BEFORE THE CORPORATION COMMISSION OF THE STATE OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF OKLAHOMA, AN OKLAHOMA CORPORATION, FOR AN ADJUSTMENT IN ITS RATES AND CHARGES AND THE ELECTRIC SERVICE RULES, REGULATIONS AND CONDITIONS OF SERVICE FOR ELECTRIC SERVICE IN THE STATE OF OKLAHOMA AND TO APPROVE A FORMULA BASE RATE PROPOSAL	CAUSE NO. PUD 2022-000093

RESPONSIVE TESTIMONY OF

DAVID J. GARRETT

PART I – RATE OF RETURN

ON BEHALF OF
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS

MARCH 7, 2023

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I. INTRODUCTION

Q. State your name and occupation.

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

Q. Summarize your educational background and professional experience.

A. I received a B.B.A. degree with a major in Finance, an M.B.A. degree, and a Juris Doctor degree 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 ("Commission") in 2011. At the Commission, I worked in the Office of General Counsel assisting 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 have testified in numerous regulatory proceedings in multiple jurisdictions on the issues of cost of capital and depreciation. I am a Certified Depreciation Professional with the Society of Depreciation Professionals. I am also a Certified Rate of Return Analyst with the Society of Utility and Regulatory Financial Analysts. A more complete description of my qualifications and regulatory experience is included in my curriculum vitae.[1]

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[1] Direct Exhibit DJG-1-1.

Q. Have your qualifications as an expert witness been accepted by the Oklahoma Corporation Commission?

A. Yes. I have testified before the Commission many times and my qualifications have been accepted each time.

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of Oklahoma Industrial Energy Consumers ("OIEC").

Q. Describe the scope and organization of your testimony.

A. In this case, I am testifying on the two primary capital recovery mechanisms for regulated utilities – return on equity and depreciation – regarding the pending application of Public Service Company of Oklahoma ("PSO" or the "Company"). Collectively, these issues are voluminous, so I am submitting two separate responsive testimony documents – Part I and Part II. Part I of my responsive testimony (this document) addresses rate of return, cost of capital and related issues, and I respond to the Direct Testimony of Company witnesses Adrien McKenzie and Christopher Garcia. Part II of my responsive testimony addresses depreciation rates and related issues, and I respond to the Direct Testimony of Company witness Jason Cash. The exhibits attached to Part I of my testimony have a prefix of "DJG-1," and the exhibits attached to Part II of my testimony have a prefix of "DJG-2."

II. <u>EXECUTIVE SUMMARY</u>

A. <u>Overview</u>

Q. Describe PSO's position regarding the awarded rate of return in this case.

A. In this case, PSO proposes an awarded ROE of 10.4%, as testified to by Company witness Mr. McKenzie.[2] PSO also proposes a capital structure consisting of 45% debt and 55% equity.[3] Mr. McKenzie relies on the Discounted Cash Flow ("DCF") Model, the Capital Asset Pricing Model ("CAPM"), and another risk premium model as part of his recommendation.

Q. Summarize your analyses and conclusions regarding PSO's cost of equity.

A. Analysis of an appropriate awarded ROE for a utility should begin with a reasonable estimation of the utility's cost of equity capital. In estimating PSO'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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[2] Direct Testimony of Christopher J. Garcia, p. 3, lines 6-7. PSO proposes a long term debt ratio of 45.38% and a common equity ratio of 54.62%, which will be referred to in rounded numbers in my testimony (45% and 55% respectively).

[3] *Id*. at 18-23.

Figure 1:
Rate of Return Recommendation

Model	Cost of Equity
CAPM (at Proxy Debt Ratio)	8.6%
Hamada CAPM (at Company-Proposed Debt Ratio)	7.7%
DCF Model (Analyst Growth)	9.3%
DCF Model (Sustainable Growth)	7.6%
Average	**8.3%**
Range	**7.6% - 9.3%**

As shown in this figure, the results of my modeling range from 7.6% - 9.3%. For reasons discussed in more detail in my testimony, I believe a reasonable awarded ROE for PSO is 8.6%.

Q. Please explain the relatively wide range in your cost of equity estimates.

A. The reason why the range of cost of equity estimates is relatively wide in this case is because of the very wide discrepancy between PSO's proposed debt ratio and the average debt ratio of the proxy group. We use key inputs from the proxy group when conducting the CAPM and DCF Model, such as stock prices, dividends, growth rates, and betas. We must also consider the capital structures of the proxy group when assessing the cost of equity estimate for the target company – PSO. The indicated costs of equity produced by the models are necessarily connected with the capital structures of each proxy company. Thus, the cost of equity for PSO depends on which capital structure is selected for the modeling, and ultimately adopted by the Commission. PSO's proposed debt ratio of 45%

is significantly lower than the average debt ratio of the proxy group, which is 56%. This means that PSO has much less financial risk relative to the proxy group. We can adjust PSO's indicated cost of equity based on its lower level of risk using the Hamada variation of the CAPM. Using the Hamada method shows that PSO's cost of equity under its equity-rich capital structure is 7.7%. If we impute a capital structure for PSO that is equal to the proxy group average, then PSO's cost of equity estimate is 8.6%.

B. Recommendation

Q. Summarize your recommendation to the Commission.

A. My primary recommendation to the Commission is to impute a ratemaking debt ratio of 55% for PSO, which is equal to the proxy group average. It is not fair to require customers to pay a premium for PSO's equity rich capital structure, when the 21 proxy companies analyzed in this case demonstrate that utilities can operate with much higher levels of debt and remain financially healthy. If the Commission imputes a ratemaking debt ratio of 55%, then PSO's awarded ROE should be 8.6%. Alternatively, if the Commission is reluctant to impute a capital structure that is equal to the proxy average, then the Commission should award PSO with an ROE of 7.7%, which is PSO's cost of equity estimate using its low-risk, equity-rich capital structure based on the Hamada model.

III. LEGAL STANDARDS AND THE AWARDED RETURN

Q. Discuss the legal standards governing the awarded rate of return on capital investments for regulated utilities.

A. In *Wilcox v. Consolidated Gas Co. of New York*, the U.S. Supreme Court ("Court" or "Supreme Court") first addressed the meaning of a fair rate of return for public utilities.[4] The Court found that "the amount of risk in the business is a most important factor" in determining the appropriate allowed rate of return.[5] Later in two landmark cases, the Court set forth the standards by which public utilities are allowed to earn a return on capital investments. In *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, 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.[6]

In *Federal Power Commission v. Hope Natural Gas Company*, the Court expanded on the guidelines set forth in *Bluefield* and stated:

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

[5] *Id*. at 48.

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

> 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.[7]

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

Q. Is it important that the awarded rate of return be based on the Company's actual cost of capital?

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

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

> 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.[8]

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

> [I]f the allowed rate of return is greater than the cost of capital, capital investments are undertaken and investors' opportunity costs are more than achieved. Any excess earnings over and above those required to service debt capital accrue to the equity holders, and the stock price increases. In this case, the wealth transfer occurs from ratepayers to shareholders.[9]

Thus, it is important to understand that the *awarded* return and the *cost* of capital are different but related concepts. The two concepts are related in that the legal and technical standards encompassing this issue require that the awarded return reflect the true cost of capital. On the other hand, the two concepts are different in that the legal standards do not mandate that awarded returns exactly match the cost of capital. Awarded returns are set through the regulatory process and may be influenced by a number of factors other than

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

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

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. As discussed further in the sections below, Mr. McKenzie's recommended awarded ROE is much higher than PSO's actual cost of capital based on objective market data. When the awarded ROE is set far above the <u>cost</u> 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 Oklahoma customers to Company shareholders. Moreover, establishing an awarded return that far exceeds true cost of capital effectively prevents the awarded returns from changing along with economic conditions. This is especially true given the fact that regulators tend to be influenced by the awarded returns in other jurisdictions, regardless of the various unknown factors influencing those awarded returns. This is yet another reason why it is crucial for regulators to focus on the target utility's actual *cost* of equity, rather than awarded returns from other jurisdictions. Awarded returns may be influenced by settlements and other political factors not based on true market conditions. In contrast, the true cost of equity as estimated through objective models is not influenced by these factors but is instead driven by market-based factors. 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. In fact, this is exactly what we have observed since 1990.

Q. Illustrate and compare the relationship between awarded utility returns and market cost of equity since 1990.

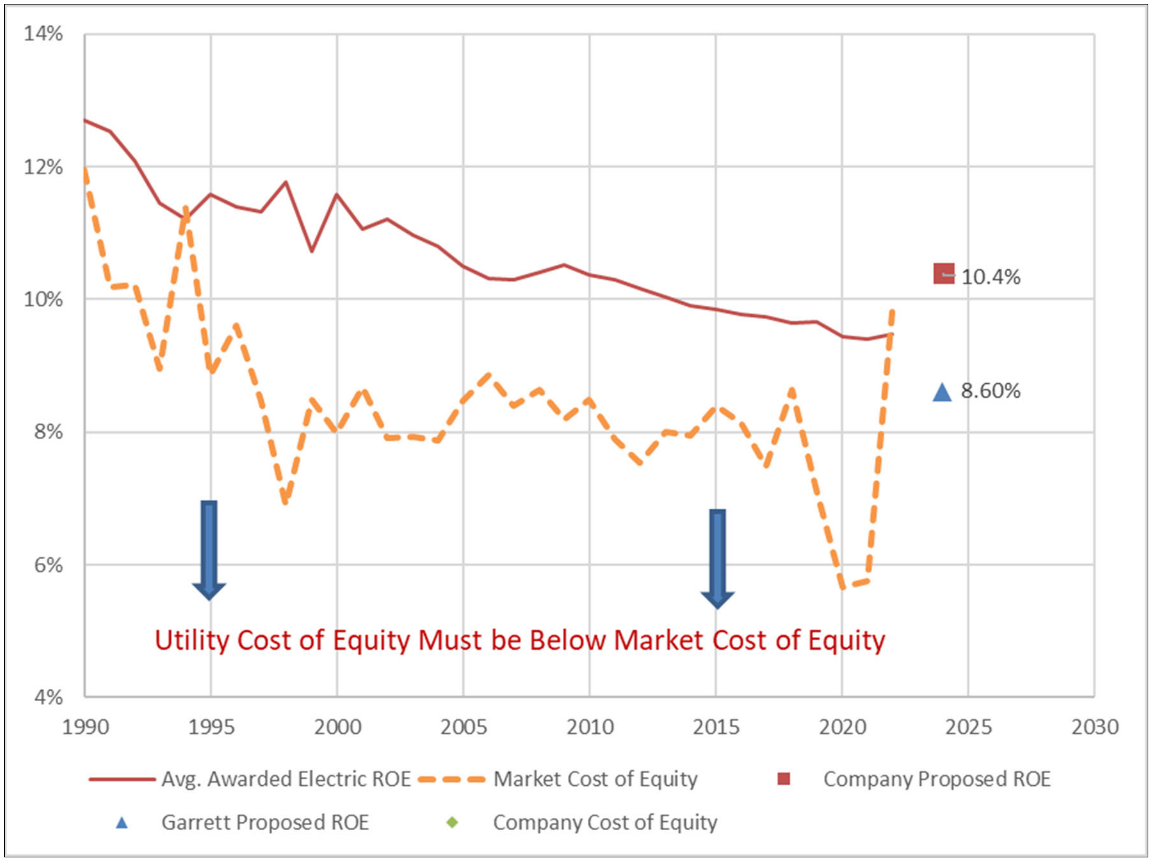
A. As shown in the figure below, awarded returns for public utilities have been above the average required market return since 1990.[10] Because utility stocks are consistently far less risky than the average stock in the marketplace, the cost of equity for utility companies is *less* than the market cost of equity. This is a fact, not an opinion. The graph below shows two trend lines. The top line is the average annual awarded returns since 1990 for U.S. regulated utilities. The bottom line is the required market return over the same period. As discussed in more detail later in my testimony, the required market return is essentially the return that investors would require if they invested in the entire market. In other words, the required market return is essentially the cost of equity of the entire market. Since it is undisputed (even by utility witnesses) that utility stocks are less risky than the average stock in the market, then the utilities' cost of equity must be less than the market cost of equity.[11] Thus, awarded returns (the solid line) should generally be below the market cost

[10] *See* Exhibit DJG-1-15.

