BEFORE THE PUBLIC SERVICE COMMISSION OF WYOMING

IN THE MATTER OF THE APPLICATION OF DOMINION ENERGY WYOMING TO INCREASE DISTRIBUTION RATES AND CHARGES AND MAKE TARIFF MODIFICATIONS	Docket No. 30010-187-GR-19

DIRECT TESTIMONY OF

ROBERT B. HEVERT

FOR DOMINION ENERGY WYOMING

November 1, 2019

DEW Exhibit 2.0

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GLOSSARY OF FREQUENTLY USED TERMS

TERM	DESCRIPTION
Beta Coefficient	A component of the CAPM that measures the risk of a given stock relative to the risk of the overall market.
Bond Yield Plus Risk Premium Approach	A risk premium model used to estimate the Cost of Equity. The Bond Yield Plus Risk Premium approach assumes that investors require a risk premium over the Cost of Debt as compensation for assuming the greater risk of common equity investment. The model is expressed as a bond yield plus equity risk premium.
Capital Asset Pricing Model ("CAPM")	A risk premium-based model used to estimate the Cost of Equity, assuming the stock is added to a well-diversified portfolio. The CAPM assumes that investors are compensated for the time value of money (represented by the Risk-Free Rate), and risk (represented by the combination of the Beta Coefficient and the Market Risk Premium).
Constant Growth DCF Model	A form of the DCF model that assumes cash flows will grow at a constant rate, in perpetuity. The model simplifies to a form that expresses the Cost of Equity as the sum of the expected dividend yield and the expected growth rate.
Cost of Debt	The contractually defined return to debt holders as the interest rate or yield on debt securities.
Cost of Equity	The return required by investors to invest in equity securities. The terms "Return on Equity" and "Cost of Equity" are used interchangeably.
Discounted Cash Flow ("DCF") Model	A model used to estimate the Cost of Equity based on expected cash flows. The Cost of Equity equals the discount rate that sets the current market price equal to the present value of expected cash flows.
Dividend Yield	For a given stock, the current annualized dividend divided by its current market price.
Empirical Capital Asset Pricing Model ("ECAPM")	Empirical CAPM is a variant of the CAPM model. ECAPM adjusts for the CAPM's tendency to under-estimate returns for companies that have Beta coefficients less than one, and over-estimate returns for relatively high-Beta coefficient stocks.
Expected Earnings	An analysis of actual expected earnings used to corroborate a reasonable ROE range.

TERM	DESCRIPTION
Flotation Costs	Flotation costs are the costs associated with the sale of new issues of common stock. These costs include out-of-pocket expenditures for preparation, filing, underwriting and other issuance costs of common stock.
Market Return	The expected return on the equity market, taken as a portfolio.
Market Risk Premium	The additional compensation required by investing in the equity market as a portfolio over the Risk-Free rate. The Market Risk Premium is a component of the CAPM.
Proxy Group	A group of publicly traded companies used as the "proxy" for the subject company (in this case, Dominion Energy Wyoming). Proxy companies are sometimes referred to as "Comparable Companies."
Return on Equity ("ROE")	The return required by investors to invest in equity securities. The terms "Return on Equity" and "Cost of Equity" are used interchangeably. Please note that the ROE in this context is distinct from the accounting measure sometimes referred to as the "Return on Average Common Equity".
Risk-Free Rate	The rate of return on an asset with no risk of default.
Risk Premium	The additional compensation required by investors for taking on additional increments of risk. Risk Premium-based approaches are used in addition to the DCF and CAPM to estimate the Cost of Equity.
Treasury Yield	The return on Treasury securities; the yield on long-term Treasury bonds is considered to be a measure of the Risk-Free Rate.

I. WITNESS IDENTIFICATION AND QUALIFICATIONS

Q. Please state your name, affiliation, and business address.

A. My name is Robert B. Hevert. I am a Partner at ScottMadden, Inc. and my business address is 1900 West Park Drive, Suite 250, Westborough, MA 01581.

Q. On whose behalf are you submitting this testimony?

A. I am submitting this direct testimony ("Direct Testimony") before the Public Service Commission of Wyoming ("Commission") on behalf of Dominion Energy Wyoming ("DEW" or the "Company").

Q. Please describe your educational background.

A. I hold a Bachelor's degree in Business and Economics from the University of Delaware, and an MBA with a concentration in Finance from the University of Massachusetts. I also hold the Chartered Financial Analyst designation.

Q. Please describe your experience in the energy and utility industries.

A. I have worked in regulated industries for over thirty years, having served as an executive and manager with consulting firms, a financial officer of a publicly traded natural gas utility, and an analyst at a telecommunications utility. In my role as a consultant, I have advised numerous energy and utility clients on a wide range of financial and economic issues including corporate and asset-based transactions, asset and enterprise valuation, transaction due diligence, and strategic matters. As an expert witness, I have provided testimony in more than 250 proceedings regarding various financial and regulatory matters before numerous state utility regulatory agencies, the Federal Energy Regulatory Commission ("FERC"), the Alberta Utilities Commission, and United States Federal

Court. A summary of my professional and educational background, including a list of my testimony in prior proceedings, is included as DEW Exhibit 2.1 to my Direct Testimony.

II. PURPOSE AND OVERVIEW OF TESTIMONY

Q. What is the purpose of your Direct Testimony?

A. My Direct Testimony presents evidence and provides a recommendation regarding the Company's Return on Equity ("ROE").[1] Additionally, I assess the reasonableness of the Company's proposed capital structure and Cost of Debt to be used for ratemaking purposes. My analyses and conclusions are supported by the data presented in DEW Exhibit 2.2 through DEW Exhibit 2.12, which have been prepared by me or under my direction.

Q. Please summarize your conclusions regarding the appropriate Cost of Equity and capital structure for the Company.

A. My analyses indicate that an ROE in the range of 9.90 percent to 10.75 percent represents the range of equity investors' required return for investment in a natural gas utility such as DEW in today's capital markets. Based on the quantitative and qualitative analyses discussed throughout my Direct Testimony, including the risk profile of the Company, it is my view that 10.50 percent is a reasonable and appropriate estimate of the Company's Cost of Equity. That ROE, together with the Company's proposed capital structure and Cost of Debt, produces an overall rate of return of 7.74 percent.[2]

1 Throughout my Direct Testimony, I interchangeably use the terms "ROE" and "Cost of Equity."
2 7.74% = (10.50% x 55.00%) + (4.37% x 45.00%).

