equity in this case.

B. Flotation Cost Adjustment

Q. PLEASE SUMMARIZE THE FLOTATION COST ADJUSTMENT APPLIED BY MR. D'ASCENDIS.

A. Mr. D'Ascendis adds 0.08% to his cost of equity modeling results to account for flotation costs.[63]

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[62] *Id.*

[63] *Id.*

Q. DO YOU AGREE WITH MR. D'ASCENDIS ON HIS FLOTATION COST POSITION?

A. No. When companies issue equity securities, they typically hire at least one investment bank as an underwriter for the securities. "Flotation costs" generally refer to the underwriter's compensation for the services it provides in connection with the securities offering. However, Mr. D'Ascendis's arguments regarding flotation costs should be rejected for several reasons, as discussed further below.

1. Flotation costs are not actual "out-of-pocket" costs.

The Company has not experienced any out-of-pocket costs for flotation. Underwriters are not compensated in this fashion. Instead, underwriters are compensated through an "underwriting spread." An underwriting spread is the difference between the price at which the underwriter purchases the shares from the firm, and the price at which the underwriter sells the shares to investors.[64] Accordingly, the Company has not experienced any out-of-pocket flotation costs, and if it has, those costs should be included in the Company's expense schedules.

2. The market already accounts for flotation costs.

When an underwriter markets a firm's securities to investors, the investors are aware of the underwriter's fees. The investors know that a portion of the price they are paying for the shares does not go directly to the company, but instead goes to compensate the underwriter for its services. In fact, federal law requires that the underwriter's

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[64] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do*, p. 509 (3rd ed., South Western Cengage Learning 2010).

compensation be disclosed on the front page of the prospectus.[65] Thus, investors have already considered and accounted for flotation costs when making their decision to purchase shares at the quoted price.

As a result, there is no need for shareholders to receive additional compensation to account for costs to which they have already considered and agreed. Similar compensation structures are in other kinds of business transactions. For example, a homeowner may hire a realtor and sell a home for $100,000. After the realtor takes a six percent commission, the seller nets $94,000. The buyer and seller agreed to the transaction notwithstanding the realtor's commission. Obviously, it would be unreasonable for the buyer or seller to demand additional funds from anyone after the deal is completed to reimburse them for the realtor's fees. Likewise, investors of competitive firms do not expect additional compensation for flotation costs. Thus, it would not be appropriate for a commission standing in the place of competition to reward a utility's investors with this additional compensation.

3. It is inappropriate to add any additional basis points to an awarded ROE proposal that is already far above the Company's cost of equity.

For the reasons discussed above, flotation costs should be disallowed from a technical standpoint; they should also be disallowed from a policy standpoint. The Company is asking this Commission to award it a cost of equity that is significantly higher than any reasonable estimate of its market-based cost of equity. Under these circumstances, it

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[65] *See* Regulation S-K, 17 C.F.R. § 229.501(b)(3) (requiring that the underwriter's discounts and commissions be disclosed on the outside cover page of the prospectus). A prospectus is a legal document that provides details about an investment offering.

is especially inappropriate to suggest that flotation costs should be considered in any way to increase an already inflated ROE proposal.

C. <u>Size Premium</u>

Q. PLEASE SUMMARIZE THE SIZE PREMIUM ADJUSTMENT APPLIED BY MR. D'ASCENDIS.

A. Mr. D'Ascendis adds 0.20% to his cost of equity modeling results to account for PGS's size relative to the proxy group.[66]

Q. DO YOU BELIEVE PGS'S SIZE SHOULD IMPACT ITS COST OF EQUITY ESTIMATE OR AUTHORIZED ROE?

A. No. The "size effect" phenomenon arose from a 1981 study conducted by Rolf 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."[67] According to Ibbotson, Banz's size effect study was "[o]ne of the most remarkable discoveries of modern finance."[68] Perhaps there was some merit to this idea at the time, but 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

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[66] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. DD-1.

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

[68] 2015 Ibbotson Stocks, Bonds, Bills, and Inflation Classic Yearbook 99 (Morningstar 2015).

years[.]"[69] After 1983, U.S. small-cap stocks actually underperformed relative to large cap stocks. In other words, the size effect essentially reversed. In *Triumph cf the Cptimists*, 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:

> 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.[70]

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:

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[69] Elroy Dimson, Paul Marsh & Mike Staunton, *Triumph cf the Cptimists: 101 Years cf Global Investment Returns*, p. 131 (Princeton University Press 2002).

[70] *Id.* at p. 133.

> 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.[71]

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

> 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.[72]

For all of these reasons, the Commission should reject the arbitrary and unsupported size premium proposed by Mr. D'Ascendis. This adjustment merely inflates a CAPM result that is already grossly overestimated.

IX. CAPITAL STRUCTURE

Q. PLEASE SUMMARIZE PGS'S PROPOSAL REGARDING ITS CAPITAL STRUCTURE.

A. PGS proposes a ratemaking capital structure consisting of 45% debt and 55% equity.

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[71] 2015 Ibbotson Stocks, Bonds, Bills, and Inflation Classic Yearbook 112 (Morningstar 2015).

[72] 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).

Q. DOES PGS'S PROPOSED CAPITAL STRUCTURE HAVE AN INCREASING EFFECT TO ITS COST OF CAPITAL?

A. Yes. As discussed in more detail below, PGS's proposed capital structure for ratemaking purposes contains too little debt. By proposing a capital structure with a higher proportion of high-cost equity instead of low-cost debt, PGS's proposed rate of return is not at its lowest reasonable level. The average debt ratio of the proxy group is 51%.