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

of equity (the dotted line), since awarded returns are supposed to be based on true cost of equity.

Figure 2:
Awarded ROEs vs. Market Cost of Equity



Because utility stocks are less risky than the average stock in the market, utility cost of equity is <u>below</u> market cost of equity (the dotted line in this graph). However, as shown in this graph, awarded ROEs have been consistently <u>above</u> the market cost of equity for many years. Thus, it is important for the Commission to focus primarily on the results of the cost of equity models when considering a fair awarded ROE, rather than an average of past awarded ROEs.

Q. Have other analysts commented on this national phenomenon of awarded ROEs exceeding market-based cost equity for utilities?

A. Yes. In his article published in Public Utilities Fortnightly in 2016, Steve Huntoon observed that even though utility stocks are less risky than the stocks of competitive industries, utility stocks have nonetheless outperformed the broader market.[12] Specifically, Huntoon notes the following three points which lead to a problematic conclusion:

> 1. Jack Bogle, the founder of Vanguard Group and a Wall Street legend, provides rigorous analysis that the long-term total return for the broader market will be around 7 percent going forward. Another Wall Street legend, Professor Burton Malkiel, corroborates that 7 percent in the latest edition of his seminal work, A Random Walk Down Wall Street.
>
> 2. Institutions like pension funds are validating [the first point] by piling on risky investments to try and get to a 7.5 percent total return, as reported by the Wall Street Journal.
>
> 3. Utilities are being granted returns on equity around 10 percent.[13]

In a follow-up article analyzing and agreeing with Mr. Huntoon's findings, Leonard Hyman and William Tilles found that utility equity investors expect about a 7.5% annual return (not too dissimilar from my cost of equity estimate for the Company in this case).[14] This finding is particularly remarkable given the results of my CAPM and DCF Model in this case, which average a cost of equity estimate almost identical to these authors' findings.

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

[13] *Id*.

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

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

> The "risk premium" being granted to utility shareholders is now higher than it has ever been over the last 35 years. Excessive utility ROEs are detrimental to utility customers and the economy as a whole. From a societal standpoint, granting ROEs that are higher than necessary to attract investment creates an inefficient allocation of capital, diverting available funds away from more efficient investments. From the utility customer perspective, if a utility's awarded and/or achieved ROE is higher than necessary to attract capital, customers pay higher rates without receiving any corresponding benefit.[15]

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

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

case. "Sooner or later, regulators may see the gap between allowed returns and cost of capital."[16]

IV. GENERAL CONCEPTS AND METHODOLOGY

Q. Discuss your approach to estimating the cost of equity in this case.

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

Q. Please explain why you used multiple models to estimate the cost of equity.

A. The models used to estimate the cost of equity attempt to measure the return on equity required by investors by estimating several different inputs. It is preferable to use multiple models because the results of any one model may contain a degree of imprecision, especially depending on the reliability of the inputs used at the time of conducting the model. By using multiple models, the analyst can compare the results of the models and

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

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. McKenzie. 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.[17] By using the same proxy group, we can remove a relatively insignificant variable

[17] *See* Exhibit DJG-1-3.

from the equation and focus on the primary factors driving PSO's cost of equity estimate in this case.

V. RISK AND RETURN CONCEPTS

Q. Discuss the general relationship between risk and return.

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

Q. Discuss the differences between firm-specific risk and market risk.

A. Firm-specific risk affects individual companies, rather than the entire market. For example, a competitive firm might overestimate customer demand for a new product, resulting in reduced sales revenue. This is an example of a firm-specific risk called "project risk."[18] 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

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

realizing less than their expected return in that particular company. While firm-specific risk affects individual companies, market risk affects all companies in the market 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.[19]

Analysis of the U.S. market in 2001 provides a good example for contrasting firm-specific risk and market risk. During that year, Enron Corp.'s stock fell from $80 per share and the company filed bankruptcy at the end of the year. If an investor's portfolio had held only Enron stock at the beginning of 2001, this irrational investor would have lost 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 his portfolio included about 499 other stocks. Each of those stocks, however, would have been affected by various *market* risk factors that occurred that year, including the terrorist attacks on September 11th, which affected all stocks in the market. Thus, the rational investor would have incurred a relatively minor loss due to market risk factors, while the irrational investor would have lost everything due to firm-specific risk factors.

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

Q. Can investors easily minimize firm-specific risk?

A. Yes. A fundamental concept in finance is that firm-specific risk can be eliminated through diversification.[20] If someone irrationally invested all their funds in one firm, they would be exposed to all the firm-specific risk <u>and</u> the market risk inherent in that single firm. Rational investors, however, are risk-averse and seek to eliminate risk they can control. Investors can 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.[21]

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

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[20] *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).

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

[22] *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).[23]

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

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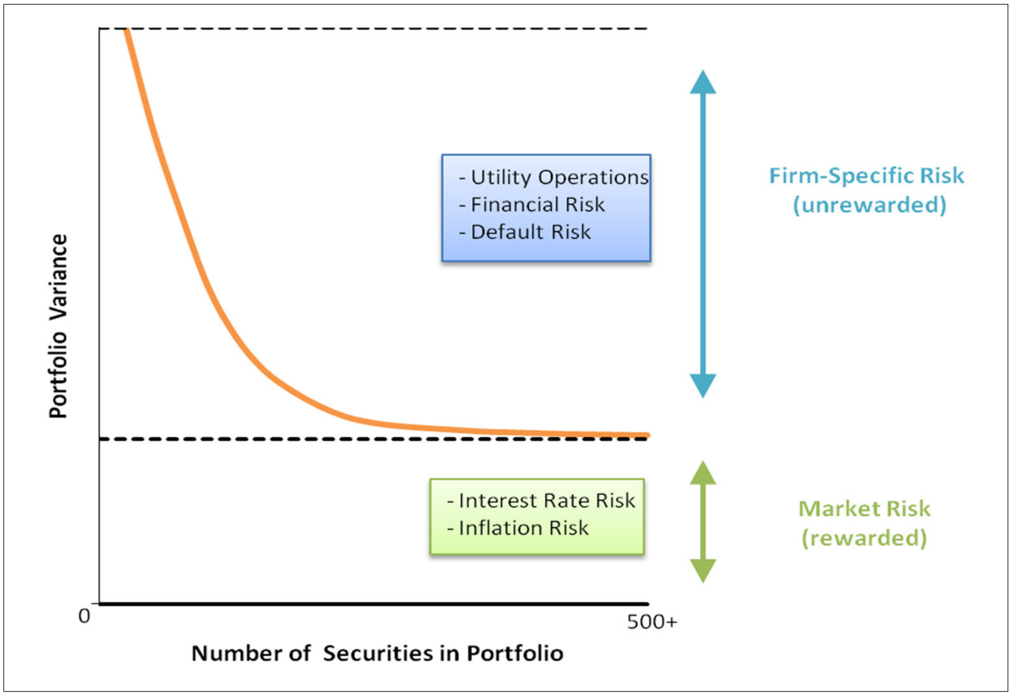
[23] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 180 (3rd ed., South Western Cengage Learning 2010).

Figure 3:
Effects of Portfolio Diversification



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

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."[24] 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 Capital Asset Pricing Model to estimate the cost of equity, which is discussed in more detail later.[25]

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."[26] Thus, cyclical firms are exposed to a greater level of market risk. Securities with betas less than one, other the other hand, are known as "defensive stocks." Companies in defensive industries, such as

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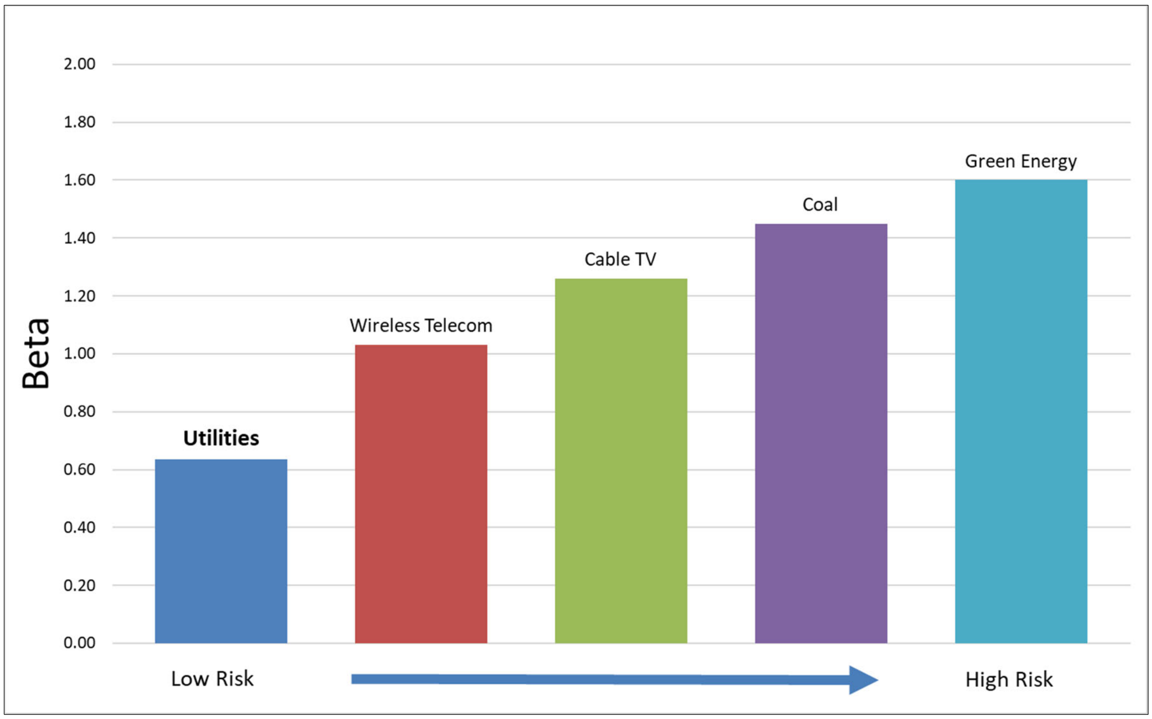
[24] *Id*. at 180-81.

[25] Though it will be discussed in more detail later, Exhibit DJG-1-9 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.

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

public utility companies, "will have low betas and performance that is comparatively unaffected by overall market conditions."[27] 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.[28]

Figure 4:
Beta by Industry



The fact that utilities are defensive firms that are exposed to little market risk is beneficial to society. When the business cycle enters a recession, consumers can be assured

[27] *Id*. at 383.

[28] *See* Betas by Sector (US) at http://pages.stern.nyu.edu/~adamodar/ (2023). 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.

that their utility companies will be able to maintain normal business operations and provide safe and reliable service under prudent management. Likewise, utility investors can be confident that utility stock prices will not widely fluctuate. So, while it is preferable that utilities are defensive firms that experience little market risk and are relatively insulated from market conditions, this fact should also be appropriately reflected in PSO's awarded return.