As to the Company's proposed capital structure, consisting of 55.00 percent common equity and 45.00 percent long-term debt, I conclude that the Company's proposal is consistent with the capital structures that have been in place over several fiscal quarters at comparable utility companies.[3] Given the consistency of its proposal with similarly situated utility companies, I conclude that the Company's proposed capital structure is reasonable and appropriate. Regarding the Cost of Debt, the Company has proposed a rate of 4.37 percent, which I find reasonable and appropriate.

Q. Please provide a brief overview of the analyses that led to your ROE recommendation.

A. Because all financial models are subject to various assumptions and constraints, equity analysts and investors tend to use multiple methods to develop their return requirements. I therefore relied on three widely-accepted approaches to develop my ROE recommendation: (1) the Constant Growth Discounted Cash Flow ("DCF") model; (2) the traditional and empirical forms of the Capital Asset Pricing Model ("CAPM"); and (3) the Bond Yield Plus Risk Premium approach. Those analyses indicate the Company's Cost of Equity currently to be in the range of 9.90 percent to 10.75 percent. That range is corroborated by the Expected Earnings approach which, as I discuss later in my Direct Testimony, is supported by recent FERC orders.

In addition to the methodologies noted above, my estimate also takes into consideration (1) the Company's relatively small size compared to the proxy group and (2) the risk associated with electrification on the natural gas utility sector. I also

[3] As discussed below, I note that the Company's actual common equity percentage is 60.00 percent. However, I understand that the proposed common equity percentage is the result of a stipulation approved by the Commission.

calculated the costs of issuing common stock (that is, "flotation" costs), and considered the changing capital market and business conditions, including changes in Federal Reserve monetary policy. Although these factors are very relevant to investors, their effect on the Company's Cost of Equity cannot be directly quantified. Therefore, although I did not make any explicit adjustments to my ROE estimates for those factors, I did take them into consideration in determining where the Company's Cost of Equity falls within the range of analytical results. In light of those analyses, I believe my recommended range is reasonable and appropriate.

Q. What are the key factors considered in your analyses and upon which you base your recommended ROE?

A. My analyses and recommendations consider the following key factors:

- The *Hope* and *Bluefield* (as referenced and defined below) decisions that established the standards for determining a fair and reasonable allowed return on equity, including: (1) consistency of the allowed return with other businesses having similar risk; (2) adequacy of the return to provide access to capital and support credit quality; and (3) confidence that the end result leads to just and reasonable rates.
- The effect of the current capital market conditions on investors' return requirements.
- The Company's business risks relative to the proxy group of comparable companies and the implications of those risks in arriving at the appropriate ROE.

As discussed further in Section VI, I considered the results of these methods in the context of general capital market factors. Based on those analyses, I conclude that a

range of 9.90 percent to 10.75 percent represents reasonable estimates of the Company's Cost of Equity.

Q. How is the remainder of your Direct Testimony organized?

A. The balance of my Direct Testimony is organized as follows:

- Section III – Provides a summary of issues regarding Cost of Equity estimation in regulatory proceedings and discusses the regulatory guidelines pertinent to the development of the cost of capital;
- Section IV – Provides an overview of the Cost of Equity analyses;
- Section V – Provides a discussion on specific risk factors and other considerations that have a direct bearing on DEW's Cost of Equity;
- Section VI – Highlights the current capital market conditions and their effect on the Company's Cost of Equity;
- Section VII – Provides my analysis of DEW's proposed capital structure;
- Section VIII – Provides my analysis of DEW's proposed Cost of Debt;
- Section IX – Summarizes my conclusions and recommendations; and
- Section X – Appendix A, which provides the technical details of my analytical approaches.

Q. What are the results of your analyses?

A. The results of my analyses are summarized in Table 1 through Table 3, below.

106 **Table 1: Summary of Constant Growth DCF Results[4]**

	Mean	Mean High
30-Day Average	9.95%	13.98%
90-Day Average	9.94%	13.97%
180-Day Average	10.01%	14.05%

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108 **Table 2: Summary of CAPM Results[5]**

CAPM	**Bloomberg Derived Market Risk Premium**	**Value Line Derived Market Risk Premium**
Average Bloomberg Beta Coefficient		
Current 30-Year Treasury (2.11%)	9.14%	9.30%
Near Term Projected 30-Year Treasury (2.28%)	9.31%	9.47%
Average Value Line Beta Coefficient		
Current 30-Year Treasury (2.11%)	10.22%	10.41%
Near Term Projected 30-Year Treasury (2.28%)	10.40%	10.58%
Empirical CAPM	**Bloomberg Derived Market Risk Premium**	**Value Line Derived Market Risk Premium**
Average Bloomberg Beta Coefficient		
Current 30-Year Treasury (2.11%)	10.40%	10.59%
Near Term Projected 30-Year Treasury (2.28%)	10.57%	10.76%
Average Value Line Beta Coefficient		
Current 30-Year Treasury (2.11%)	11.22%	11.43%
Near Term Projected 30-Year Treasury (2.28%)	11.39%	11.60%

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4 DEW Exhibit 2.2.
5 DEW Exhibit 2.6.

Table 3: Summary of Bond Yield Plus Risk Premium Results[6]

Bond Yield Plus Risk Premium Approach	
Current 30-Year Treasury (2.11%)	9.96%
Near Term Projected 30-Year Treasury (2.28%)	9.91%
Long Term Projected 30-Year Treasury (3.70%)	10.01%

As shown in Tables 1 through 3, I have performed several analyses to estimate the Company's Cost of Equity. Those results are supported by the results of my Expected Earnings analysis, which range from 9.08 percent to 12.09 percent, with an average of 10.73 percent, and a median of 10.24 percent.[7] Based on those analytical results, and in light of the considerations discussed throughout the balance of my Direct Testimony, I believe a reasonable range is from 9.90 percent to 10.75 percent. Within that range, and considering the specific risk profile of DEW, I believe an ROE of 10.50 percent is appropriate.

Q. Are there other factors that should be considered in determining the weight given to the methods and results summarized above?