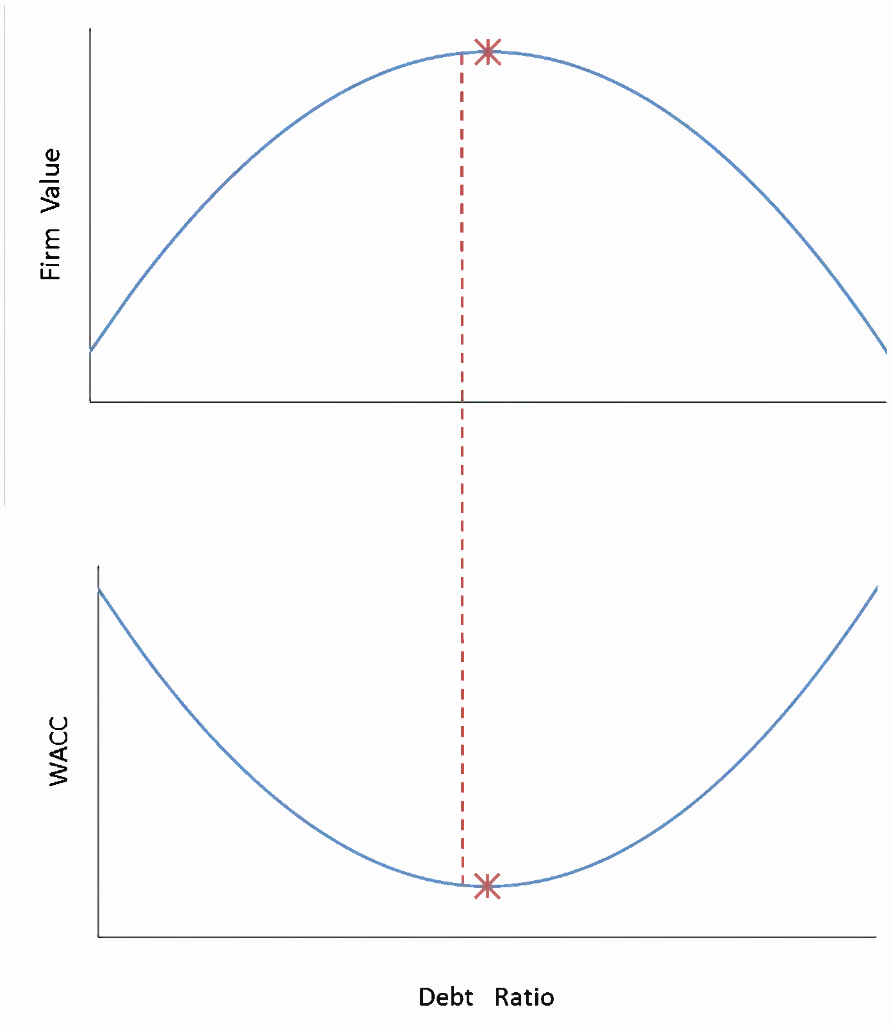
Q. DESCRIBE IN GENERAL THE CONCEPT OF A COMPANY'S CAPITAL STRUCTURE.

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 issuances 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 the level of debt financing is too high, the firm's WACC will increase instead of decrease. The following figure illustrates these concepts:

Figure 9:
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.[73]

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 3:
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 Equation 3, 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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[73] *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.[74]

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.

Q. DESCRIBE THE APPROACH YOU USED TO ASSESS THE REASONABLENESS OF PGS'S CAPITAL STRUCTURE FOR RATEMAKING PURPOSES?

A. To assess a reasonable capital structure for PGS, I examined the capital structures of the proxy group. The cost of equity indicated under the CAPM is inseparable from the

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

proxy group capital structures. For comparative purposes, I also looked at debt ratios observed in other industries. I discuss each of these approaches in more detail below.

A. Proxy and Industry Debt Ratios

Q. PLEASE DESCRIBE THE DEBT AND EQUITY RATIOS OF THE PROXY GROUP.

A. According to the debt ratios recently reported in Value Line for the utility proxy group (the same proxy group used by Mr. D'Ascendis), the average debt ratio of the proxy group is 51%.[75] This is notably higher than PGS's proposed debt ratio of only 45%. Conversely, the equity ratio of the proxy group is 49% and PGS's proposed equity ratio is considerably higher at 55%.

Q. WHY IS IT CRITICAL TO CONSIDER THE CAPITAL STRUCTURES OF THE PROXY GROUP WHEN ASSESSING A FAIR CAPITAL STRUCTURE FOR PGS?

A. The cost of equity of any particular company is necessarily connected with its capital structure. This is because there is a direct relationship between risk and return. That is, the higher (lower) risk, the higher (lower) expected return. All else held constant, companies with higher amounts of leverage have higher levels of financial risk. Since we are using a proxy group of companies to assess a fair cost of equity estimate for

[75] Exhibit DJG-13.

PGS, we must also factor in the capital structures of those companies into the analysis – failing to do so is an analytical error. Since PGS's debt ratio is lower and the equity ratio is higher than the proxy group average, it has less financial risk than the proxy group. This discrepancy in debt ratio and equity ratio must be accounted for. This issue will be discussed in more detail below in my Hamada model analysis.

Q. PLEASE DESCRIBE THE DEBT RATIOS RECENTLY OBSERVED IN COMPETITIVE U.S. INDUSTRIES.

A: There are more than 2,000 publicly traded (?) companies in the U.S. with debt ratios of at least 50%.[76] The following figure shows a sample of these industries with debt ratios higher than 56%.

[76] Exhibit DJG-14.

Figure 10:
Industries with Debt Ratios Greater than 56%

Industry	# Firms	Debt Ratio
Financial Svcs. (Non-bank & Insurance)	166	92%
Hotel/Gaming	65	86%
Brokerage & Investment Banking	30	80%
Retail (Automotive)	29	80%
Hospitals/Healthcare Facilities	33	76%
Air Transport	24	76%
Bank (Money Center)	15	71%
Rubber& Tires	3	67%
Recreation	50	66%
Food Wholesalers	14	66%
Transportation	21	66%
Computers/Peripherals	35	65%
Cable TV	9	65%
Advertising	54	64%
Retail (Grocery and Food)	17	64%
Retail (Special Lines)	98	64%
Telecom (Wireless)	11	63%
Power	48	62%
R.E.I.T.	192	62%
Oil/Gas Distribution	24	62%
Transportation (Railroads)	4	62%
Telecom. Services	32	62%
Chemical (Diversified)	4	61%
Auto & Truck	34	61%
Aerospace/Defense	67	60%
Broadcasting	22	60%
Packaging & Container	22	60%
Apparel	37	59%
Beverage (Soft)	29	59%
Utility (General)	14	59%
Retail (Distributors)	66	58%
Farming/Agriculture	35	57%
Green & Renewable Energy	18	57%
Information Services	16	57%
Total / Average	**1,338**	**66%**

Many of the industries shown here, like public utilities, are generally well-established industries with large amounts of capital assets. The shareholders of these industries generally prefer these higher debt ratios to maximize their profits. There are several notable industries that are relatively comparable to public utilities. For example, the Cable TV, Telecom industries have debt ratios of at least 60%.