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

Q. Describe the Discounted Cash Flow ("DCF") model.

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

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. Stock Price

Q. How did you determine the stock price input of the DCF Model?

A. For the stock price (P_0), I used a 30-day average of stock prices for each company in the proxy group.[29] 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.[30] Past stock prices, in essence, reflect outdated information. The DCF Model used in utility rate cases is a derivation of the dividend discount model, which is used to determine the current value of an asset. Thus, according to the dividend discount model and the efficient market hypothesis, the value for the "P_0" term in the DCF Model should technically be the current stock price, rather than an average.

Q. Why did you use a 30-day average for the current stock price input?

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

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[29] *See* Exhibit DJG-1-4.

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

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.[31]

B. <u>Dividend</u>

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 obtained the most recent quarterly dividend paid for each proxy company and annualized those dividends.[32]

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. McKenzie, there is not a statistically significant difference between them because utility stock prices and dividends are generally quite stable. This is another reason that cost of capital models such as the CAPM and the DCF Model are well-suited to be conducted on

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[31] Exhibit DJG-1-4. 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.

[32] Exhibit DJG-1-5.

utilities. The differences between my DCF Model and Mr. McKenzie's DCF Model are primarily driven by differences in our growth rate estimates, which are further discussed below.

C. Growth Rate

Q. Summarize the growth rate input in the DCF Model.

A. The most critical input in the DCF Model is the growth rate. Unlike the stock price and dividend inputs, the growth rate input (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. Therefore, 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 source of confusion in this area.

A. 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, estimating historical earnings growth may provide an indication of future earnings and dividend growth. In general, however, revenue growth tends to be more consistent and predictable than earnings growth because it is less likely to be influenced by accounting adjustments.[33]

B. 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.

C. 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.

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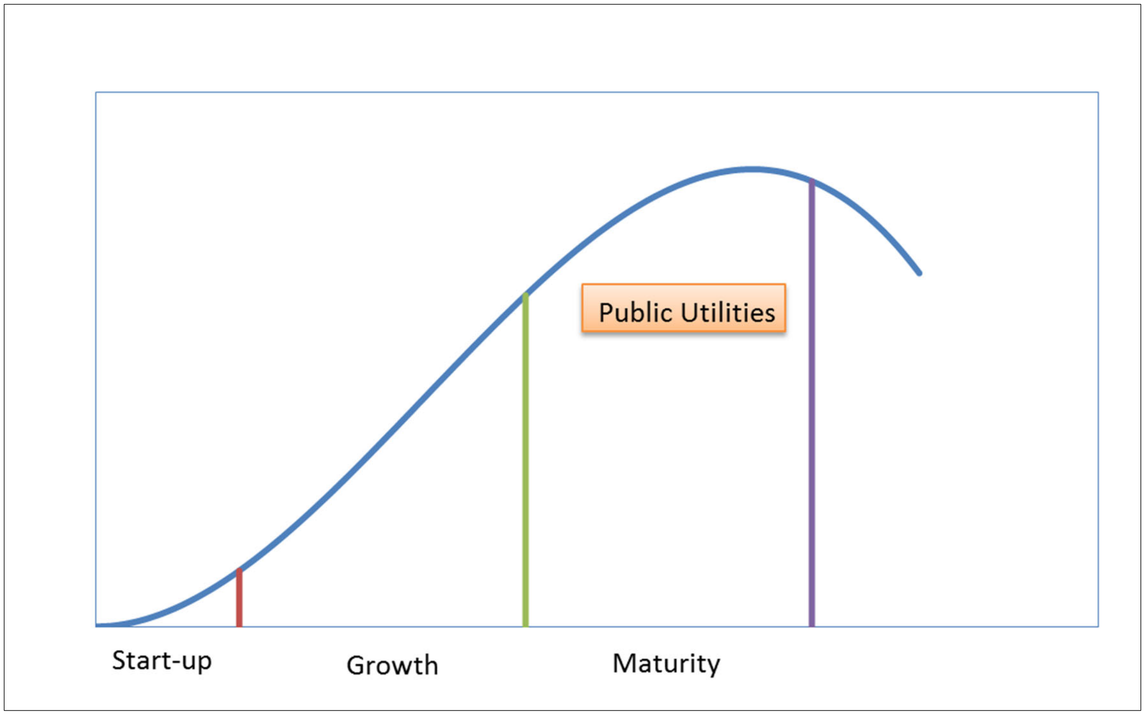
[33] *See* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*, p. 279 (3rd ed., John Wiley & Sons, Inc. 2012).

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.[34] 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."[35]

In fact, it is reasonable to assume that a regulated utility would grow at a rate that is <u>less</u> than the U.S. economic growth rate. Unlike competitive firms, which might increase their growth by launching a new product line, franchising, or expanding into new and developing markets, utility operating companies with defined service territories cannot do any of these things to grow. Gross Domestic Product ("GDP") is one of the most widely used measures of economic production and is used to measure aggregate economic growth. According to the Congressional Budget Office's 2022 Long-Term Budget Outlook, the long-term forecast for nominal U.S. GDP growth is 3.9%.[36]

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[34] *See id.* at p. 306.

[35] *Id.*

[36] Congressional Budget Office, The 2022 Long-Term Budget Outlook, https://www.cbo.gov/system/files/2022-07/57971-LTBO.pdf.

Q. Please illustrate the sustainable growth rate determinants you considered for your DCF Models.

A. The following figure compares the growth rate determinants I considered in my DCF analysis in this case.[37]

Figure 6:
Sustainable Growth Rate Determinants

Terminal Growth Determinants	Rate
Nominal GDP	3.9%
Real GDP	1.7%
PSO Historical Customer Growth	0.65%
PSO Historical Sales Growth	-0.19%
Average	1.5%
Long-Term Growth Ceiling	**3.9%**

Each of these growth determinants avoids the circular reference problem inherent in other growth determinants such as dividends and earnings growth when conducting a DCF Model on a regulated utility for purposes of setting a fair awarded ROE (because the awarded ROE more directly impacts earnings and dividends).

Q. Please describe the growth rates you used in your DCF Models.

A. For my "sustainable growth" variation of the DCF Model, I used the projected long-term GDP growth rate of 3.9%. 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

[37] *See also* Exhibit DJG-1-6.

in which it operates (as measured by U.S. GDP in this case). For the "analyst growth" variation of the DCF Model, I considered projected short-term dividend growth rate estimates published by Value Line.[38] 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. Did you also consider growth determinants specific to PSO when assessing the reasonableness of your DCF growth inputs.

A. Yes. I considered firm-specific qualitative growth determinants, namely load growth and customer growth, to assess the reasonableness of my long-term growth rate inputs. PSO's historical customer and sales growth show annual growth rates of 0.65% and -0.19%, respectively. As with the terminal growth determinants discussed above, these firm-specific growth determinants also avoid the circular reference problem inherent in considering earnings and dividend growth when conducting a DCF Model on a regulated utility for purposes of setting a fair awarded ROE. These firm-specific, low growth determinants provide further support for why GDP may be properly considered as a ceiling for sustainable growth rate inputs in the DCF Model, particularly for a utility company.

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 produced a cost

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[38] Exhibit DJG-6.

of equity indication of 7.6%. The analyst growth variation of the DCF produced a result of 9.3%.[39]

D. Response to Mr. McKenzie's DCF Model

Q. Please summarize the results of Mr. McKenzie's DCF Models.

A. Mr. McKenzie's DCF Models produced results ranging from 8.3% - 9.8%.[40] Mr. McKenzie relies on several sources of analysts' short-term growth rates for the long-term growth rate input in the DCF Model. Thus, while some of Mr. McKenzie's DCF results do fall within my recommended range for the awarded ROE in this case, his results are generally overstated due to his reliance on analysts' growth rates. Mr. McKenzie also conducted a DCF Model on a group of non-utility companies.

1. Long-Term Growth Rates

Q. Describe the problems with Mr. McKenzie's long-term growth input.

A. Mr. McKenzie used long-term growth rates in his proxy group as high as 10%,[41] which is more than twice as high as projected, long-term nominal U.S. GDP growth (only 3.9%). As discussed above, 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. McKenzie used short-term, quantitative growth estimates published by analysts. As discussed above, these analysts' estimates are inappropriate to

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[39] Exhibit DJG-1-7.

[40] Direct Testimony of Adrien M. McKenzie, p. 44, Table 3.

[41] Exhibit AMM-4.

use in the DCF Model as long-term growth rates because they are estimates for short-term growth.

2. Non-Utility Group

Q. Did Mr. McKenzie also conduct a DCF analysis on a group of non-utility companies?

A. Yes. In addition to conducting the DCF Model on the utility proxy group, Mr. McKenzie also conducted a DCF analysis on a group of non-utility companies.[42]

Q. Do you agree with the results of Mr. McKenzie's non-utility-group DCF analysis as an indication for a reasonable cost of equity estimate for PSO?

A. No. First, Mr. McKenzie's non-utility group analysis suffers from the same overestimated growth rates as his other DCF analysis discussed above. For that reason alone, the Commission should reject the results. Furthermore, conducting cost of equity analysis on a group of non-utility companies adds no marginal value to the process of estimating utility cost of equity. The reason analysts select a group of utility companies for cost of equity analysis in utility rate proceedings is that utility companies will be relatively similar in terms of operations and risk profiles as the utility being studied. *(the non utility group is not comparable)* In addition, Mr. McKenzie states that "[t]his analysis was not relied on to arrive at [his] recommended ROE."[43] The Commission should not rely on it either.

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[42] Exhibit AMM-10.

[43] Direct Testimony of Adrien M. McKenzie, p. 57, lines 13-14.

VII. CAPITAL ASSET PRICING MODEL ANALYSIS

Q. Describe the Capital Asset Pricing Model.

A. The Capital Asset Pricing Model ("CAPM") is a market-based model founded on the principle that investors expect higher returns for incurring additional risk.[44] The CAPM estimates this expected return. The various assumptions, theories, and equations involved in the CAPM are discussed further in Appendix B. Using the CAPM to estimate the cost of equity of a regulated utility is consistent with the legal standards governing the fair rate of return. The U.S. Supreme Court has recognized that "the amount of risk in the business is a most important factor" in determining the allowed rate of return,[45] and that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks."[46] The CAPM is a useful model because it directly considers the amount of risk inherent in a business. The CAPM directly measures the most important component of a fair rate of return analysis: Risk.

Q. Describe the inputs for the CAPM.

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

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[44] 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).

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

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

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

Q. Is it preferable to use the yield on long-term Treasury bonds for the risk-free rate in the CAPM?

A. Yes. In valuing an asset, investors estimate cash flows over long periods of time. Common stock is viewed as a long-term investment, and the cash flows from dividends are assumed to last indefinitely. Thus, short-term Treasury bill yields are rarely used in the CAPM to represent the risk-free rate. Short-term rates are subject to greater volatility and thus can lead to unreliable estimates. Instead, long-term Treasury bonds are usually used to represent the risk-free rate in the CAPM. I considered a 30-day average of daily Treasury yield curve rates on 30-year Treasury bonds in my risk-free rate estimate, which resulted in a risk-free rate of 3.7%.[47]

[47] Exhibit DJG-1-8.