A. Yes. All models used to estimate the Cost of Equity require certain assumptions, which may become more, or less, relevant as market conditions and data change. Important considerations are the consistency of each model's underlying assumptions with current and expected market conditions, and the reasonableness of its results relative to observable benchmarks.

Risk Premium-based methods (such as the CAPM) provide a measure of risk and directly reflect investors' expectations regarding future market returns. Other Risk

6 DEW Exhibit 2.7.
7 DEW Exhibit 2.8.

Premium approaches (such as the Bond Yield Plus Risk Premium approach) reflect the well-documented finding that the Cost of Equity does not move in lock-step with interest rates. For example, at times interest rates fall because investors can be so risk averse that they would rather accept a very modest return on Treasury securities than take on the risk of equity ownership. In such circumstances, low interest rates suggest an increasing, not a decreasing, Cost of Equity. Therefore, the important analytical issue is understanding each model's fundamental structure and assumptions, and considering its results in the context of current and expected market conditions.

As discussed in Section III, below, the ROE should be comparable to returns investors expect to earn on other investments of similar risk. To that point, the mean low results of my Constant Growth DCF model are below any authorized ROE for a natural gas utility since at least 1980[8] and approximately 200 basis points below DEW's currently authorized ROE. With those considerations in mind, I believe my recommendation reasonably reflects investors' return requirements in the current market environment.

III. SUMMARY OF ISSUES SURROUNDING COST OF EQUITY ESTIMATION IN REGULATORY PROCEEDINGS

Q. Before addressing the specific aspects of this proceeding, please provide a general overview of the issues surrounding the Cost of Equity in regulatory proceedings.

A. In general terms, the Cost of Equity is the return investors require to make an equity investment in a firm. That is, investors will only provide funds to a firm if the return they *expect* is equal to, or greater than, the return they *require* to accept the risk of providing

8 Source: S&P Global Market Intelligence, Regulatory Research Associates.

funds to the firm. From the firm's perspective, that required return, whether it is provided to debt or equity investors, has a cost. Individually, we speak of the "Cost of Debt" and the "Cost of Equity"; together, they are referred to as the "Cost of Capital."

The Cost of Capital (including the costs of both debt and equity) is based on the economic principle of "opportunity costs." Investing in any asset, whether debt or equity securities, implies a forgone opportunity to invest in alternative assets. For an investment to be sensible, its expected return must be at least equal to the return expected on alternative, comparable investment opportunities. If it is not, investors will sell the "over-valued" security, and buy the "under-valued" security until the expected returns on the two are aligned.

Although both debt and equity have required costs, they differ in certain fundamental ways. Most noticeably, the Cost of Debt is contractually defined and can be directly observed as the interest rate or yield on debt securities.[9] The Cost of Equity, on the other hand, is neither directly observable nor a contractual obligation. Rather, equity investors have a claim on cash flows only after debt holders are paid; the uncertainty (or risk) associated with those residual cash flows determines the Cost of Equity. Because equity investors bear that additional "residual risk," they require higher returns than debt holders. In that basic sense, equity and debt investors differ: they invest in different securities, face different risks, and require different returns.

Whereas the Cost of Debt can be directly observed, the Cost of Equity must be estimated or inferred based on market data and various financial models. As discussed throughout my Direct Testimony, each model is subject to its own set of assumptions,

9 The observed interest rate may be adjusted to reflect issuance or other directly observable costs.

which may become more, or less, applicable as market conditions change. In addition, because the Cost of Equity is an opportunity cost, the models typically are applied to a group of "comparable" or "proxy" companies. The choice of models (including their inputs), the selection of proxy companies, and the interpretation of model results all require the application of reasoned judgment. That judgment should consider data and information, both quantitative and qualitative, not necessarily included in the models themselves.

In the end, the estimated Cost of Equity should reflect the return that investors require in light of relevant risks, and the returns available on comparable investments. A given utility stock may require a higher return based on the risks to which it is exposed relative to other utilities. That is, although utilities may be viewed as a "sector", that does not mean that all utilities require the same return. The assessment of relative risk and its effect on the Cost of Equity requires the application of reasoned, experienced judgment applied to a variety of data, much of which is qualitative in nature.

Q. Please summarize the regulatory guidelines established for the purpose of determining the ROE.

A. The United States Supreme Court (the "Court") established the guiding principles for establishing a fair return for capital in two cases: (1) *Bluefield Water Works and Improvement Co. v. Public Service Comm'n of West Virginia*, 262 U.S. 679 (1923) *("Bluefield")*; and (2) *Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) *("Hope").* In those cases, the Court recognized that the fair rate of return on common equity should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial

integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

Q. Does Wyoming precedent provide similar guidance?

A. Yes. The Commission has followed the principles set out in *Hope* and *Bluefield* in establishing a fair rate of return. In the Company's 2009 rate case, the Commission noted:

> Regarding an allowable rate of return, the Commission's discretion must be guided by the earnings and capital attraction standards of [*Bluefield*] and [*Hope*]; accepted in Wyoming in *In re Northern Utilities*, 70 Wyo. 225, 247 P.2d 767 (Wyo. 1952).[10]

Based on these standards, the authorized ROE should provide the Company with the opportunity to earn a fair and reasonable return, and should enable efficient access to external capital under a variety of market conditions.

Q. Why is it important for a utility to be allowed the opportunity to earn a return adequate to attract equity capital at reasonable terms?

A. A return that is adequate to attract capital at reasonable terms enables the utility to provide service while maintaining its financial integrity. As discussed above, and in keeping with the *Hope* and *Bluefield* standards, that return should be commensurate with the returns expected elsewhere in the market for investments of equivalent risk. The consequence of the Commission's order in this case, therefore, should be to provide DEW with the opportunity to earn a return on equity that is: (1) adequate to attract capital at reasonable terms; (2) sufficient to ensure its financial integrity; and (3) commensurate with returns on investments in enterprises having corresponding risks. To the extent

[10] Public Service Commission of Wyoming, Docket No. 30010-94-GR-08, Memorandum Opinion, Findings and Order, June 17, 2009, page 26, para 97.