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR CAPITAL STRUCTURE ANALYSES AND YOUR RECOMMENDATION REGARDING CAPITAL STRUCTURE.

A. The results of my analyses are summarized in the following figure:

Figure 11:
Capital Structure Analysis – Summary of Results

Source	Debt Ratio
Cable TV	65%
Power	62%
Telecom Services	62%
Proxy Group of Utilities	**51%**
Company Proposal (total debt)	**45%**

As shown in this figure, PGS's proposed debt ratio is clearly too low (and its equity ratio is too high). This results in excessively high capital costs and utility rates. My analysis indicates that PGS's total debt ratio for ratemaking should be 51%, and the equity ratio should be no more than 49%.

B. The Hamada Model: Capital Structure's Effect on ROE

Q. HAVE YOU CONSIDERED THE IMPACT THAT YOUR CAPITAL STRUCTURE RECOMMENDATION COULD HAVE ON THE COMPANY'S INDICATED COST OF EQUITY?

A. Yes. I assessed the impact of my capital structure proposal on the Company's cost of equity estimate by using the Hamada model.

Q. WHAT IS THE PREMISE OF THE HAMADA MODEL?

A. The Hamada formula can be used to analyze changes in a firm's cost of capital as it adds or reduces financial leverage, or debt, in its capital structure by starting with an "unlevered" beta and then "relevering" the beta at different debt ratios. 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 Hamada formula. The Hamada formula for unlevering beta is stated as follows:[77]

[77] Damodaran *supra* n. 18, at 197. This formula was originally developed by Hamada in 1972.

Equation 4:
Hamada Formula

$$\beta_U = \frac{\beta_L}{\left[1 + (1 - T_c)\left(\frac{D}{E}\right)\right]}$$

where:	β_U	=	*unlevered beta (or "asset" beta)*
	β_L	=	*average levered beta of proxy group*
	T_C	=	*corporate tax rate*
	D	=	*book value of debt*
	E	=	*book value of equity*

Using Equation 4, the beta for the firm can be unlevered, and then "relevered" based on various debt ratios (by rearranging this equation to solve for β_L).

Q. PLEASE SUMMARIZE THE RESULTS OF THE HAMADA FORMULA BASED ON YOUR PROPOSED CAPITAL STRUCTURE FOR THE COMPANY.

A. The average capital structure of the proxy group consists of 51% debt and 49% equity. Because PGS's debt ratio is so much lower than that of the proxy group, when we "relever" PGS relative to the proxy group, it results in a much lower ROE than if PGS had been operating with a capital structure equal to that of the proxy group. This makes sense because PGS is much less risky relative to the proxy group due to the decreased amount of debt in its capital structure. The results of my Hamada model are presented in the figure below.[78]

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[78] Exhibit DJG-15.

Figure 12:
Hamada Model ROE

Unlevering Beta	
Proxy Debt Ratio	51%
Proxy Equity Ratio	49%
Proxy Debt / Equity Ratio	1.0
Tax Rate	21%
Equity Risk Premium	5.1%
Risk-free Rate	4.9%
Proxy Group Beta	0.81
Unlevered Beta	0.44

Relevered Betas and Cost of Equity Estimates

Debt Ratio	D/E Ratio	Levered Beta	Cost of Equity
0%	0.0	0.44	7.1%
20%	0.3	0.53	7.6%
25%	0.3	0.56	7.7%
30%	0.4	0.59	7.9%
45%	0.8	0.73	8.6%
51%	1.0	0.81	9.0%
60%	1.5	0.97	9.8%

According to the results of the Hamada model, if the Commission adopts my capital structure recommendation, PGS's indicated cost of equity estimate (under the CAPM) would be 9.0%. However, if the Commission accepts PGS's proposed capital structure, the Company's cost of equity estimate would be 8.6%.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes. 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.

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University of Oklahoma — Norman, OK
Master of Business Administration — 2014
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University of Oklahoma College of Law — Norman, OK
Juris Doctor — 2007
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PROFESSIONAL DESIGNATIONS

Society of Depreciation Professionals
Certified Depreciation Professional (CDP)

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

WORK EXPERIENCE

Resolve Utility Consulting PLLC — Oklahoma City, OK
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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.

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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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Pennsylvania Public Utility Commission	Veolia Water Pennsylvania, Inc.	R-2024-3045192 R-2024-3045193	Cost of capital, depreciation rates, net salvage	Pennsylvania Office of Consumer Advocate
Pennsylvania Public Utility Commission	PECO Energy Company - Gas Division	R-2024-3046932	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Pennsylvania Public Utility Commission	PECO Energy Company - Electric Division	R-2024-3046931	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 2023-000087	Cost of capital, depreciation rates, net salvage	Oklahoma Industrial Energy Consumers
Maryland Public Service Commission	Maryland Water Service, Inc.	9729	Cost of capital, awarded rate of return, capital structure	Maryland Office of People's Counsel
Kansas Corporation Commission	Kansas Gas Service	24-KGSG-610-RTS	Depreciation rates, service lives, net salvage	The Citizens' Utility Ratepayer Board
Pennsylvania Public Utility Commission	FirstEnergy Pennsylvania Electric Company	R-2024-3047068	Depreciation rates, service lives, net salvage	Pennsylvania Office of Consumer Advocate
Maryland Public Service Commission	Chesapeake Utilities Corporation Sandpiper Energy, Inc. Elkton Gas Company	9721	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Pennsylvania Public Utility Commission	Duquesne Light Company	R-2024-3046523	Cost of capital, depreciation rates, net salvage	Pennsylvania Office of Consumer Advocate
Public Utility Commission of Texas	CenterPoint Energy Houston Electric	PUC 56211	Depreciation rates, service lives, net salvage	Texas Coast Utilities Coalition
Washington Utilities & Transportation Commission	Avista Corporation	UE-240006 UG-240007	Cost of capital, awarded rate of return, capital structure	Washington Office of Attorney General
Public Utility Commission of Texas	AEP Texas Inc.	PUC 56165	Depreciation rates, service lives, net salvage	Cities Served by AEP Texas
Public Utilities Commission of Nevada	Southwest Gas Corporation	23-09012	Depreciation rates, service lives, net salvage	Bureau of Consumer Protection
Public Utilities Commission of the State of California	Southern California Edison	A.23-05-010	Depreciation rates, service lives, net salvage	The Utility Reform Network