B. The Beta Coefficient

Q. How is the beta coefficient used in this model?

A. As discussed above, beta represents the sensitivity of a given security to movements in the overall market. The CAPM states that in efficient capital markets, the expected risk premium on each investment is proportional to its beta. Recall that a security with a beta greater (less) than one is more (less) risky than the market portfolio. An index such as the S&P 500 Index is used as a proxy for the market portfolio. The historical betas for publicly traded firms are published by various institutional analysts. Beta may also be calculated through a linear regression analysis, which provides additional statistical information about the relationship between a single stock and the market portfolio. As discussed above, beta also represents the sensitivity of a given security to the market as a whole. The market portfolio of all stocks has a beta equal to one. Stocks with betas greater than one are relatively more sensitive to market risk than the average stock. For example, if the market increases (decreases) by 1.0%, a stock with a beta of 1.5 will, on average, increase (decrease) by 1.5%. In contrast, stocks with betas of less than one are less sensitive to market risk. For example, if the market increases (decreases) by 1.0%, a stock with a beta of 0.5 will, on average, only increase (decrease) by 0.5%.

Q. Describe the source for the betas you used in your CAPM analysis.

A. I used betas recently published by Value Line Investment Survey. The beta for each proxy company is less than 1.0. Thus, we have an objective measure to prove the well-known concept that utility stocks are less risky than the average stock in the market. While there is evidence suggesting that betas published by sources such as Value Line may actually overestimate the risk of utilities (and thus overestimate the CAPM), I used the betas published by Value Line in the interest of reasonableness.[48]

C. The Equity Risk Premium

Q. Describe the equity risk premium.

A. The final term of the CAPM is the equity risk premium ("ERP"), which is the required return on the market portfolio less the risk-free rate ($R_M - R_F$). In other words, the ERP is the level of return investors expect above the risk-free rate in exchange for investing in risky securities. Many experts would agree that "the single most important variable for making investment decisions is the equity risk premium."[49] 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.

1. Historical Average

Q. Describe the historical equity risk premium.

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

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[48] *See* Exhibit DJG-1-9; *See also* Appendix B for a more detailed discussion of raw beta calculations and adjustments.

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

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. What matters in the CAPM model, however, is not the actual risk premium from the past, but rather the current and forward-looking risk premium.[50] Some investors may think that a historic ERP provides some indication of what the prospective risk premium is; however, there is empirical evidence to suggest the prospective, forward-looking ERP is actually lower than the historical ERP. In a landmark publication on risk premiums around the world, *Triumph of the Optimists*, the authors suggest through extensive empirical research that the prospective ERP is lower than the historical ERP.[51] This is due in large part to what is known as "survivorship bias" or "success bias" – a tendency for failed companies to be excluded from historical indices.[52] 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.[53]

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

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

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

[52] *Id*. at 34.

[53] *Id*. at 194.

> The historical risk premium obtained by looking at U.S. data is biased upwards because of survivor bias. . . . The true premium, it is argued, is much lower. This view is backed up by a study of large equity markets over the twentieth century (*Triumph of the Optimists*), which concluded that the historical risk premium is closer to 4%.[54]

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. Fortunately, "a naïve reliance on long-run historical averages is not the only approach for estimating the expected risk premium."[55]

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 discussed below.

2. <u>EXPERT SURVEYS</u>

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 conducts such a survey each year. Their 2022 expert survey reported an average ERP of 5.6%.[56]

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

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

[56] Pablo Fernandez, Pablo Linares & Isabel F. Acin, *Survey: Market Risk Premium and Risk-Free Rate used for 81 countries in 2020* (IESE Business School 2020), copy available at http://www.valumonics.com/wp-content/uploads/2017/06/Discount-rate-Pablo-Fern%C3%A1ndez.pdf. IESE Business School is the graduate

3. IMPLIED EQUITY RISK PREMIUM

Q. Describe the implied equity risk premium approach.

A. The third method of estimating the ERP is arguably the best. The implied ERP relies on the stable growth model proposed by Gordon, often called the "Gordon Growth Model," which is a basic stock valuation model widely used in finance for many years.[57] This model is a mathematical derivation of the DCF Model. In fact, the underlying concept in both models is the same: The current value of an asset is equal to the present value of its future cash flows. Instead of using this model to determine the discount rate of one company, we can use it to determine the discount rate for the entire market by substituting the inputs of the model. Specifically, instead of using the current stock price (P_0), we will use the current value of the S&P 500 (V_{500}). Instead of using the dividends of a single firm, we will consider the dividends paid by the entire market. Additionally, we should consider potential dividends. In other words, stock buybacks should be considered in addition to paid dividends, as stock buybacks represent another way for the firm to transfer free cash flow to shareholders. Focusing on dividends alone without considering stock buybacks could understate the cash flow component of the model, and ultimately understate the implied ERP. The market dividend yield plus the market buyback yield gives us the gross cash yield to use as our cash flow in the numerator of the discount model. This gross cash yield is increased each year over the next five years by the growth rate. These cash flows

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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.

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

must be discounted to determine their present value. The discount rate in each denominator is the risk-free rate (R_F) plus the discount rate (K). The following formula shows how the implied return is calculated. Since the current value of the S&P is known, we can solve for K: The implied market return.[58]

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

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

Equation 2:
Implied Equity Risk Premium

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

[58] *See* Exhibit DJG-1-10 for detailed calculation.

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 9.4%. I subtracted the risk-free rate to arrive at the implied equity risk premium of 5.7%.[59] Dr. Damodaran, one of the world's leading experts on the ERP, promotes the implied ERP method discussed above. He calculates monthly and annual implied ERPs with this method and publishes his results. Dr. Damodaran's average ERP estimate for March 2023 using several implied ERP variations was 5.1%.[60]

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).[61] The results are presented in the following figure:

[59] *Id*.

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

[61] *See also* Exhibit DJG-1-11.

Figure 7:
Equity Risk Premium Results

IESE Business School Survey	5.6%
Kroll (Duff & Phelps) Report	6.0%
Damodaran (average)	5.1%
Garrett	5.7%
Average	**5.6%**

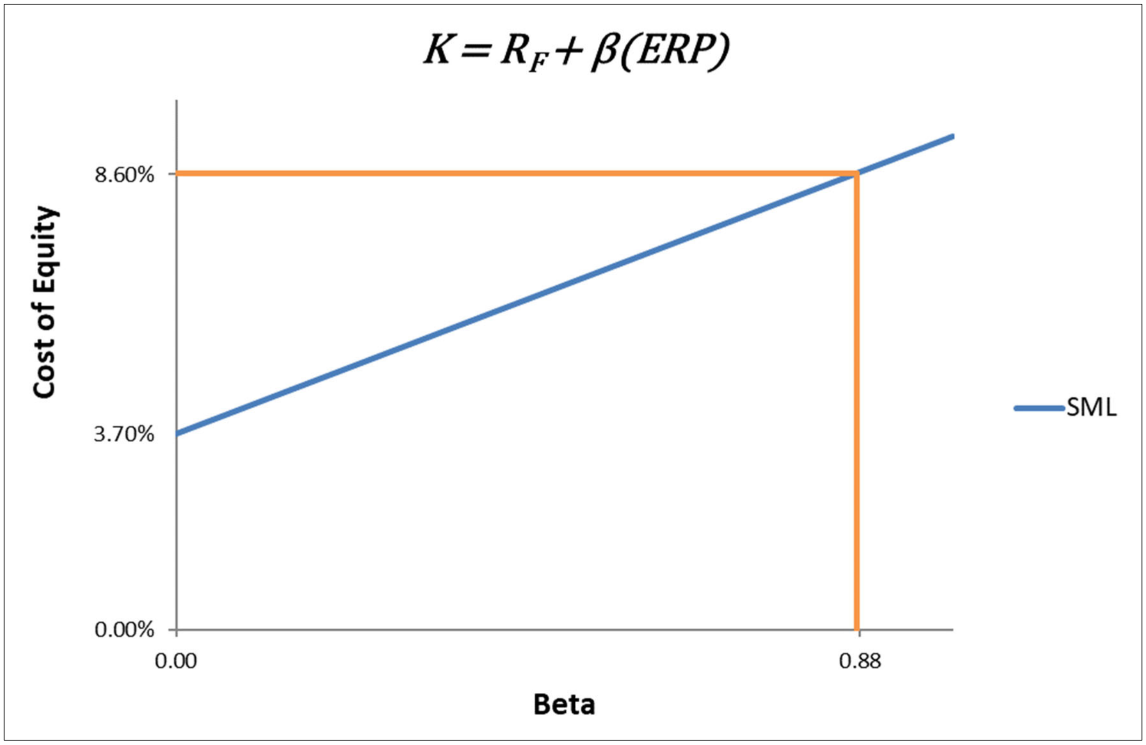
The average ERP from these sources is 5.6%.

Q. Please explain the final results of your CAPM analysis.

A. Using the inputs for the risk-free rate, beta coefficient, and equity risk premium discussed above, I estimate that PSO's CAPM cost of equity is 8.6% (assuming a capital structure equal to the proxy group average).[62] The CAPM may be displayed graphically through what is known as the Security Market Line ("SML"). The following figure shows the expected return (cost of equity) on the y-axis, and the average 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.

[62] Exhibit DJG-1-12.

Figure 8:
CAPM Graph



The SML provides the rate of return that will compensate investors for the beta risk of that investment. Thus, at an average beta of 0.88 for the proxy group, the estimated CAPM cost of equity for PSO is 8.6%.

D. Response to Mr. McKenzie's CAPM Analysis

Q. Mr. McKenzie's CAPM analysis yields considerably higher results. Did you find specific problems with Mr. McKenzie's CAPM assumptions and inputs?

A. Yes, I did. Mr. McKenzie's CAPM cost of equity results are as high as 11.7%,[63] which is considerably higher than my estimate. The primary problem with Mr. McKenzie's CAPM cost of equity result stems from his estimate of the equity risk premium ("ERP").

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[63] Exhibit AMM-6.

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

Q. Did Mr. McKenzie rely on a reasonable measure for the ERP?

A. No, he did not. Mr. McKenzie estimates an ERP as high as 9.4%.[64] The ERP is one of three inputs in the CAPM equation, and it is one of the most single important factors for estimating the cost of equity in this case. As discussed above, I used three widely-accepted methods for estimating the ERP, including consulting expert surveys, calculating the implied ERP based on aggregate market data, and considering the ERPs published by reputable analysts. The average ERP from these sources is 5.6%.

Q. Please discuss and illustrate how Mr. McKenzie's ERP compares with other estimates for the ERP.

A. As discussed above, the 2022 IESE Business School expert survey reports an average ERP of 5.6%. Similarly, Kroll (formerly Duff & Phelps) recently estimated an ERP of 6.0%. The following chart illustrates that Mr. McKenzie's ERP estimate is far out of line with industry norms[65].