DEW is provided a reasonable opportunity to earn its market-based Cost of Equity, neither customers nor shareholders should be disadvantaged. In fact, a return that is adequate to attract capital at reasonable terms enables the Company to provide safe, reliable natural gas utility service while maintaining its financial integrity.

Q. How is the Cost of Equity estimated in regulatory proceedings?

A. As noted earlier (and as discussed in more detail later in my Direct Testimony), the Cost of Equity is estimated by the use of various financial models. By their nature, those models produce a range of results from which the ROE is estimated. That estimate must be based on a comprehensive review of relevant data and information, and does not necessarily lend itself to a strict mathematical solution. The key consideration in determining the ROE is to ensure the overall analysis reasonably reflects investors' views of the financial markets in general, and of the subject company (in the context of the proxy companies) in particular.

The use of multiple methods, and the consideration given to them, recently was addressed by the FERC. In its November 15, 2018 *Order Directing Briefs,* the FERC determined that "in light of current investor behavior and capital market conditions, relying on the DCF methodology alone will not produce a just and reasonable ROE".[11] In its October 16, 2018 *Order Directing Briefs*, the FERC determined that although it "previously relied solely on the DCF model to produce the evidentiary zone of reasonableness…", it is "…concerned that relying on that methodology alone will not

11 Docket Nos. EL14-12-003 and EL15-45-000, *Order Directing Briefs*, 165 FERC ¶ 61,118 (November 15, 2018) at para. 34.

produce just and reasonable results."[12] As the FERC explained, because the Cost of Equity depends on what the market expects, it is important to understand "how investors analyze and compare their investment opportunities."[13] The FERC also explained that, although certain investors may give some weight to the DCF approach, other investors "place greater weight on one or more of the other methods…"[14] Those methods include the CAPM, the Risk Premium method, and the Expected Earnings method, all of which I have applied in this proceeding.

The use of multiple models makes intuitive sense when we consider that market prices are set by the buying and selling behavior of multiple investors, whose circumstances, objectives, and constraints vary over time and across market conditions. We cannot assume a single method is the best measure of the factors motivating those decisions for all investors, at all times. Intuition suggests it is more appropriate to use as many methods as we reasonably can, and to reflect the many factors motivating investment decisions as best we can. In this instance, intuition, financial theory,[15] and financial practice reach a common conclusion: we should apply and reasonably consider multiple methods when estimating the Cost of Equity.

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12 Docket No. EL11-66-001, et al., *Order Directing Briefs*, 165 FERC ¶ 61,030 (October 16, 2018) at para. 30.

13 *Id.*, at para. 33.

14 *Id.*, at para. 35. *See*, generally, Docket No. PL19-4-000, *Inquiry Regarding the Commission's Policy for Determining Return on Equity*, March 21, 2019.

15 As Professor Eugene Brigham explains: "Whereas debt and preferred stocks are contractual obligations which have easily determined costs, it is not at all easy to estimate [the Cost of Equity]. However, three methods can be used: (1) the Capital Asset Pricing Model (CAPM), (2) the discounted cash flow (DCF) model, and (3) the bond-yield-plus-risk-premium approach. These methods should not be regarded as mutually exclusive – no one dominates the others, and all are subject to error when used in practice. Therefore, when faced with the task of estimating a company's cost of equity, we generally use all three methods and then choose among them on the basis of our confidence in the data used for each in the specific case at hand." Eugene F. Brigham, Louis C. Gapenski, Financial Management, Theory and Practice, 7th ed., The Dryden Press, 1994, at 341.

Practitioners and academics recognize financial models simply are approximations of investor behavior, not precise quantifications of it. They appreciate that models are tools to be used in the ROE estimation process, and that strict adherence to any single approach, or to the specific results of any single approach, can lead to flawed or misleading conclusions. That position is consistent with the *Hope* and *Bluefield* principle that it is the analytical result, as opposed to the method employed, that is controlling in arriving at ROE determinations. A reasonable ROE estimate, therefore, appropriately considers alternative methods and the reasonableness of their individual and collective results in the context of observable, relevant market information.

IV. COST OF EQUITY ESTIMATION

Q. Please briefly discuss the ROE in the context of the regulated rate of return.

A. Regulated utilities primarily use common stock and long-term debt to finance their capital investments. The overall rate of return weighs the costs of the individual sources of capital by their respective book values. While the Cost of Debt can be directly observed, the Cost of Equity is market-based and, therefore, must be estimated based on observable market information.

Proxy Group Selection

Q. As a preliminary matter, why is it necessary to select a group of proxy companies to determine the Cost of Equity for the Company?

A. Because the ROE is market-based, and given that DEW is not a publicly traded entity, it is necessary to establish a group of comparable, publicly traded companies to serve as its "proxy." Even if the Company were publicly traded, it is possible that transitory events could bias its market value in one way or another over a given period of time. A

significant benefit of using a proxy group is that it moderates the effects of anomalous, temporary events associated with any one company.

Q. Please provide a summary profile of DEW.

A. DEW, which is a wholly owned subsidiary of Dominion Energy, Inc. ("DEI"), provides natural gas distribution service to more than one million customers in Utah and 27,000 customers in southwestern Wyoming.[16] DEI's and DEW's current long-term issuer credit ratings are as follows:

Table 4: Current Credit Ratings[17]

	S&P	Moody's
Dominion Energy, Inc.	BBB+ (outlook: Stable)	Baa2 (outlook: Stable)
DEW (Questar Gas Co.)	BBB+ (outlook: Stable)	A3 (outlook: Stable)

Q. How did you select the companies included in your proxy group?

A. I began with the universe of companies that Value Line classifies as Natural Gas Utilities, which includes 10 domestic U.S. utilities, and applied the following screening criteria:

- Dividend Payments: Because certain of the models used in my analyses assume earnings and dividends grow over time, I excluded companies that do not consistently pay quarterly cash dividends;
- Utility Equity Analyst Coverage: To ensure the growth rates used in my analyses are not biased by a single analyst, all the companies in my proxy group have been covered by at least two utility industry equity analysts;
- Corporate Credit Rating Threshold: All the companies in my proxy group have investment grade senior unsecured bond and/or corporate credit ratings from S&P;

16 https://www.dominionenergy.com/company/moving-energy/western-gas-operations.
17 Source: S&P Global Market Intelligence.