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Pennsylvania Public Utility Commission	Pennsylvania-American Water Company	R-2023-3043189 R-2023-3043190	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45967	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Massachusetts Department of Public Utilities	Massachusetts Electric Company and Nantucket Electric Company D/B/A National Grid	D.P.U. 23-150	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Iowa Utilities Board	Interstate Power and Light Company	RPU-2023-0002	Depreciation rates, service lives, net salvage	Office of Consumer Advocate
Public Service Commission of South Carolina	Duke Energy Carolinas	2023-388-E 2023-403-E	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Indiana Utility Regulatory Commission	Citizens Energy Group	45988	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Railroad Commission of Texas	CenterPoint Energy Resources Corp.	OS-23-00015513	Depreciation rates, service lives, net salvage	Alliance of CenterPoint Municipalities
Indiana Utility Regulatory Commission	CenterPoint Energy Indiana South	45990	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Delaware Public Service Commission	Artesian Water Company, Inc.	23-0601	Cost of capital, depreciation rates, net salvage	Division of the Public Advocate
Maryland Public Service Commission	Washington Gas Light Company	9704	Cost of capital, awarded rate of return, capital structure	Maryland Office of People's Counsel
Delaware Public Service Commission	Veolia Water Delaware Inc.	23-0598	Cost of capital, awarded rate of return, capital structure	Division of the Public Advocate
Connecticut Public Utilities Regulatory Authority	United Illuminating Company	22-08-08	Depreciation rates, service lives, net salvage	PURA Staff
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 54634	Depreciation rates, service lives, net salvage	Alliance of Xcel Municipalities
Railroad Commission of Texas	SiEnergy, LP	OS-23-00013504	Depreciation rates, service lives, net salvage	Texas municipal intervenor group

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Pennsylvania Public Utility Commission	Aqua Pennsylvania, Inc.	A-2022-3034143	Fair market value review	Pennsylvania Office of Consumer Advocate
Wyoming Public Service Commission	Rocky Mountain Power	20000-633-ER-23	Cost of capital and authorized rate of return	Wyoming Industrial Energy Consumers
Maryland Public Service Commission	Potomac Electric Power Company	9702	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Public Utilities Commission of Nevada	Nevada Power Company d/b/a NV Energy	23-06007 23-06008	Depreciation rates, service lives, net salvage	Bureau of Consumer Protection
Public Utilities Commission of Ohio	Northeast Ohio Natural Gas Corp.	23-0154-GA-AIR	Cost of capital, awarded rate of return, capital structure	Office of the Ohio Consumers' Counsel
New York State Public Service Commission	The Brooklyn Untion Gas Company and Keyspan Gas East Corporation d/b/a Nation Grid	23-G-0225 23-G-0226	Depreciation rates, service lives, net salvage, depreciation reserve	The City of New York
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-23-11	Cost of capital, awarded rate of return, capital structure	Micron Technology, Inc.
Indiana Utility Regulatory Commission	Indiana Michigan Power Company	45933	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Massachusetts Department of Public Utilities	Fitchburg Gas and Electric Company d/b/a Unitil	D.P.U. 23-80; D.P.U. 23-81	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Kansas Corporation Commission	Evergy Kansas Central, Evergy Kansas South, and Evergy Metro	23-EKCE-775-RTS	Depreciation rates, service lives, net salvage	The Citizens' Utility Ratepayer Board
Delaware Public Service Commission	Delmarva Power & Light Company	22-0897	Cost of capital, awarded rate of return, capital structure	Division of the Public Advocate
Connecticut Public Utilities Regulatory Authority	Connecticut Water Company	23-08-32	Depreciation rates, service lives, net salvage	PURA Staff
Connecticut Public Utilities Regulatory Authority	Connecticut Natural Gas Corporation and The Southern Connecticut Gas Company	23-11-02	Depreciation rates, service lives, net salvage	PURA Staff
Railroad Commission of Texas	Atmos Pipeline – Texas	OS-23-00013758	Depreciation rates, service lives, net salvage	Atmos Texas Municipalities

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Wyoming Public Service Commission	Black Hills Wyoming Gas	30026-78-GR-23	Depreciation rates, service lives, net salvage	Wyoming Office of Consumer Advocate
Indiana Utility Regulatory Commission	Indianapolis Power & Light Company d/b/a AES Indiana	45911	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
New Mexico Public Regulation Commission	Southwestern Public Service Company	22-00286-UT	Cost of capital, depreciation rates, net salvage	The New Mexico Large Customer Group; Occidental Permian
Public Utilities Commission of the State of California	Southern California Gas Company San Diego Gas & Electric Company	A.22-05-015 A.22-05-016	Depreciation rates, service lives, net salvage	The Utility Reform Network
Public Utilties Commission of the State of Colorado	Public Service Company of Colorado	22AL-0530E 22AL-0478E	Cost of capital, awarded rate of return, capital structure	Colorado Energy Consumers
New Mexico Public Regulatory Commission	Public Service Company of New Mexico	22-00270-UT	Cost of capital, depreciation rates, net salvage	The Albuquerque Bernalillo County Water Utility Authority
Florida Public Service Commission	Peoples Gas System	20230023-GU 20220219-GU 20220212-GU	Cost of capital, depreciation rates, net salvage	Florida Office of Public Counsel
Maryland Public Service Commission	Potomac Edison Company	9695	Cost of capital, depreciation rates, net salvage	Maryland Office of People's Counsel
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	2022.11.099	Depreciation rates, service lives, net salvage	Montana Consumer Counsel and Denbury Onshore
Indiana Utility Regulatory Commission	Indiana-American Water Company	45870	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Service Commission of South Carolina	Dominion Energy South Carolina	2023-70-G	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Maryland Public Service Commission	Columbia Gas of Maryland	9701	Cost of capital, awarded rate of return, capital structure	Maryland Office of People's Counsel
Pennsylvania Public Utility Commission	Columbia Water Company	R-2023-3040258	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Maryland Public Service Commission	Baltimore Gas and Electric Company	9692	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Arizona Corporation Commission	Arizona Public Service Company	E-01345A-22-0144	Cost of capital, awarded rate of return, capital structure	Residential Utility Consumer Office
Oklahoma Corporation Commission	Public Service Company of Oklahoma	PUD 2022-000093	Cost of capital, depreciation rates, net salvage	Oklahoma Industrial Energy Consumers
Public Service Commission of the State of Montana	NorthWestern Energy	2022.07.078	Cost of capital, depreciation rates, net salvage	Montana Consumer Counsel and Montana Large Customer Group
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45772	Cost of capital, depreciation rates, net salvage	Indiana Office of Utility Consumer Counselor
Public Service Commission of South Carolina	Duke Energy Progress	2022-254-E	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Wyoming Public Service Commission	Cheyenne Light, Fuel and Power Company D/B/A Black Hills Energy	20003-214-ER-22	Depreciation rates, service lives, net salvage	Wyoming Office of Consumer Advocate
Railroad Commission of Texas	Texas Gas Services Company	OS-22-00009896	Depreciation rates, service lives, net salvage	The City of El Paso
Public Utilities Commission of Nevada	Sierra Pacific Power Company	22-06014	Depreciation rates, service lives, net salvage	Bureau of Consumer Protection
Washington Utilities & Transportation Commission	Puget Sound Energy	UE-220066 UG-220067 UG-210918	Depreciation rates, service lives, net salvage	Washington Office of Attorney General
Public Utility Commission of Texas	Oncor Electric Delivery Company LLC	PUC 53601	Depreciation rates, service lives, net salvage	Alliance of Oncor Cities
Florida Public Service Commission	Florida Public Utilities Company	20220067-GU	Cost of capital, depreciation rates	Florida Office of Public Counsel
Public Utility Commission of Texas	Entergy Texas, Inc.	PUC 53719	Depreciation rates, decommissioning costs	Texas Municipal Group
Florida Public Service Commission	Florida City Gas	2020069-GU	Cost of capital, depreciation rates	Florida Office of Public Counsel
Connecticut Public Utilities Regulatory Authority	Aquarion Water Company of Connecticut	22-07-01	Depreciation rates, service lives, net salvage	PURA Staff