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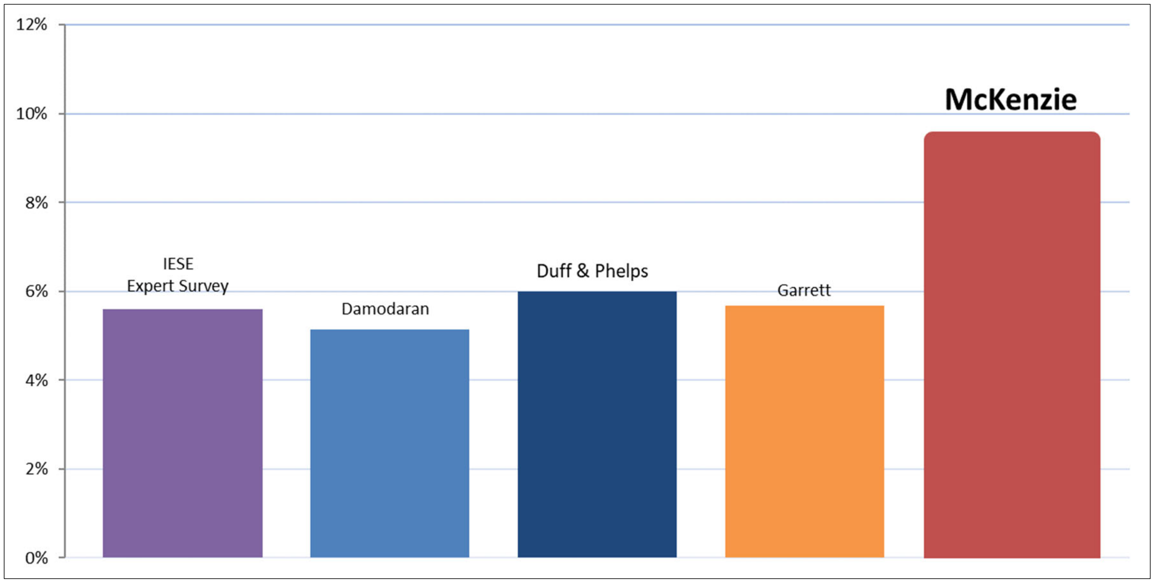
[64] Exhibit AMM-11.

[65] The ERP estimated by Dr. Damodaran is the average of several ERP estimates under slightly differing assumptions.

Figure 9:
Equity Risk Premium Comparison



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

2. <u>Other Risk Premium Analyses</u>

Q. Did you review Mr. McKenzie's other risk premium analyses?

A. Yes. I am addressing Mr. McKenzie's other risk premium analyses in this section because the CAPM itself is a risk premium model. Many utility ROE witnesses, including Mr. McKenzie in this case, conduct what they call a "historical risk premium analysis," "bond yield plus risk premium analysis" or "allowed return premium analysis." In short, this analysis simply compares the difference between awarded ROEs in the past with bond yields.

Q. Do you agree with the results of Mr. McKenzie's risk premium analysis?

A. No. Not only do I disagree with the results of Mr. McKenzie's risk premium analysis, but I also disagree with the entire premise of the analysis. Mr. McKenzie's risk premium model considers ROEs allowed by regulatory commissions for electric utilities dating back nearly 50 years[66] – which contradicts Mr. McKenzie's acknowledgement that cost of equity modeling is a "forward-looking" concept.[67] This decision is especially problematic considering the fact that capital costs and awarded ROEs were much higher several decades ago than they are currently. As discussed earlier in this testimony, it is clear that awarded ROEs are consistently higher than market-based cost of equity, and they have been for many years. Thus, these types of risk premium "models" effectively perpetuate the discrepancy between awarded ROEs and market-based cost of equity.

Furthermore, the risk premium analysis offered by Mr. McKenzie is completely unnecessary when we already have a real risk premium model to use: the CAPM. The CAPM itself is a "risk premium" model; it takes the bare minimum return any investor would require for buying a stock (the risk-free rate), then adds a *premium* to compensate the investor for the extra risk he or she assumes by buying a stock rather than a riskless U.S. Treasury security. The CAPM has been utilized by companies around the world for decades for the same purpose we are using it in this case – to estimate cost of equity.

In stark contrast to the Nobel-prize-winning CAPM, the risk premium models relied upon by utility witnesses are not market-based, and therefore have no value in helping us

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[66] Exhibit AMM-8.

[67] Direct Testimony of Adrien M. McKenzie, p. 45, line 18.

estimate the market-based cost of equity. Unlike the CAPM, which is found in almost every comprehensive financial textbook, the risk premium models used by utility witnesses are almost exclusively found in the texts and testimonies of such witnesses. Specifically, these risk premium models attempt to create an inappropriate link between market-based factors, such as interest rates, with awarded returns on equity. Inevitably, this type of model is used to justify a cost of equity that is much higher than one that would be dictated by market forces.

3. Empirical CAPM

Q. Please summarize Mr. McKenzie's empirical CAPM analysis

A. Mr. McKenzie offers another version of the CAPM that he calls the "empirical CAPM" ("ECAPM").[68] The premise of Mr. McKenzie's ECAPM is that the real CAPM underestimates the return required from low-beta securities, such as those of the proxy group.[69]

Q. Do you agree with Mr. McKenzie's ECAPM results?

A. No. The premise of Mr. McKenzie's E-CAPM 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. McKenzie 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

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[68] Exhibit AMM-7.

[69] Direct Testimony of Adrien M. McKenzie, p. 49, et. seq.

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. According to this research, it is better to employ an adjustment method that adjusts raw betas toward an industry average, rather than the market average, which ultimately would result in betas that are lower than those published in Value Line.[70] Finally, Mr. McKenzie's ECAPM still suffers from the same overestimated risk-free rate and ERP inputs discussed above. Thus, regardless of the differing theories regarding the mean reversion tendencies of low-beta securities, Mr. McKenzie's ECAPM should be disregarded for its ERP input alone.

VIII. OTHER COST OF EQUITY ISSUES

Q. Would you like to address any other cost of equity issues raised in Mr. McKenzie's testimony?

A. Yes. Mr. McKenzie applied an upward adjustment to his CAPM results to account for the "size effect." In addition, Mr. McKenzie performed an expected earnings analysis. I disagree with both of these decisions, and I will address each of these two issues below.

1. Size Effect

Q. Describe Mr. McKenzie's size premium adjustment to his CAPM.

A. Mr. McKenzie's CAPM analysis incorporates an upward adjustment to account for the "size effect."[71]

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[70] *See* Appendix B for further discussion on these theories.

[71] Direct Testimony of Adrien McKenzie, p. 47, line 12.

Q. Do you agree with Mr. McKenzie's size effect premium?

A. No. The "size effect" phenomenon arose from a 1981 study conducted by Banz, which found that "in the 1936 – 1975 period, the common stock of small firms had, on average, higher risk-adjusted returns than the common stock of large firms."[72] According to Ibbotson, Banz's size effect study was "[o]ne of the most remarkable discoveries of modern finance."[73] 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 years. . . ." [74] After 1983, U.S. small-cap stocks actually underperformed relative to large cap stocks. In other words, the size effect essentially reversed. In *Triumph of the Optimists*, the authors conducted an extensive empirical study of the size effect phenomenon around the world. They found that after the size effect phenomenon was discovered in 1981, it disappeared within a few years:

> 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.[75]

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

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

[73] 2015 Ibbotson Stocks, Bonds, Bills, and Inflation Classic Yearbook 99 (Morningstar 2015).

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

[75] *Id*. at 133.

use the term 'size effect' to imply that we should automatically expect there to be a small-cap premium," yet, this is exactly what utility witnesses often do in attempting to artificially inflate the cost of equity with a size premium. Other prominent sources have agreed that the size premium is a dead phenomenon. According to Ibbotson:

> The unpredictability of small-cap returns has given rise to another argument against the existence of a size premium: that markets have changed so that the size premium no longer exists. As evidence, one might observe the last 20 years of market data to see that the performance of large-cap stocks was basically equal to that of small cap stocks. In fact, large-cap stocks have outperformed small-cap stocks in five of the last 10 years.[76]

In addition to the studies discussed above, other scholars have concluded 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.[77]

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

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[76] 2015 Ibbotson Stocks, Bonds, Bills, and Inflation Classic Yearbook 112 (Morningstar 2015).

[77] 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).

2. Expected Earnings Model

Q. Please describe Mr. McKenzie's expected earnings model.

A. Mr. McKenzie's expected earnings model considers the expected return on common equity of the proxy companies.[78]

Q. Do you believe the results of this model should have any bearing on a reasonable cost of equity estimate for PSO?

A. No. Earned returns on equity (whether historical or projected) are a different concept than cost of equity. The cost of equity is a forward-looking concept that examines an investor's expected return on an asset given the level of risk in the investment. If an investor estimates a cost of equity of 20% in XYZ Corp (a very risky company), but the Company only reports a 5% return for a given year, this does not mean that the investor should have only "expected" a low 5% return for a relatively risky investment. Furthermore, analyzing earned returns in this context contributes to a feedback loop which (especially if Mr. McKenzie's model is given any weight) will result in inflated ROEs. We are using cost of equity models (i.e., the CAPM and DCF Model) to determine a fair awarded ROE (which would give PSO the opportunity to earn that ROE). It makes no sense to consider earned ROEs for the purpose of setting an authorized ROE. Moreover, Mr. McKenzie's "expected" ROEs are as high as 14%,[79] which is at least 500 basis points higher than a reasonable estimate for PSO's cost of equity. For all these reasons, the Commission should reject Mr. McKenzie's expected earnings model.

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[78] Exhibit AMM-9.

[79] Exhibit AMM-9.

IX. CAPITAL STRUCTURE

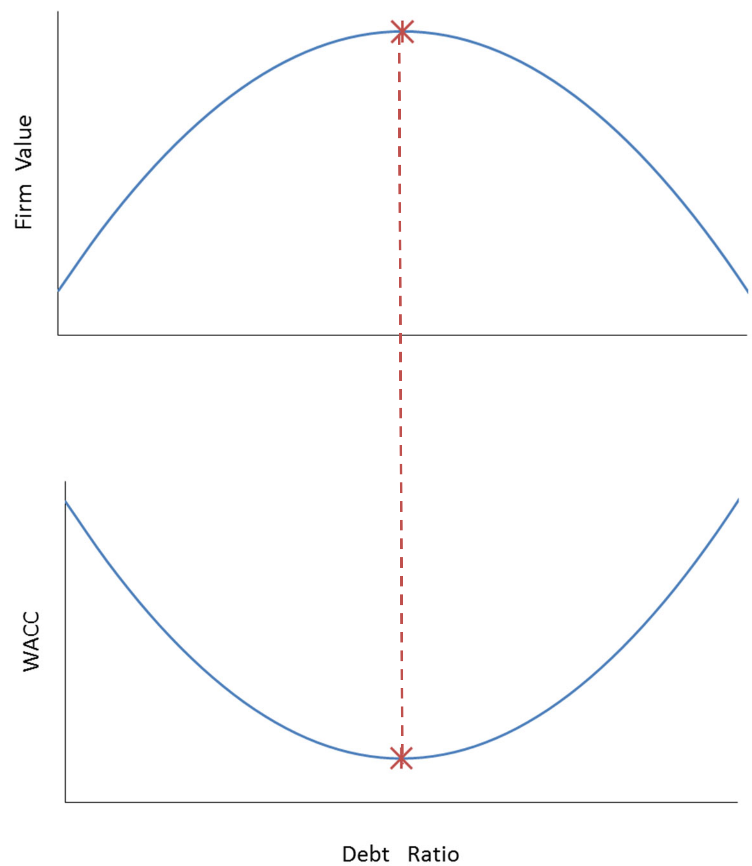
Q. Describe in general the concept of a company's "capital structure."

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

Q. Is it true that, by increasing debt, competitive firms can add value and reduce their WACC?

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

Figure 10:
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.[80]

[80] *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. 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*
	r	=	***weighted average cost of capital (WACC)***
	A	=	*plant investments*
	D	=	*accumulated depreciation*

As shown in this equation, utilities can increase their revenue requirement by increasing 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.