- Gas Distribution Operating Income Threshold: To incorporate companies that are primarily regulated gas distribution utilities, I included companies with at least 60.00 percent of operating income derived from regulated natural gas utility operations; and
- Significant Events: I eliminated companies currently known to be party to a merger, or other significant transaction.

Q. Did you include Dominion Energy, Inc. in your proxy group?

A. No. To avoid the circular logic that would otherwise occur, it has been my consistent practice to exclude the subject company (or its parent) from the proxy group. Additionally, DEI is not included in the universe of companies that Value Line classifies as Natural Gas Utilities.

Q. Why did you begin with the universe of companies that Value Line classifies as Natural Gas Utilities?

A. In this proceeding, we are estimating the Cost of Equity for DEW, a wholly owned subsidiary of DEI, that is a rate regulated natural gas distribution company. By applying the screening criteria discussed above, I ensured that the proxy group excludes companies with regulated electric operations, or significant unregulated activities. Consequently, the proxy group contained in Table 5 below contains only companies that, like DEW, are focused on the regulated distribution of natural gas. Because all seven proxy companies are primarily natural gas distribution utilities, they are reasonable proxies for DEW.

Q. What companies met those screening criteria?

A. The criteria discussed above resulted in a proxy group of the following seven companies:

Table 5: Proxy Group Screening Results

Company	Ticker
Atmos Energy Corporation	ATO
New Jersey Resources Corporation	NJR
Northwest Natural Holding Company	NWN
ONE Gas, Inc.	OGS
South Jersey Industries, Inc.	SJI
Spire, Inc.	SR
Southwest Gas Corporation	SWX

Q. Do you believe that a proxy group of seven companies is sufficiently large?

A. Yes. Because all analysts use some form of screening process to develop proxy groups, those groups, by definition, are not randomly drawn from a larger population. Consequently, there is no reason to place more reliance on the range of results derived from a larger, but potentially less comparable proxy group simply by virtue of the larger number of observations. Moreover, because I am using market-based data, my analytical results will not necessarily be tightly clustered around a central point. Results that may be somewhat dispersed do not suggest the screening approach is inappropriate or the results less meaningful. Including companies whose fundamental comparability to the subject company is tenuous, simply for the purpose of expanding the number of observations, does not add relevant information to the analysis.

Cost of Equity Estimation

Q. How have you determined the investor-required ROE?

A. As noted earlier, because the Cost of Equity is not directly observable, it must be estimated based on both quantitative and qualitative information. Although several empirical models have been developed for that purpose, all are subject to limiting

assumptions or other constraints. Consequently, many finance texts recommend using multiple approaches to estimate the Cost of Equity as detailed in Section X (Appendix A).[18] When faced with the task of estimating the Cost of Equity, analysts and investors are inclined to gather and evaluate as much relevant data as reasonably can be analyzed and, therefore, rely on multiple analytical approaches.

As a practical matter, no individual model is more reliable than all others under all market conditions. Therefore, it is important to use multiple methods to mitigate the effects of assumptions and inputs associated with any single approach. As noted earlier, the use of multiple methods, and the consideration given to them, recently was endorsed by FERC.

Consistent with that approach, I have considered the results of the Constant Growth DCF model, the traditional and empirical forms of the CAPM, and the Bond Yield Plus Risk Premium approach. I also have provided an Expected Earnings analysis, which I have applied as a corroborating method. FERC issued similar guidance, using the Expected Earnings analysis in its determination of the "zone of reasonableness", observing that "*investors use those models*".[19]

Q. Please briefly describe the Constant Growth DCF model.

A. The Constant Growth DCF approach defines the Cost of Equity as the sum of (1) the expected dividend yield, and (2) expected long-term growth. As explained in Section X, the model often is expressed in the familiar form

18 *See, e.g.*, Eugene Brigham, Louis Gapenski, Financial Management: Theory and Practice, 7th Ed., 1994, at 341, and Tom Copeland, Tim Koller and Jack Murrin, Valuation: Measuring and Managing the Value of Companies, 3rd ed., 2000, at 214.

19 Docket No. EL11-66-001, et al., *Order Directing Briefs*, 165 FERC ¶ 61,030 (October 16, 2018) at para. 44 (italics in original).

$k = \frac{D(1+g)}{P_0} + g$, where the expected dividend yield generally equals the expected annual dividend divided by the current stock price, and the growth rate is based on analysts' expectations of earnings growth. The Constant Growth DCF formula, which falls from the longer "present value" structure,[20] requires several simplifying assumptions, including the constancy of inputs in perpetuity.

Under the model's strict assumptions, the growth rate equals the rate of capital appreciation (that is, the growth in the stock price).[21] Given that assumption, it does not matter whether the investor holds the stock in perpetuity, or whether they hold the stock for some period of time, collect the dividends, then sell at the prevailing market price. That result also requires that the ROE result reached today will remain unchanged in perpetuity. So, if market conditions are such that the model produces an unreasonably low (or high) ROE estimate today, it assumes that estimate will be the same ROE investors require every day in the future, regardless of whether or how market conditions change.

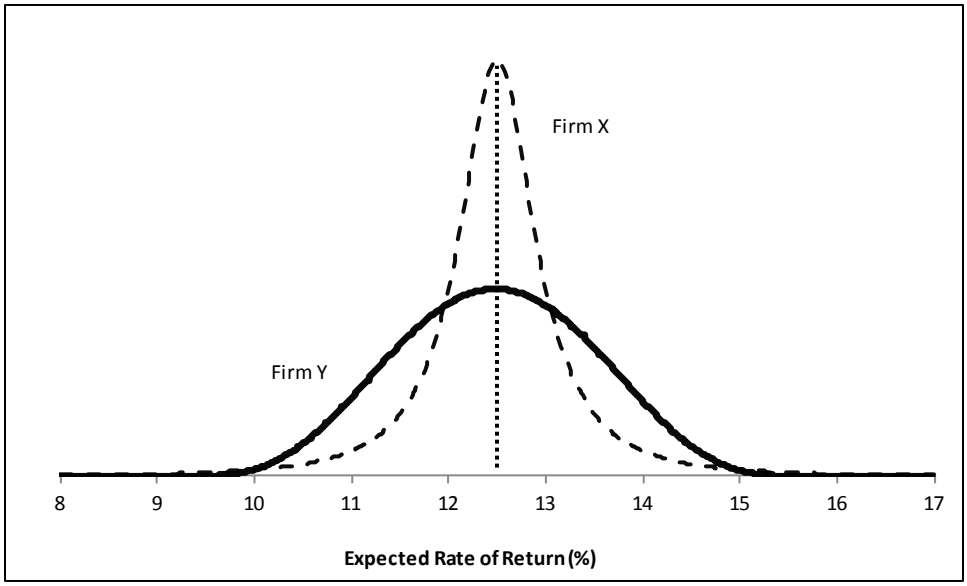
Q. Please briefly describe the Capital Asset Pricing Model.