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Washington Utilities & Transportation Commission	Avista Corporation	UE-220053 UG-220054 UE-210854	Cost of capital, awarded rate of return, capital structure	Washington Office of Attorney General
Federal Energy Regulatory Commission	ANR Pipeline Company	RP22-501-000	Depreciation rates, service lives, net salvage	Ascent Resources - Utica, LLC
Pennsylvania Public Utility Commission	Columbia Gas of Pennsylvania, Inc.	R-2022-3031211	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Public Service Commission of South Carolina	Piedmont Natural Gas Company	2022-89-G	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Pennsylvania Public Utility Commission	UGI Utilities, Inc. - Gas Division	R-2021-3030218	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Public Utilities Commission of the State of California	Pacific Gas & Electric Company	A.21-06-021	Depreciation rates, service lives, net salvage	The Utility Reform Network
Pennsylvania Public Utility Commission	PECO Energy Company - Gas Division	R-2022-3031113	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 202100164	Cost of capital, depreciation rates, net salvage	Oklahoma Industrial Energy Consumers
Massachusetts Department of Public Utilities	NSTAR Electric Company D/B/A Eversource Energy	D.P.U. 22-22	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Michigan Public Service Company	DTE Electric Company	U-20836	Cost of capital, awarded rate of return, capital structure	Michigan Environmental Council and Citizens Utility Board of Michigan
New York State Public Service Commission	Consolidated Edison Company of New York, Inc.	22-E-0064 22-G-0065	Depreciation rates, service lives, net salvage, depreciation reserve	The City of New York
Pennsylvania Public Utility Commission	Aqua Pennsylvania Wastewater / East Whiteland Township	A-2021-3026132	Fair market value estimates for wastewater assets	Pennsylvania Office of Consumer Advocate
Public Service Commission of South Carolina	Kiawah Island Utility, Inc.	2021-324-WS	Cost of capital, awarded rate of return, capital structure	South Carolina Office of Regulatory Staff
Pennsylvania Public Utility Commission	Aqua Pennsylvania Wastewater / Willistown Township	A-2021-3027268	Fair market value estimates for wastewater assets	Pennsylvania Office of Consumer Advocate

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45621	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Arkansas Public Service Commission	Southwestern Electric Power Company	21-070-U	Cost of capital, depreciation rates, net salvage	Western Arkansas Large Energy Consumers
Federal Energy Regulatory Commission	Southern Star Central Gas Pipeline	RP21-778-002	Depreciation rates, service lives, net salvage	Consumer-Owned Shippers
Railroad Commission of Texas	Participating Texas gas utilities in consolidated proceeding	OS-21-00007061	Securitization of extraordinary gas costs arising from winter storms	The City of El Paso
Public Service Commission of South Carolina	Palmetto Wastewater Reclamation, Inc.	2021-153-S	Cost of capital, awarded rate of return, capital structure, ring-fencing	South Carolina Office of Regulatory Staff
Public Utilties Commission of the State of Colorado	Public Service Company of Colorado	21AL-0317E	Cost of capital, depreciation rates, net salvage	Colorado Energy Consumers
Pennsylvania Public Utility Commission	City of Lancaster - Water Department	R-2021-3026682	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 51802	Depreciation rates, service lives, net salvage	The Alliance of Xcel Municipalities
Pennsylvania Public Utility Commission	The Borough of Hanover - Hanover Municipal Waterworks	R-2021-3026116	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Maryland Public Service Commission	Delmarva Power & Light Company	9670	Cost of capital and authorized rate of return	Maryland Office of People's Counsel
Oklahoma Corporation Commission	Oklahoma Natural Gas Company	PUD 202100063	Cost of capital, awarded rate of return, capital structure	Oklahoma Industrial Energy Consumers
Indiana Utility Regulatory Commission	Indiana Michigan Power Company	45576	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	El Paso Electric Company	PUC 52195	Depreciation rates, service lives, net salvage	The City of El Paso
Pennsylvania Public Utility Commission	Aqua Pennsylvania	R-2021-3027385	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Public Service Commission of the State of Montana	NorthWestern Energy	D2021.02.022	Cost of capital, awarded rate of return, capital structure	Montana Consumer Counsel
Pennsylvania Public Utility Commission	PECO Energy Company	R-2021-3024601	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
New Mexico Public Regulation Commission	Southwestern Public Service Company	20-00238-UT	Cost of capital and authorized rate of return	The New Mexico Large Customer Group; Occidental Permian
Oklahoma Corporation Commission	Public Service Company of Oklahoma	PUD 202100055	Cost of capital, depreciation rates, net salvage	Oklahoma Industrial Energy Consumers
Pennsylvania Public Utility Commission	Duquesne Light Company	R-2021-3024750	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Maryland Public Service Commission	Columbia Gas of Maryland	9664	Cost of capital and authorized rate of return	Maryland Office of People's Counsel
Indiana Utility Regulatory Commission	Southern Indiana Gas Company, d/b/a Vectren Energy Delivery of Indiana, Inc.	45447	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	Southwestern Electric Power Company	PUC 51415	Depreciation rates, service lives, net salvage	Cities Advocating Reasonable Deregulation
New Mexico Public Regulatory Commission	Avangrid, Inc., Avangrid Networks, Inc., NM Green Holdings, Inc., PNM, and PNM Resources	20-00222-UT	Ring fencing and capital structure	The Albuquerque Bernalillo County Water Utility Authority
Indiana Utility Regulatory Commission	Indiana Gas Company, d/b/a Vectren Energy Delivery of Indiana, Inc.	45468	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utilities Commission of Nevada	Nevada Power Company and Sierra Pacific Power Company, d/b/a NV Energy	20-07023	Construction work in progress	MGM Resorts International, Caesars Enterprise Services, LLC, and the Southern Nevada Water Authority
Massachusetts Department of Public Utilities	Boston Gas Company, d/b/a National Grid	D.P.U. 20-120	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Public Service Commission of the State of Montana	ABACO Energy Services, LLC	D2020.07.082	Cost of capital and authorized rate of return	Montana Consumer Counsel
Maryland Public Service Commission	Washington Gas Light Company	9651	Cost of capital and authorized rate of return	Maryland Office of People's Counsel