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.[81]

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

Q. Describe the approach you used to assess the reasonableness of PSO's capital structure for ratemaking purposes?

A. To assess a reasonable capital structure for PSO, I examined the capital structures of the proxy group and PSO's parent company, AEP. I also compared PSO's proposed debt ratio with debt ratios observed in other industries. I discuss each of these approaches in more detail below.

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

A. Proxy and Parent Utility Debt Ratios

Q. Please describe the debt 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. McKenzie), the average debt ratio of the proxy group is 56%.[82] This is notably higher than PSO's proposed debt ratio of only 45%.

Q. What is AEP's debt ratio?

A. PSO's parent company, AEP, had a debt ratio of 58% at the end of 2022.[83]

Q. Why is AEP's significantly higher debt ratio significant?

A. The capital structure of AEP, as with other parent companies comprising the proxy group, are not directly set by regulatory commissions. Thus, those debt ratios are more reflective of the debt ratios that might be seen if utilities operated in a purely unregulated environment. Moreover, since PSO is a wholly owned subsidiary of AEP, PSO's "equity" is funded by AEP. Since AEP has a debt ratio of 58%, this means that AEP is using debt to finance the purchase of PSO's equity – a strategy known as "double leveraging." This results in excess profits to the utility since the cost of debt is notably lower than the cost of equity. If the Commission approves PSO's proposed capital structures, it would allow AEP to earn a windfall equity return on debt that was borrowed at lower rates – at the expense of customers.

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[82] Exhibit DJG-1-16.

[83] Value Line Investment Survey, AEP Report.

B. Competitive Industry Debt Ratios

Q. Please describe the debt ratios recently observed in competitive U.S. industries.

A: There are nearly 2,000 companies in the U.S. with debt ratios higher than 50%.[84] The following figure shows a sample of these industries with debt ratios higher than 56%.

[84] Exhibit DJG-1-16.

Figure 11:
Industries with Debt Ratios Greater than 56%

Industry	# Firms	Debt Ratio
Air Transport	21	84%
Hotel/Gaming	69	82%
Hospitals/Healthcare Facilities	34	82%
Retail (Automotive)	30	78%
Brokerage & Investment Banking	30	76%
Computers/Peripherals	42	71%
Bank (Money Center)	7	68%
Cable TV	10	68%
Food Wholesalers	14	67%
Advertising	58	67%
Oil/Gas Distribution	23	66%
Rubber& Tires	3	65%
Transportation (Railroads)	4	65%
Real Estate (Operations & Services)	60	64%
Retail (Grocery and Food)	13	64%
Retail (Special Lines)	78	64%
Recreation	57	62%
Insurance (Life)	27	61%
Trucking	35	61%
Packaging & Container	25	61%
Power	48	60%
Telecom. Services	49	60%
Telecom (Wireless)	16	60%
R.E.I.T.	223	60%
Auto & Truck	31	59%
Utility (General)	15	59%
Household Products	127	58%
Office Equipment & Services	16	58%
Environmental & Waste Services	62	57%
Utility (Water)	16	57%
Retail (Distributors)	69	57%
Transportation	18	57%
Green & Renewable Energy	19	57%
Total / Average	**1,349**	**65%**

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 in order to maximize their profits. There are several notable industries that are relatively comparable to public utilities. For example, the Cable TV, Telecom, Power, and Water Utility 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 table:

Figure 12:
Capital Structure Analysis – Summary of Results

Source	Debt Ratio
Cable TV	68%
Power	60%
Telecom (Wireless)	60%
PSO Parent Company	**58%**
Proxy Group of Utilities	**56%**
PSO Proposed	**45%**

As shown in this figure, PSO's proposed debt ratio is clearly too low. This results in excessively high capital costs and utility rates. My analysis indicates that PSO's debt ratio for ratemaking should be at least 56%. Thus I recommend the Commission adopt a capital structure for PSO consisting of 56% debt and 44% equity.

C. 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:[85]

Equation 1:
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*

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

Using this equation, 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 56% debt and 44% equity. Because PSO's debt ratio is so much lower than that of the proxy group, when we "relever" PSO relative to the proxy group, it results in a much lower ROE than if PSO had been operating with a capital structure equal to that of the proxy group. This makes sense because PSO 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 following figure.

Figure 13:
Hamada Model ROE

Unlevering Beta	
Proxy Debt Ratio	56%
Proxy Equity Ratio	44%
Proxy Debt / Equity Ratio	1.3
Tax Rate	25%
Equity Risk Premium	5.6%
Risk-free Rate	3.7%
Proxy Group Beta	0.88
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	6.2%
20%	0.3	0.53	6.7%
30%	0.4	0.59	7.0%
40%	0.7	0.67	7.4%
45%	0.8	0.72	7.7%
56%	1.3	0.88	8.6%
60%	1.5	0.94	9.0%

According to the results of the Hamada model, if the Commission were to adopt my capital structure recommendation, PSO's indicated cost of equity estimate (under the CAPM) would be 8.6%. However, if the Commission's accepts the PSO's proposed capital structure, the Company's cost of equity estimate would be 7.7%.

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.

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:[86]

Equation 4:
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;

[86] *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 5:
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:[87]

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

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

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

The basic form of the Constant Growth DCF Model described above is sometimes referred to as the "Annual" DCF Model. This is because the model assumes an annual dividend payment to be paid at the end of every year, as well as an increase in dividends once each year. In reality however, most utilities pay dividends on a quarterly basis. The Constant Growth DCF equation may be modified to reflect the assumption that investors receive successive quarterly dividends and reinvest them throughout the year at the discount rate. This variation is called the Quarterly Approximation DCF Model.[88]

Equation 6:
Quarterly Approximation Discounted Cash Flow Model

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

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

[88] *Id*. at 348.

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

APPENDIX B:

CAPITAL ASSET PRICING MODEL THEORY

The Capital Asset Pricing Model ("CAPM") is a market-based model founded on the principle that investors demand higher returns for incurring additional risk.[89] 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.[90]

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

The basic CAPM equation is expressed as follows:

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[89] 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).

[90] *Id*.

Equation 7:
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:[91]

Equation 8:
Beta

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

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

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

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

for beta's natural tendency to revert to an underlying mean.[92] Some analysts use an adjustment method proposed by Blume, which adjusts raw betas toward the market mean of one.[93] 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."[94] 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.[95] In other words, "[t]he Vasicek adjustment seeks to overcome one weakness of the Blume model by not applying the same adjustment to every security; rather, a security-specific adjustment is made depending on the statistical quality of the regression."[96] The Vasicek beta adjustment equation is expressed as follows:

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[92] *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).

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

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

[95] 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).

[96] 2012 Ibbotson Stocks, Bonds, Bills, and Inflation Valuation Yearbook 77-78 (Morningstar 2012).

Equation 9:
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.[97]

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

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

specifically related to utility companies. Gombola concluded that "[t]he strong evidence of auto-regressive tendencies in utility betas lends support to the application of adjustment procedures such as the . . . adjustment procedure presented by Vasicek."[98] 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."[99] In conducting the Vasicek adjustment on betas in previous cases, it reveals that utility betas are even lower than those published by Value Line.[100] Gombola's findings are particular important here, because his study was conducted specifically on utility companies. This evidence indicates that using Value Line's betas in a CAPM cost of equity estimate for a utility company may lead to overestimated results. Regardless, adjusting betas to a level that is higher than Value Line's betas is not reasonable, and it would produce CAPM cost of equity results that are too high.

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[98] 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).

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

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

101 Park Avenue, Suite 1125
Oklahoma City, OK 73102

DAVID J. GARRETT

405.249.1050
dgarrett@resolveuc.com

EDUCATION

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

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

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

PROFESSIONAL DESIGNATIONS

Society of Depreciation Professionals
Certified Depreciation Professional (CDP)

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

The Mediation Institute
Certified Civil / Commercial & Employment Mediator

WORK EXPERIENCE

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

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

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

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

TEACHING EXPERIENCE

University of Oklahoma — Norman, OK
Adjunct Instructor – "Conflict Resolution" — 2014 – 2021
Adjunct Instructor – "Ethics in Leadership"

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

PUBLICATIONS

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

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
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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-El 20190156-El 20190174-El	Depreciation rates, service lives, net salvage	Florida Office of Public Counsel
Illinois Commerce Commission	Commonwealth Edison Company	20-0393	Depreciation rates, service lives, net salvage	The Office of the Illinois Attorney General
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 49831	Depreciation rates, service lives, net salvage	Alliance of Xcel Municipalities
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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

Weighted Average Rate of Return Proposal

Exhibit DJG-1-2

Capital Component	Proposed Ratio	Cost Rate	Weighted Cost
Long-Term Debt	56%	3.85%	2.16%
Common Equity	44%	9.00%	3.96%
Total	100.0%		6.12%

Proxy Group Summary

Company	Ticker	Market Cap. ($ millions)	Market Category	Value Line Safety Rank	Financial Strength
Alliant Energy	LNT	14,000	Large Cap	2	A
Ameren Corp.	AEE	23,000	Large Cap	1	A
American Elec Pwr	AEP	48,900	Large Cap	1	A+
Black Hills Corp.	BKH	4,600	Mid Cap	2	A
CMS Energy Corp.	CMS	17,600	Large Cap	2	A
Consolidated Edison	ED	33,700	Large Cap	1	A+
Dominion Energy	D	52,200	Large Cap	2	B++
DTE Energy Co.	DTE	22,300	Large Cap	2	A
Duke Energy Corp.	DUK	78,300	Large Cap	2	A
Entergy Corp.	ETR	23,000	Large Cap	2	B++
Evergy Inc.	EVRG	13,500	Large Cap	2	B++
Eversource Energy	ES	28,300	Large Cap	1	A
NextEra Energy, Inc.	NEE	149,100	Large Cap	1	A+
OGE Energy Corp.	OGE	8,000	Mid Cap	2	A
Pinnacle West Capital	PNW	8,500	Mid Cap	2	A
Portland General Elec.	POR	4,400	Mid Cap	2	B++
Pub Sv Enterprise Grp.	PEG	30,500	Large Cap	1	A++
Sempra Energy	SRE	49,400	Large Cap	2	A
Southern Company	SO	71,300	Large Cap	2	A
WEC Energy Group	WEC	30,500	Large Cap	1	A+
Xcel Energy Inc.	XEL	39,400	Large Cap	1	A+