A. Whereas DCF models focus on expected cash flows, Risk Premium-based models such as the CAPM focus on the additional return that investors require for taking on additional risk. In finance, "risk" generally refers to the variation in expected returns, rather than the expected return, itself. Consider two firms, X and Y, with expected returns, and the expected variation in returns noted in Chart 1, below. Although the two have the same

20 *See* Section X, part A.
21 As discussed in Section X, part A, the model assumes that earnings, dividends, book value, and the stock price all grow at the same constant rate in perpetuity. Additionally, academic research has indicated that analysts forecasts of growth are superior to other measures of growth (*see* Section X, part A).

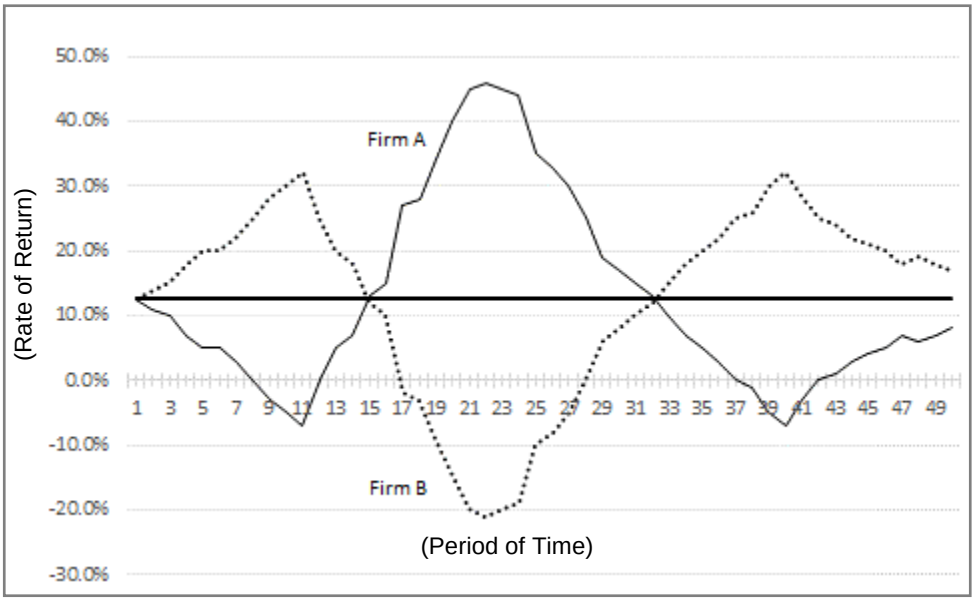
expected return (12.50 percent), Firm Y's are far more variable. From that perspective, Firm Y would be considered the riskier investment.

Chart 1: Expected Return and Risk



Now consider two other firms, Firm A and Firm B. Both have expected returns of 12.50 percent, and both are equally risky as measured by their volatility. But as Firm A's returns go up, Firm B's returns go down. That is, the returns are negatively correlated as illustrated in Chart 2, below.

Chart 2: Relative Risk



If we were to combine Firms A and B into a portfolio, we would expect a 12.50 percent return with no uncertainty because of the opposing symmetry of their risk profiles. That is, we can diversify the risk away. As long as two stocks are not perfectly correlated, we can achieve diversification benefits by combining them in a portfolio. That is the essence of the Capital Asset Pricing Model – because we can combine firms into a portfolio, the only risk that matters is the risk that remains after diversification, *i.e.*, the "non-diversifiable" risk.

The CAPM defines the Cost of Equity as the sum of the "risk-free" rate, and a premium to reflect the additional risk associated with equity investments. The "risk-free" rate is the yield on a security viewed as having no default risk, such as long-term Treasury bonds. The risk-free rate essentially sets the baseline of the CAPM. That is, an investor would expect a higher return than the risk-free rate to purchase an asset that carries risk. The difference between that higher return (*i.e.*, the required return) and the risk-free rate is the risk premium.

Risk-Free Rate + Risk Premium = Cost of Equity [1]

The risk premium is defined as a security's Beta coefficient multiplied by the risk premium of the overall market (the "Market Risk Premium" or "MRP"). The Beta coefficient is a measure of the subject company's risk relative to the overall market, *i.e.*, the "non-diversifiable" risk. A Beta coefficient of 1.00 means the security is as risky as the overall market; a value below 1.00 represents a security with less risk than the overall market, and a value over 1.00 represents a security with more risk than the overall market.

Risk-Free Rate + (Beta Coefficient x Market Risk Premium) = Cost of Equity [2]

Given that the correlation between the proxy group companies and the S&P 500 has declined since 2014, while the relative risk has increased,[22] the CAPM in the form presented here may not adequately reflect the expected systematic risk, and therefore, the returns required by investors in low-Beta companies. As such, I have considered the Empirical CAPM ("ECAPM") approach, which is a variant of the CAPM approach. The ECAPM adjusts for the CAPM's tendency to under-estimate returns for companies that (like utilities) have Beta coefficients less than one, and over-estimate returns for relatively high-Beta coefficient stocks.

Q. Please briefly describe the Bond Yield Plus Risk Premium approach.

A. This approach is based on the basic financial principle that equity investors bear the risk associated with ownership and, therefore, require a premium over the return they would have earned as a bondholder. That is, because returns to equity holders are more risky

22 *See* Chart 10, below.

than returns to bondholders, equity investors must be compensated for bearing that additional risk (that difference often is referred to as the "Equity Risk Premium"). Bond Yield Plus Risk Premium approaches estimate the Cost of Equity as the sum of the Equity Risk Premium and the yield on a particular class of bonds.