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Florida Public Service Commission	Utilities, Inc. of Florida	20200139-WS	Cost of capital and authorized rate of return	Florida Office of Public Counsel
New Mexico Public Regulatory Commission	El Paso Electric Company	20-00104-UT	Cost of capital, depreciation rates, net salvage	City of Las Cruces and Doña Ana County
Public Utilities Commission of Nevada	Nevada Power Company	20-06003	Cost of capital, awarded rate of return, capital structure, earnings sharing	MGM Resorts International, Caesars Enterprise Services, LLC, Wynn Las Vegas, LLC, Smart Energy Alliance, and Circus Circus Las Vegas, LLC
Wyoming Public Service Commission	Rocky Mountain Power	20000-578-ER-20	Cost of capital and authorized rate of return	Wyoming Industrial Energy Consumers
Florida Public Service Commission	Peoples Gas System	20200051-GU 20200166-GU	Cost of capital, depreciation rates, net salvage	Florida Office of Public Counsel
Wyoming Public Service Commission	Rocky Mountain Power	20000-539-EA-18	Depreciation rates, service lives, net salvage	Wyoming Industrial Energy Consumers
Public Service Commission of South Carolina	Dominion Energy South Carolina	2020-125-E	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Pennsylvania Public Utility Commission	The City of Bethlehem	2020-3020256	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 49831	Depreciation rates, service lives, net salvage	Alliance of Xcel Municipalities
Public Service Commission of South Carolina	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 / East Norriton Township	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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

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

Proxy Group Summary

Company	Ticker	Market Cap. ($ millions)	Market Category	Value Line Safety Rank	Financial Strength
Atmos Energy Corp	ATO	24,700	Large Cap	1	A
New Jersey Resources Corp	NJR	4,600	Mid Cap	2	A
NiSource Inc	NI	18,000	Large Cap	2	A
Northwest Natural Holding Company	NWN	1,700	Small Cap	2	A
ONE Gas Inc	OGS	4,500	Mid Cap	2	A
Southwest Gas Holdings Inc	SWX	5,000	Mid Cap	2	A
Spire Inc.	SR	4,300	Mid Cap	2	B++

Value Line Investment Survey

DCF - Stock and Index Prices

Ticker	^GSPC	ATO	NJR	NI	NWN	OGS	SWX	SR
30-day Average	5817	156.36	46.32	39.15	41.57	75.45	71.51	74.62
Standard Deviation	153.8	3.14	1.55	0.55	1.38	2.27	2.05	1.59
06/09/25	6006	151.97	44.47	39.35	39.97	73.61	71.27	73.84
06/06/25	6000	152.18	44.27	39.28	39.70	73.44	71.09	73.63
06/05/25	5939	152.35	44.20	38.99	39.81	73.41	71.48	73.60
06/04/25	5971	152.15	44.32	39.08	39.76	73.49	71.97	73.31
06/03/25	5970	154.61	45.59	39.43	40.70	75.30	73.68	75.21
06/02/25	5936	154.64	45.35	39.59	40.72	74.67	71.64	74.65
05/30/25	5912	154.68	45.43	39.54	40.97	74.76	71.83	75.28
05/29/25	5912	154.34	45.26	38.99	40.90	74.33	71.90	74.79
05/28/25	5889	153.72	44.85	38.75	40.96	73.54	71.00	73.74
05/27/25	5922	156.49	45.74	39.28	41.41	75.21	72.40	75.40
05/23/25	5803	156.41	45.28	39.02	40.76	74.46	70.81	74.62
05/22/25	5842	154.43	45.01	38.50	40.45	73.49	69.10	73.47
05/21/25	5845	156.09	45.59	38.85	40.95	74.79	69.06	74.24
05/20/25	5940	158.22	46.27	39.51	41.76	76.13	71.06	75.14
05/19/25	5964	159.10	46.61	39.92	41.54	75.73	71.35	74.45
05/16/25	5958	156.81	46.14	39.08	41.10	74.62	69.02	73.31
05/15/25	5917	155.11	45.78	38.69	40.73	73.49	69.18	72.59
05/14/25	5893	151.41	45.04	37.88	39.78	71.18	67.46	71.03
05/13/25	5887	152.81	45.72	37.82	40.53	72.64	67.48	71.79
05/12/25	5844	154.37	45.83	38.32	41.22	73.94	69.16	72.19
05/09/25	5660	158.98	46.81	39.58	42.83	76.35	74.99	74.66
05/08/25	5664	160.36	47.50	39.61	43.57	79.00	75.26	75.02
05/07/25	5631	161.76	48.32	40.48	43.95	80.66	75.74	76.11
05/06/25	5607	161.06	48.25	39.36	43.63	80.15	73.02	76.62
05/05/25	5650	160.51	48.61	39.31	43.55	77.55	72.37	76.04
05/02/25	5687	160.61	49.02	39.30	43.20	77.74	73.39	76.48
05/01/25	5604	159.29	48.42	38.96	42.94	77.18	72.63	76.29
04/30/25	5569	159.74	48.45	39.11	43.10	77.81	71.55	76.54
04/29/25	5561	158.81	48.58	39.44	43.29	77.59	72.21	77.06
04/28/25	5529	157.85	48.74	39.45	43.27	77.28	72.09	77.39