Value Line Investment Survey

DCF Stock and Index Prices

Exhibit DJG-1-4

Ticker	^GSPC	LNT	AEE	AEP	BKH	CMS	ED	D	DTE	DUK	ETR	EVRG	ES	NEE	OGE	PNW	POR	PEG	SRE	SO	WEC	XEL
30-day Average	4051	53.79	86.76	92.09	68.46	61.98	93.27	60.29	114.66	100.36	106.74	61.68	80.29	77.66	38.88	74.31	47.82	61.41	158.33	67.02	92.76	68.86
Standard Deviation	76.4	0.79	1.61	1.87	3.59	1.19	1.90	1.96	2.28	2.10	1.29	1.27	2.14	4.29	0.72	1.21	1.05	1.03	2.40	1.53	1.64	1.51
01/10/23	3919	54.51	89.12	96.39	70.44	64.37	97.23	61.08	120.02	104.36	106.64	64.18	84.92	84.00	39.73	74.77	49.49	63.67	157.51	70.38	95.91	72.11
01/11/23	3970	55.47	90.62	96.73	71.91	64.86	97.75	61.62	120.72	104.59	107.69	64.41	85.04	84.45	40.17	75.57	49.98	63.97	162.06	70.82	97.38	72.78
01/12/23	3983	55.34	89.75	95.52	72.44	63.82	96.68	62.14	119.39	104.02	105.76	63.92	84.37	84.52	40.22	75.31	49.59	62.79	160.93	69.61	96.05	71.95
01/13/23	3999	55.05	90.15	93.97	72.07	63.40	95.65	62.15	117.93	103.92	105.48	62.89	83.27	84.14	39.94	74.49	48.26	62.66	160.83	69.59	94.95	71.17
01/17/23	3991	54.62	89.24	93.99	70.70	62.97	94.66	61.76	117.31	103.16	105.83	62.57	82.98	85.19	39.54	74.23	47.86	62.90	161.77	69.33	94.25	71.09
01/18/23	3929	53.26	86.68	91.60	69.83	60.82	92.53	61.06	113.90	101.21	106.50	60.52	80.48	83.26	38.75	73.52	46.83	60.83	156.69	67.02	91.76	68.76
01/19/23	3899	52.77	86.04	90.79	69.76	60.61	91.67	61.25	112.56	100.94	105.92	59.25	79.07	82.06	37.98	73.32	45.62	60.02	155.78	65.76	91.03	68.00
01/20/23	3973	53.44	86.68	91.32	70.34	61.51	92.97	61.66	113.97	100.79	106.35	59.64	79.03	81.29	38.36	74.48	46.50	60.43	157.99	66.43	92.30	68.55
01/23/23	4020	53.43	85.98	91.81	70.05	61.21	92.73	62.20	113.77	99.97	105.67	60.14	79.17	82.14	38.37	72.90	46.55	60.89	158.74	66.17	92.05	68.01
01/24/23	4017	53.88	86.47	91.85	69.89	61.29	93.23	61.72	113.43	100.34	106.18	61.35	79.53	83.36	38.92	73.19	47.37	60.95	159.12	66.01	92.10	68.34
01/25/23	4016	53.96	86.89	91.50	70.31	61.65	93.63	61.56	113.41	100.39	106.41	61.93	79.00	76.10	39.03	72.89	46.89	60.85	158.98	66.57	91.96	68.56
01/26/23	4060	54.00	87.45	92.14	70.69	61.94	94.05	61.82	113.35	100.31	107.37	61.40	79.60	75.91	39.23	73.15	47.17	61.03	160.50	66.82	92.08	68.80
01/27/23	4071	53.97	87.18	92.22	70.60	61.99	94.08	61.69	113.59	100.55	107.61	61.74	80.22	75.09	39.23	73.20	47.22	60.63	161.83	67.30	91.99	68.43
01/30/23	4018	53.65	86.91	92.02	70.42	62.16	94.22	61.92	114.33	100.61	106.60	61.69	80.64	74.57	39.03	73.14	46.92	61.10	161.24	66.73	91.85	68.10
01/31/23	4077	54.03	86.87	93.10	71.67	62.68	94.48	62.86	116.37	101.41	107.18	62.65	81.59	74.15	39.32	74.55	47.58	61.93	160.33	66.98	93.20	68.77
02/01/23	4119	54.74	87.29	93.78	71.76	63.21	94.62	62.33	116.19	101.50	108.10	62.89	81.97	73.76	39.83	76.53	48.00	61.81	159.88	68.15	94.11	69.61
02/02/23	4180	54.76	86.73	93.68	72.68	63.21	94.33	61.24	114.71	101.01	109.43	63.24	82.65	75.11	39.83	77.74	49.08	62.13	161.13	67.91	94.13	69.56
02/03/23	4136	53.34	85.30	91.26	71.25	62.24	92.12	59.51	112.76	99.56	106.98	61.64	79.63	74.19	38.80	75.88	48.39	60.85	155.90	66.58	92.78	67.98
02/06/23	4111	53.93	85.90	91.65	70.72	62.94	92.73	60.99	113.82	100.78	107.73	62.12	80.58	75.03	38.96	75.61	48.31	61.28	157.64	67.20	93.05	68.80
02/07/23	4164	53.54	85.99	91.43	70.33	61.96	92.44	60.85	113.71	99.80	106.67	61.98	79.96	75.59	39.12	74.97	48.36	61.01	157.10	67.04	92.38	68.88
02/08/23	4118	52.62	84.72	89.55	63.80	60.40	90.97	58.84	112.28	98.18	104.53	60.62	78.42	74.55	38.37	73.29	47.56	60.14	154.42	65.76	90.89	67.85
02/09/23	4082	52.06	83.72	88.48	62.59	60.01	89.40	57.03	112.00	96.56	103.41	60.16	77.49	72.80	37.88	72.12	46.66	59.56	152.76	65.10	90.16	67.32
02/10/23	4090	53.23	85.50	90.55	63.53	61.41	91.55	58.81	113.68	98.11	105.79	61.07	79.35	74.26	38.48	74.09	47.69	60.65	157.13	66.19	92.49	68.48
02/13/23	4137	53.79	85.84	91.09	63.70	61.62	91.99	57.92	114.04	99.03	105.83	61.35	79.57	75.13	38.82	74.65	47.94	61.31	157.78	66.44	93.06	68.71
02/14/23	4136	53.29	85.20	90.48	63.38	61.16	91.10	57.35	113.70	98.46	106.09	60.65	78.18	75.54	38.36	74.07	47.07	61.16	156.85	65.96	91.70	67.98
02/15/23	4148	53.44	85.83	90.92	64.10	61.18	91.20	57.54	114.21	98.26	107.55	61.35	79.16	76.45	38.35	74.65	47.08	61.76	158.39	66.08	92.11	67.90
02/16/23	4090	53.14	85.84	90.70	64.13	60.97	91.66	57.39	113.40	98.29	108.27	61.01	78.01	75.20	38.02	74.28	48.16	61.77	157.47	65.18	91.61	67.26
02/17/23	4079	53.97	87.26	92.41	64.72	61.97	93.25	57.98	115.30	99.49	109.43	62.10	79.55	75.58	38.41	75.10	49.62	62.23	158.49	66.63	92.87	68.01
02/21/23	3997	53.34	86.04	90.85	63.25	61.16	92.73	57.39	113.24	97.68	107.60	61.13	77.66	73.19	37.75	74.14	48.44	61.15	155.42	65.55	91.49	67.20
02/22/23	3991	53.26	85.50	90.82	62.83	60.81	92.41	57.01	112.81	97.47	107.50	60.93	77.73	73.21	37.69	73.60	48.37	60.80	155.16	65.24	91.14	66.69

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
Alliant Energy	LNT	1.81	53.79	3.36%
Ameren Corp.	AEE	2.52	86.76	2.90%
American Elec Pwr	AEP	3.32	92.09	3.61%
Black Hills Corp.	BKH	2.50	68.46	3.65%
CMS Energy Corp.	CMS	1.95	61.98	3.15%
Consolidated Edison	ED	3.24	93.27	3.47%
Dominion Energy	D	2.67	60.29	4.43%
DTE Energy Co.	DTE	3.81	114.66	3.32%
Duke Energy Corp.	DUK	4.02	100.36	4.01%
Entergy Corp.	ETR	4.28	106.74	4.01%
Evergy Inc.	EVRG	2.45	61.68	3.97%
Eversource Energy	ES	2.70	80.29	3.36%
NextEra Energy, Inc.	NEE	1.87	77.66	2.41%
OGE Energy Corp.	OGE	1.66	38.88	4.27%
Pinnacle West Capital	PNW	3.46	74.31	4.66%
Portland General Elec.	POR	1.81	47.82	3.79%
Pub Sv Enterprise Grp.	PEG	2.28	61.41	3.71%
Sempra Energy	SRE	4.76	158.33	3.01%
Southern Company	SO	2.72	67.02	4.06%
WEC Energy Group	WEC	3.12	92.76	3.36%
Xcel Energy Inc.	XEL	2.08	68.86	3.02%
Average		**$2.81**	**$79.40**	**3.60%**

[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	3.9%	[1]
Real GDP	1.7%	[2]
PSO Historical Customer Growth	0.65%	[3]
PSO Historical Sales Growth	-0.19%	[4]
Average	1.5%	
Long-Term Growth Ceiling	**3.9%**	

[1],[2] CBO, The 2022 Long-Term Budget Outlook, p. 40

[3],[4] See Response to OIEC 6-9 Attach. 1 (CAGR 2011-2021)

DCF Final Result

Company	Ticker	[1] Dividend Yield	[2] Analyst Growth	[3] Sustainable Growth	[4] DCF Result (Analyst Growth)	[5] DCF Result (Sustainable Growth)
Alliant Energy	LNT	3.4%	6.0%	3.9%	9.6%	7.4%
Ameren Corp.	AEE	2.9%	7.0%	3.9%	10.1%	6.9%
American Elec Pwr	AEP	3.6%	6.0%	3.9%	9.8%	7.6%
Black Hills Corp.	BKH	3.7%	5.5%	3.9%	9.4%	7.7%
CMS Energy Corp.	CMS	3.1%	6.0%	3.9%	9.3%	7.2%
Consolidated Edison	ED	3.5%	3.0%	3.9%	6.6%	7.5%
Dominion Energy	D	4.4%	0.5%	3.9%	5.0%	8.5%
DTE Energy Co.	DTE	3.3%	3.0%	3.9%	6.4%	7.4%
Duke Energy Corp.	DUK	4.0%	2.0%	3.9%	6.1%	8.1%
Entergy Corp.	ETR	4.0%	5.0%	3.9%	9.2%	8.1%
Evergy Inc.	EVRG	4.0%	7.0%	3.9%	11.2%	8.0%
Eversource Energy	ES	3.4%	6.5%	3.9%	10.1%	7.4%
NextEra Energy, Inc.	NEE	2.4%	10.0%	3.9%	12.6%	6.4%
OGE Energy Corp.	OGE	4.3%	3.0%	3.9%	7.4%	8.3%
Pinnacle West Capital	PNW	4.7%	2.0%	3.9%	6.7%	8.7%
Portland General Elec.	POR	3.8%	6.0%	3.9%	10.0%	7.8%
Pub Sv Enterprise Grp.	PEG	3.7%	5.0%	3.9%	8.9%	7.8%
Sempra Energy	SRE	3.0%	6.0%	3.9%	9.2%	7.0%
Southern Company	SO	4.1%	3.5%	3.9%	7.7%	8.1%
WEC Energy Group	WEC	3.4%	7.0%	3.9%	10.6%	7.4%
Xcel Energy Inc.	XEL	3.0%	6.5%	3.9%	9.7%	7.0%
Average		**3.6%**	**6.0%**	**3.9%**	**9.3%**	**7.6%**

[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 sustainable growth rate)
[5] Annual Compounding DCF = D_0 (1 + g) / P_0 + g (using analyst growth rate)

CAPM Risk-Free Rate

Date	Rate
01/10/23	3.74%
01/11/23	3.67%
01/12/23	3.56%
01/13/23	3.61%
01/17/23	3.64%
01/18/23	3.54%
01/19/23	3.57%
01/20/23	3.66%
01/23/23	3.69%
01/24/23	3.62%
01/25/23	3.62%
01/26/23	3.62%
01/27/23	3.64%
01/30/23	3.66%
01/31/23	3.65%
02/01/23	3.55%
02/02/23	3.55%
02/03/23	3.63%
02/06/23	3.67%
02/07/23	3.72%
02/08/23	3.70%
02/09/23	3.75%
02/10/23	3.83%
02/13/23	3.79%
02/14/23	3.81%
02/15/23	3.85%
02/16/23	3.92%
02/17/23	3.88%
02/21/23	3.98%
02/22/23	3.94%
Average	**3.70%**