Bond Yield + Equity Risk Premium = Cost of Equity [3]

Q. Please summarize your analytical results.

A. The results of the models described above are provided in Tables 6 and 7, below.[23]

Table 6: Summary of DCF Results[24]

	Mean Low	Mean	Mean High
30-Day Average	7.51%	9.95%	13.98%
90-Day Average	7.51%	9.94%	13.97%
180-Day Average	7.58%	10.01%	14.05%

23 *See* Section X for a more detailed description of the models, assumptions, and inputs described in Section IV.

24 DEW Exhibit 2.2.

Table 7: Summary of Risk Premium Results[25]

CAPM	Bloomberg Derived Market Risk Premium	Value Line Derived Market Risk Premium
Average Bloomberg Beta Coefficient		
Current 30-Year Treasury (2.11%)	9.14%	9.30%
Near Term Projected 30-Year Treasury (2.28%)	9.31%	9.47%
Average Value Line Beta Coefficient		
Current 30-Year Treasury (2.92%)	10.22%	10.41%
Near Term Projected 30-Year Treasury (3.08%)	10.40%	10.58%
Empirical CAPM	**Bloomberg Derived Market Risk Premium**	**Value Line Derived Market Risk Premium**
Average Bloomberg Beta Coefficient		
Current 30-Year Treasury (2.11%)	10.40%	10.59%
Near Term Projected 30-Year Treasury (2.28%)	10.57%	10.76%
Average Value Line Beta Coefficient		
Current 30-Year Treasury (2.92%)	11.22%	11.43%
Near Term Projected 30-Year Treasury (3.08%)	11.39%	11.60%
Bond Yield Plus Risk Premium Approach		
Current 30-Year Treasury (2.11%)	9.96%	
Near Term Projected 30-Year Treasury (2.28%)	9.91%	
Long-Term Projected 30-Year Treasury (3.70%)	10.01%	

Q. Please briefly describe the Expected Earnings analysis.

A. The Expected Earnings analysis is based on the principle of opportunity costs. By taking historical returns on book equity and comparing those to authorized ROEs, investors are able to directly compare returns from investments of similar risk. In addition to historical returns, Value Line also provides projected returns on book equity. I have relied solely

25 DEW Exhibit 2.6 and DEW Exhibit 2.7.

on forward-looking projections in the Expected Earnings analysis.[26] Those results range from 9.08 percent to 12.09 percent, with an average of 10.73 percent and a median of 10.24 percent.[27] As noted earlier, I used those results to assess the reasonableness of the DCF, CAPM, and Bond-Yield Plus Risk Premium results.[28]

V. BUSINESS RISKS AND OTHER CONSIDERATIONS

Small Size

Q. Please explain the risk associated with small size.

A. Both the financial and academic communities have long accepted the proposition that the Cost of Equity for small firms is subject to a "size effect".[29] Although empirical evidence of the size effect often is based on studies of industries beyond regulated utilities, utility analysts also have noted the risks with associated small market capitalizations. Specifically, Ibbotson Associates noted:

> For small utilities, investors face additional obstacles, such as a smaller customer base, limited financial resources, and a lack of diversification across customers, energy sources, and geography. These obstacles imply a higher investor return.[30]

Small size, therefore, leads to two categories of increased risk for investors: (1) liquidity risk (*i.e.*, the risk of not being able to sell one's shares in a timely manner due to the relatively thin market for the securities); and (2) fundamental business risks.

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26 As described more fully in Section X, an adjustment is necessary to accurately reflect the average invested capital over the period in question.
27 DEW Exhibit 2.8.
28 *See* Docket Nos. EL14-12-003 and EL15-45-000, *Order Directing Briefs.* (November 15, 2018).
29 Mario Levis, *The record on small companies: A review of the evidence*, Journal of Asset Management 2, March 2002, at 368-397, for a review of literature relating to the size effect.
30 Michael Annin, *Equity and the Small-Stock Effect*, Public Utilities Fortnightly, October 15, 1995.

Q. How does DEW compare in size to the proxy companies?

A. Relative to the proxy group, the Company is significantly smaller in terms of both average customers and annual revenues. Exhibit DEW 2.9 estimates the implied market capitalization for DEW. That is, because it is not a separately traded entity, an estimated stand-alone market capitalization for DEW must be calculated. The implied market capitalization of DEW is calculated by applying the median market-to-book ratio for the proxy group of 2.30 to the Company's implied total common equity of $35.48 million.[31] The implied market capitalization based on that calculation is $81.67 million, which is approximately 1.89 percent of the proxy group median of $4.32 billion.

Q. How does the comparatively small size of DEW affect its business risks relative to the proxy group of companies?

A. In general, smaller companies are less able to withstand adverse events that affect their revenues and expenses. Capital expenditures for non-revenue producing investments such as system maintenance and replacements will put proportionately greater pressure on customer costs, potentially leading to customer attrition or demand reduction. These risks affect the return required by investors for smaller companies.

Q. Is there support in the financial community for the use of a small size premium?

A. Yes. There have been several studies that demonstrate the size premium. One of the earliest works in this area found that over a period of 40 years "the common stock of small firms had, on average, higher risk-adjusted returns than the common stock of large firms."[32] The author, who referred to that finding as the "size effect," suggested that the

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[31] Equity value of DEW is estimated from the proposed test year rate base and proposed equity ratio.

[32] R. W. Banz, *The Relationship Between Return and Market Value of Common Stocks*, Journal of Financial Economics, 9, 1981.

CAPM was mis-specified in that on average, smaller firms had significantly larger risk-adjusted returns than larger firms. The author also concluded that the size effect was "most pronounced for the smallest firms in the sample."[33] Since then, additional empirical research has focused on explaining the size effect as a function of lower trading volume and other factors, but the proposition that Beta fails to reflect the risks of smaller firms persists.[34]

In 1994, Fama and French focused on the issue of whether the CAPM adequately explained security returns and proposed a "three factor" model for expected security returns. Those factors include: (1) the covariance with the market, (2) size, and (3) financial risk as determined by the book-to-market ratio. As explained by Morningstar, Fama and French "found that the returns on stocks are better explained as a function of size and book-to-market value in addition to the single market factor of the CAPM, with the company's size capturing the size effect and its book-to-market ratio capturing the financial distress of a firm."[35]

Q. How did you estimate the size premium for DEW?

A. In its *2019 Cost of Capital Navigator*, Duff & Phelps presents its calculation of the size premium for deciles of market capitalizations relative to the S&P 500 Index. An additional estimate of the size premium associated with DEW, therefore, is the difference in the Duff & Phelps size risk premiums for the proxy group median market capitalization relative to the implied market capitalization for the Company.