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

DCF - Dividend Yields

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield
Atmos Energy Corp	ATO	3.48	156.36	2.23%
New Jersey Resources Corp	NJR	1.80	46.32	3.89%
NiSource Inc	NI	1.12	39.15	2.86%
Northwest Natural Holding Company	NWN	1.96	41.57	4.72%
ONE Gas Inc	OGS	2.68	75.45	3.55%
Southwest Gas Holdings Inc	SWX	2.48	71.51	3.47%
Spire Inc.	SR	3.14	74.62	4.21%
Average		**$2.38**	**$72.14**	**3.56%**

[1] Yahoo Finance
[2] Average stock price from Exhibit DJG-3
[3] = [1] / [2]

DCF - Terminal Growth Rate Determinants

Terminal Growth Determinants	Rate
Nominal GDP	3.7%
Real GDP	1.6%
Long-Term Growth Ceiling	**3.7%**

CBO, The Long-Term Budget Outlook: 2025-2055, , p. 32

DCF - Final Result

Company	Ticker	[1] Dividend Yield	[2] Analyst Growth	[3] Sustainable Growth	[4] DCF Result (Analyst Growth)	[5] DCF Result (Sustainable Growth)
Atmos Energy Corp	ATO	2.2%	7.0%	3.7%	9.4%	6.0%
New Jersey Resources Corp	NJR	3.9%	5.0%	3.7%	9.1%	7.7%
NiSource Inc	NI	2.9%	4.5%	3.7%	7.5%	6.7%
Northwest Natural Holding Company	NWN	4.7%	0.5%	3.7%	5.2%	8.6%
ONE Gas Inc	OGS	3.6%	2.0%	3.7%	5.6%	7.4%
Southwest Gas Holdings Inc	SWX	3.5%	5.5%	3.7%	9.2%	7.3%
Spire Inc.	SR	4.2%	4.0%	3.7%	8.4%	8.1%
Average		**3.6%**	**4.1%**	**3.7%**	**7.8%**	**7.4%**

[1] Dividend Yield from Exhibit DJG-4
[2] Forecasted dividend growth rates - Value Line
[3] Sustainable growth rate from Exhibit DJG-5
[4] Annual Compounding DCF = D_0 (1 + g) / P_0 + g (using analyst growth rate)
[5] Annual Compounding DCF = D_0 (1 + g) / P_0 + g (using sustainable growth rate)

CAPM - Risk-Free Rate Estimate

Date	Rate
04/28/25	4.69%
04/29/25	4.64%
04/30/25	4.66%
05/01/25	4.74%
05/02/25	4.79%
05/05/25	4.83%
05/06/25	4.81%
05/07/25	4.77%
05/08/25	4.83%
05/09/25	4.83%
05/12/25	4.89%
05/13/25	4.94%
05/14/25	4.97%
05/15/25	4.91%
05/16/25	4.89%
05/19/25	4.92%
05/20/25	4.96%
05/21/25	5.08%
05/22/25	5.05%
05/23/25	5.04%
05/27/25	4.94%
05/28/25	4.97%
05/29/25	4.92%
05/30/25	4.92%
06/02/25	4.99%
06/03/25	4.98%
06/04/25	4.89%
06/05/25	4.88%
06/06/25	4.97%
06/09/25	4.95%
Average	**4.89%**

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

CAPM - Beta Coefficients

Company	Ticker	Beta
Atmos Energy Corp	ATO	0.75
New Jersey Resources Corp	NJR	0.85
NiSource Inc	NI	0.85
Northwest Natural Holding Company	NWN	0.80
ONE Gas Inc	OGS	0.80
Southwest Gas Holdings Inc	SWX	0.80
Spire Inc.	SR	0.80
Average		0.81

Betas from Value Line Investment Survey

CAPM - Implied Equity Risk Premium Estimate

Year	[1] Market Value	[2] Operating Earnings	[3] Dividends	[4] Buybacks	[5] Earnings Yield	[6] Dividend Yield	[7] Buyback Yield	[8] 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%
2020	31,659	1,019	480	520	3.22%	1.52%	1.64%	3.16%
2021	40,356	1,739	511	882	4.31%	1.27%	2.18%	3.45%
2022	32,133	1,656	565	923	5.15%	1.76%	2.87%	4.63%
2023	36,870	1,790	588	795	4.85%	1.60%	2.16%	3.75%
2024	49,805	1,968	630	943	3.95%	1.26%	1.89%	3.16%

Cash Yield	4.36%	[9]
Growth Rate	6.96%	[10]
Risk-free Rate	4.89%	[11]
Current Index Value	5,817	[12]

Year	[13] 1	[14] 2	[15] 3	[16] 4	[17] 5
Expected Dividends	271	290	310	332	355
Expected Terminal Value					7446
Present Value	247	240	234	228	4869

Intrinsic Index Value	5817	[18]
Required Return on Market	9.9%	[19]
Implied Equity Risk Premium	**5.0%**	[20]

[1-4] S&P Quarterly Press Releases, data found at https://us.spindices.com/indices/equity/sp-500 (additional info tab) (all dollar figures are in $ billions)
[1] Market value of S&P 500
[5] = [2] / [1]
[6] = [3] / [1]
[7] = [4] / [1]
[8] = [6] + [7]
[9] = Average of [8]
[10] = Compund annual growth rate of [2] = (end value / beginning value)^ $^{1/10}$-1
[11] Risk-free rate from DJG risk-free rate exhibit
[12] 30-day average of closing index prices from DJG stock price exhibit
[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	5.5%	[1]
Kroll (Duff & Phelps) Report	5.5%	[2]
Damodaran (average)	4.3%	[3]
Garrett	5.0%	[4]
Average	[redacted]**5.1%**	