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

CAPM Beta Coefficient

Company	Ticker	Beta
Alliant Energy	LNT	0.85
Ameren Corp.	AEE	0.85
American Elec Pwr	AEP	0.75
Black Hills Corp.	BKH	0.95
CMS Energy Corp.	CMS	0.80
Consolidated Edison	ED	0.80
Dominion Energy	D	0.80
DTE Energy Co.	DTE	0.95
Duke Energy Corp.	DUK	0.85
Entergy Corp.	ETR	0.95
Evergy Inc.	EVRG	0.90
Eversource Energy	ES	0.90
NextEra Energy, Inc.	NEE	0.95
OGE Energy Corp.	OGE	1.00
Pinnacle West Capital	PNW	0.90
Portland General Elec.	POR	0.85
Pub Sv Enterprise Grp.	PEG	0.90
Sempra Energy	SRE	0.95
Southern Company	SO	0.90
WEC Energy Group	WEC	0.80
Xcel Energy Inc.	XEL	0.80
Average		0.88

Betas from Value Line Investment Survey

CAPM Implied Equity Risk Premium Estimate

Exhibit DJG-1-10

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Year	Market Value	Operating Earnings	Dividends	Buybacks	Earnings Yield	Dividend Yield	Buyback Yield	Gross Cash Yield
2011	11,385	877	240	405	7.70%	2.11%	3.56%	5.67%
2012	12,742	870	281	399	6.83%	2.20%	3.13%	5.33%
2013	16,495	956	312	476	5.80%	1.89%	2.88%	4.77%
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%

Cash Yield	4.74%	[9]
Growth Rate	7.09%	[10]
Risk-free Rate	3.70%	[11]
Current Index Value	4,051	[12]

	[13]	[14]	[15]	[16]	[17]
Year	1	2	3	4	5
Expected Dividends	206	220	236	253	271
Expected Terminal Value					4933
Present Value	188	184	180	176	3322

Intrinsic Index Value	4051	[18]
Required Return on Market	9.4%	[19]
Implied Equity Risk Premium	**5.7%**	[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	5.6%	[1]
Kroll (Duff & Phelps) Report	6.0%	[2]
Damodaran (average)	5.1%	[3]
Garrett	5.7%	[4]
Average	**5.6%**	

CAPM Results

		[1]	[2]
Company	Ticker	Beta	CAPM Result
Alliant Energy	LNT	0.85	8.5%
Ameren Corp.	AEE	0.85	8.5%
American Elec Pwr	AEP	0.75	7.9%
Black Hills Corp.	BKH	0.95	9.0%
CMS Energy Corp.	CMS	0.80	8.2%
Consolidated Edison	ED	0.80	8.2%
Dominion Energy	D	0.80	8.2%
DTE Energy Co.	DTE	0.95	9.0%
Duke Energy Corp.	DUK	0.85	8.5%
Entergy Corp.	ETR	0.95	9.0%
Evergy Inc.	EVRG	0.90	8.7%
Eversource Energy	ES	0.90	8.7%
NextEra Energy, Inc.	NEE	0.95	9.0%
OGE Energy Corp.	OGE	1.00	9.3%
Pinnacle West Capital	PNW	0.90	8.7%
Portland General Elec.	POR	0.85	8.5%
Pub Sv Enterprise Grp.	PEG	0.90	8.7%
Sempra Energy	SRE	0.95	9.0%
Southern Company	SO	0.90	8.7%
WEC Energy Group	WEC	0.80	8.2%
Xcel Energy Inc.	XEL	0.80	8.2%
Average			**8.6%**

Risk-free Rate	[3]	3.7%
Equity Risk Premium	[4]	5.6%

[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)	8.6%
Hamada CAPM (at Company-Proposed Debt Ratio)	7.7%
DCF Model (Analyst Growth)	9.3%
DCF Model (Sustainable Growth)	7.6%
Average	**8.3%**
Range	**7.6% - 9.3%**

Market Cost of Equity vs. Awarded Returns

Exhibit DJG-1-14

	[1]		[2]		[3]		[4]	[5]	[6]	[7]
	Electric Utilities		Gas Utilities		Total Utilities		S&P 500	T-Bond	Risk	Market
Year	ROE	#	ROE	#	ROE	#	Returns	Rate	Premium	COE
1990	12.70%	38	12.68%	33	12.69%	71	-3.06%	8.07%	3.89%	11.96%
1991	12.54%	42	12.45%	31	12.50%	73	30.23%	6.70%	3.48%	10.18%
1992	12.09%	45	12.02%	28	12.06%	73	7.49%	6.68%	3.55%	10.23%
1993	11.46%	28	11.37%	40	11.41%	68	9.97%	5.79%	3.17%	8.96%
1994	11.21%	28	11.24%	24	11.22%	52	1.33%	7.82%	3.55%	11.37%
1995	11.58%	28	11.44%	13	11.54%	41	37.20%	5.57%	3.29%	8.86%
1996	11.40%	18	11.12%	17	11.26%	35	22.68%	6.41%	3.20%	9.61%
1997	11.33%	10	11.30%	12	11.31%	22	33.10%	5.74%	2.73%	8.47%
1998	11.77%	10	11.51%	10	11.64%	20	28.34%	4.65%	2.26%	6.91%
1999	10.72%	6	10.74%	6	10.73%	12	20.89%	6.44%	2.05%	8.49%
2000	11.58%	9	11.34%	13	11.44%	22	-9.03%	5.11%	2.87%	7.98%
2001	11.07%	15	10.96%	5	11.04%	20	-11.85%	5.05%	3.62%	8.67%
2002	11.21%	14	11.17%	19	11.19%	33	-21.97%	3.81%	4.10%	7.91%
2003	10.96%	20	10.99%	25	10.98%	45	28.36%	4.25%	3.69%	7.94%
2004	10.81%	21	10.63%	22	10.72%	43	10.74%	4.22%	3.65%	7.87%
2005	10.51%	24	10.41%	26	10.46%	50	4.83%	4.39%	4.08%	8.47%
2006	10.32%	26	10.40%	15	10.35%	41	15.61%	4.70%	4.16%	8.86%
2007	10.30%	38	10.22%	35	10.26%	73	5.48%	4.02%	4.37%	8.39%
2008	10.41%	37	10.39%	32	10.40%	69	-36.55%	2.21%	6.43%	8.64%
2009	10.52%	40	10.22%	30	10.39%	70	25.94%	3.84%	4.36%	8.20%
2010	10.37%	61	10.15%	39	10.28%	100	14.82%	3.29%	5.20%	8.49%
2011	10.29%	42	9.92%	16	10.19%	58	2.10%	1.88%	6.01%	7.89%
2012	10.17%	58	9.94%	35	10.08%	93	15.89%	1.76%	5.78%	7.54%
2013	10.03%	49	9.68%	21	9.93%	70	32.15%	3.04%	4.96%	8.00%
2014	9.91%	38	9.78%	26	9.86%	64	13.52%	2.17%	5.78%	7.95%
2015	9.85%	30	9.60%	16	9.76%	46	1.38%	2.27%	6.12%	8.39%
2016	9.77%	42	9.54%	26	9.68%	68	11.77%	2.45%	5.69%	8.14%
2017	9.74%	53	9.72%	24	9.73%	77	21.61%	2.41%	5.08%	7.49%
2018	9.64%	37	9.62%	26	9.63%	63	-4.23%	2.68%	5.96%	8.64%
2019	9.66%	67	9.71%	32	9.68%	99	31.22%	1.92%	5.20%	7.12%
2020	9.44%	43	9.46%	34	9.45%	77	18.01%	0.93%	4.72%	5.65%
2021	9.40%	55	9.52%	29	9.44%	84	18.01%	1.51%	4.24%	5.75%
2022	9.47%	59			9.47%	59	-18.01%	3.88%	5.94%	9.82%

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

[3] = [1] + [2]

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

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

Proxy Company Debt Ratios

Company	Ticker	Debt Ratio
Alliant Energy	LNT	55%
Ameren Corp.	AEE	56%
American Elec Pwr	AEP	58%
Black Hills Corp.	BKH	58%
CMS Energy Corp.	CMS	63%
Consolidated Edison	ED	52%
Dominion Energy	D	58%
DTE Energy Co.	DTE	63%
Duke Energy Corp.	DUK	57%
Entergy Corp.	ETR	67%
Evergy Inc.	EVRG	52%
Eversource Energy	ES	57%
NextEra Energy, Inc.	NEE	59%
OGE Energy Corp.	OGE	46%
Pinnacle West Capital	PNW	55%
Portland General Elec.	POR	56%
Pub Sv Enterprise Grp.	PEG	55%
Sempra Energy	SRE	46%
Southern Company	SO	64%
WEC Energy Group	WEC	55%
Xcel Energy Inc.	XEL	58%
Average		56%

Debt ratios from Value Line Investment Survey

Competitive Industry Debt Ratios

Exhibit DJG-1-16

Industry	# Firms	Debt Ratio
Air Transport	21	84%
Hotel/Gaming	69	82%
Hospitals/Healthcare Facilities	34	82%
Retail (Automotive)	30	78%
Brokerage & Investment Banking	30	76%
Computers/Peripherals	42	71%
Bank (Money Center)	7	68%
Cable TV	10	68%
Food Wholesalers	14	67%
Advertising	58	67%
Oil/Gas Distribution	23	66%
Rubber& Tires	3	65%
Transportation (Railroads)	4	65%
Real Estate (Operations & Services)	60	64%
Retail (Grocery and Food)	13	64%
Retail (Special Lines)	78	64%
Recreation	57	62%
Insurance (Life)	27	61%
Trucking	35	61%
Packaging & Container	25	61%
Power	48	60%
Telecom. Services	49	60%
Telecom (Wireless)	16	60%
R.E.I.T.	223	60%
Auto & Truck	31	59%
Utility (General)	15	59%
Household Products	127	58%
Office Equipment & Services	16	58%
Environmental & Waste Services	62	57%
Utility (Water)	16	57%
Retail (Distributors)	69	57%
Transportation	18	57%
Green & Renewable Energy	19	57%
Computer Services	80	56%
Broadcasting	26	56%
Retail (Online)	63	56%
Apparel	39	56%
Aerospace/Defense	77	56%
Paper/Forest Products	7	55%
Beverage (Soft)	31	55%
Farming/Agriculture	39	54%
Reinsurance	1	53%
Chemical (Diversified)	4	52%
Construction Supplies	49	52%
Retail (General)	15	52%
Business & Consumer Services	164	52%
Real Estate (Development)	18	51%
Furn/Home Furnishings	32	51%
Total / Average	**1,994**	**61%**

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

Hamada Model

Unlevering Beta

Proxy Debt Ratio	56%	[1]
Proxy Equity Ratio	44%	[2]
Proxy Debt / Equity Ratio	1.3	[3]
Tax Rate	25%	[4]
Equity Risk Premium	5.6%	[5]
Risk-free Rate	3.7%	[6]
Proxy Group Beta	0.88	[7]
Unlevered Beta	0.44	[8]

Relevered Betas and Cost of Equity Estimates

[9]	[10]	[11]	[12]
Debt Ratio	D/E Ratio	Levered Beta	Cost of Equity
0%	0.0	0.44	6.2%
20%	0.3	0.53	6.7%
30%	0.4	0.59	7.0%
40%	0.7	0.67	7.4%
45%	0.8	0.72	7.7%
56%	1.3	0.88	8.6%
60%	1.5	0.94	9.0%

[1] Company proposed debt ratio
[2] Company proposed 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]