CAPM - Final Results

		[1]	[2]
Company	Ticker	Beta	CAPM Result
Atmos Energy Corp	ATO	0.75	8.7%
New Jersey Resources Corp	NJR	0.85	9.2%
NiSource Inc	NI	0.85	9.2%
Northwest Natural Holding Company	NWN	0.80	8.9%
ONE Gas Inc	OGS	0.80	8.9%
Southwest Gas Holdings Inc	SWX	0.80	8.9%
Spire Inc.	SR	0.80	8.9%
Average			**9.0%**

Risk-free Rate	[3]	4.9%
Equity Risk Premium	[4]	5.1%

[1] From Exhibit DJG-8
[2] = [3] + [1] * [4]
[3] From Exhibit DJG-7
[4] From Exhibit DJG-10

Cost of Equity Summary

Model	Cost of Equity
CAPM (at Proxy Debt Ratio)	9.0%
Hamada CAPM (at Company-Proposed Debt Ratio)	8.6%
DCF Model (Analyst Growth)	7.8%
DCF Model (Sustainable Growth)	7.4%
Model Average	**8.2%**
Model Range	**7.4% -- 9.0%**
Recommended ROE	**9.0%**

Proxy Company Debt Ratios

Company	Ticker	Debt Ratio
Atmos Energy Corp	ATO	39%
New Jersey Resources Corp	NJR	57%
NiSource Inc	NI	54%
Northwest Natural Holding Company	NWN	55%
ONE Gas Inc	OGS	44%
Southwest Gas Holdings Inc	SWX	54%
Spire Inc.	SR	53%
Average		51%

Debt ratios from Value Line Investment Survey - 2024

Competitive Industry Debt Ratios

Industry	# Firms	Debt Ratio
Financial Svcs. (Non-bank & Insurance)	166	92%
Hotel/Gaming	65	86%
Brokerage & Investment Banking	30	80%
Retail (Automotive)	29	80%
Hospitals/Healthcare Facilities	33	76%
Air Transport	24	76%
Bank (Money Center)	15	71%
Rubber& Tires	3	67%
Recreation	50	66%
Food Wholesalers	14	66%
Transportation	21	66%
Computers/Peripherals	35	65%
Cable TV	9	65%
Advertising	54	64%
Retail (Grocery and Food)	17	64%
Retail (Special Lines)	98	64%
Telecom (Wireless)	11	63%
Power	48	62%
R.E.I.T.	192	62%
Oil/Gas Distribution	24	62%
Transportation (Railroads)	4	62%
Telecom. Services	32	62%
Chemical (Diversified)	4	61%
Auto & Truck	34	61%
Aerospace/Defense	67	60%
Broadcasting	22	60%
Packaging & Container	22	60%
Apparel	37	59%
Beverage (Soft)	29	59%
Utility (General)	14	59%
Retail (Distributors)	66	58%
Farming/Agriculture	35	57%
Green & Renewable Energy	18	57%
Information Services	16	57%
Office Equipment & Services	14	56%
Environmental & Waste Services	50	56%
Utility (Water)	15	55%
Real Estate (Development)	15	55%
Computer Services	63	54%
Household Products	101	52%
Retail (REITs)	28	52%
Drugs (Biotechnology)	535	50%
Software (Internet)	29	50%
Furn/Home Furnishings	28	50%
Total / Average	**2,216**	**63%**

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

Hamada Model Results

Unlevering Beta

Proxy Debt Ratio	51%	[1]
Proxy Equity Ratio	49%	[2]
Proxy Debt / Equity Ratio	1.0	[3]
Tax Rate	21%	[4]
Equity Risk Premium	5.1%	[5]
Risk-free Rate	4.9%	[6]
Proxy Group Beta	0.81	[7]
Unlevered Beta	0.44	[8]

Relevered Betas and Cost of Equity Estimates

[9] Debt Ratio	[10] D/E Ratio	[11] Levered Beta	[12] Cost of Equity
0%	0.0	0.44	7.1%
20%	0.3	0.53	7.6%
25%	0.3	0.56	7.7%
30%	0.4	0.59	7.9%
45%	0.8	0.73	8.6%
51%	1.0	0.81	9.0%
60%	1.5	0.97	9.8%

[1] Proxy group average debt ratio
[2] Proxy group average equity ratio
[3] = [1] / [2]
[4] Company assumed tax rate
[5] Equity risk premium from Exhibit DJG-11
[6] Risk-free rate from Exhibit DJG-11
[7] Average proxy beta from Exhibit DJG-11
[8] = [7] / (1 + (1 - [4]) * [3])
[9] Various debt ratios (Garrett proposed highlighted)
[10] = [9] / (1 - [9])
[11] = [8] * (1 + (1 - [4]) * [10])
[12] = [6] + [11] * [5]

Final Rate of Return Recommendation

Capital Component	Proposed Ratio	Cost Rate	Weighted Cost
Long-Term Debt	47.39%	5.64%	2.67%
Short-Term Debt	3.61%	4.55%	0.16%
Common Equity	49.00%	9.00%	4.41%
Total	100.00%		7.25%

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:[1]

Equation 1:
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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[1] *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 2:
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:[2]

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

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

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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;

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

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.[1] 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.[2]

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[1] 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).

[2] *Id*.

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:

Equation 1:
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.

<u>Raw Beta Calculations and Adjustments</u>

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:[3]

Equation 2:
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*

[3] 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).

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 for beta's natural tendency to revert to an underlying mean.[4] Some analysts use an adjustment method proposed by Blume, which adjusts raw betas toward the market mean of one.[5] 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."[6] 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.[7] 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

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[4] *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).

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

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

[7] 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).

statistical quality of the regression."[8] The Vasicek beta adjustment equation is expressed as follows:

Equation 3:
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.*[9]

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[8] 2012 Ibbotson Stocks, Bonds, Bills, and Inflation Valuation Yearbook 77-78 (Morningstar 2012).

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

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 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."[10] 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."[11] In conducting the Vasicek adjustment on betas in previous cases, it reveals that utility betas are even lower than those published by Value Line.[12] 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.

[10] 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).

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

[12] *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.