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33 *Id.*.

34 *See, e.g.* Mario Levis, *The record on small companies: A review of the evidence,* Journal of Asset Management, March, 2002.

35 Morningstar, Ibbotson SBBI 2013 Valuation Yearbook, at 109.

As shown on Exhibit DEW 2.9, based on recent market data, the median market capitalization of the proxy group was approximately $4.32 billion, which corresponds to the fifth decile of Duff & Phelps's market capitalization data. Based on the Duff & Phelps analysis, that decile has a size premium of 1.28 percent (or 128 basis points). The implied market capitalization for DEW is approximately $81.67 million, which falls within the tenth decile and corresponds to a size premium of 5.22 percent (or 522 basis points). The difference between those size premiums is 394 basis points (5.22 percent – 1.28 percent).

Q. Have you considered the comparatively small size of DEW in your ROE recommendation?

A. Yes. While I have quantified the small size effect, rather than proposing a specific premium, I have considered the small size of the Company in my assessment of business risks in order to determine where, within a reasonable range of returns, DEW's required ROE appropriately falls. In that regard, the Company's comparatively small size further supports my conclusion that an ROE above the proxy group mean is reasonable.

Electrification

Q. What is Electrification?

A. Electrification is the conversion of fossil-fuel based transportation (*i.e.*, gasoline powered vehicles) and end-use heating and appliance loads (such as oil and natural gas-fired heating systems) to electricity.

Q. Please explain the risk of Electrification on the natural gas utility sector?

A. As noted in a recent ICF study for the American Gas Association, as states and local municipalities contemplate "deep decarbonization" of their economies as the electric grid

becomes less carbon-intensive, policy-makers and environmental advocates are considering electrification as an option for further reducing greenhouse gas emissions.[36] If successful, these policies could affect the natural gas utility sector by drastically reducing demand for natural gas, leaving natural gas utilities at risk of holding stranded assets.[37]

Flotation Costs

Q. What are flotation costs?

A. Flotation costs are the expenses incurred in connection with the sale of new shares of equity. As discussed below, such costs include out-of-pocket expenditures for the preparation, filing, underwriting, and other issuance costs of common stock.

Q. Why is it important to recognize flotation costs in the allowed ROE?

A. In order to attract and retain new investors, a regulated utility must have the opportunity to earn a return that is both competitive and compensatory. To the extent that a company is denied the opportunity to recover prudently incurred flotation costs, actual returns will fall short of expected (or required) returns, thereby diminishing its ability to attract adequate capital on reasonable terms.

Q. Are flotation costs part of a utility's invested costs or part of the utility's expenses?

A. Flotation costs are part of the invested costs of the utility, which are properly reflected on the balance sheet under "paid in capital." They are not current expenses, and therefore, are not reflected on the income statement. Rather, like investments in rate base or the

36 *Implications of Policy Driven Residential Electrification,* An American Gas Association Study prepared by ICF, July 2018, at 1.

37 McKinsey & Company, "Are US gas utilities nearing the end of their golden age?", September 2018, https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/are-us-gas-utilities-nearing-the-end-of-their-golden-age

issuance costs of long-term debt, flotation costs are incurred over time. As a result, the great majority of a utility's flotation costs are incurred prior to the test year, but remain part of the cost structure that exists during the test year and beyond, and should be recognized for ratemaking purposes. Therefore, recovery of flotation costs is appropriate even if no new issuances are planned in the near future because failure to allow such cost recovery may deny DEW the opportunity to earn its required rate of return in the future.

Q. Is the need to consider flotation costs eliminated because DEW is a wholly owned subsidiary of DEI.?

A. No, it is not. Although the Company is a wholly-owned subsidiary of DEI, it is appropriate to consider flotation costs because wholly owned subsidiaries receive equity capital from their parents and provide returns on the capital that roll up to the parent, which is designated to attract and raise capital based on the returns of those subsidiaries. To deny recovery of issuance costs associated with the capital that is invested in the subsidiaries ultimately would penalize the investors that fund the utility operations and would inhibit the utility's ability to obtain new equity capital at a reasonable cost. This is important for companies such as DEW that are planning continued capital expenditures in the near term, and for which access to capital (at reasonable cost rates) to fund such required expenditures will be critical.

Q. Do the DCF and CAPM models already incorporate investor expectations of a return in order to compensate for flotation costs?

A. No. The models used to estimate the appropriate ROE assume no "friction" or transaction costs, as these costs are not reflected in the market price (in the case of the DCF model) or risk premium (in the case of the CAPM and the Bond Yield Plus Risk

Premium model). Therefore, it is appropriate to consider flotation costs when determining where within the range of reasonable results DEW's return should be set.

Q. Is the need to consider flotation costs recognized by the academic and financial communities?

A. Yes. The need to reimburse investors for equity issuance costs is recognized by the academic and financial communities in the same spirit that investors are reimbursed for the costs of issuing debt. For example, Dr. Morin notes that "[t]he costs of issuing [common stock] are just as real as operating and maintenance expenses or costs incurred to build utility plants, and fair regulatory treatment must permit the recovery of these costs."[38] Dr. Morin further notes that "equity capital raised in a given stock issue remains on the utility's common equity account and continues to provide benefits to ratepayers indefinitely."[39] This treatment is consistent with the philosophy of a fair rate of return. As explained by Dr. Shannon Pratt:

> Flotation costs occur when a company issues new stock. The business usually incurs several kinds of flotation or transaction costs, which reduce the actual proceeds received by the business. Some of these are direct out-of-pocket outlays, such as fees paid to underwriters, legal expenses, and prospectus preparation costs. Because of this reduction in proceeds, the business's required returns must be greater to compensate for the additional costs. Flotation costs can be accounted for either by amortizing the cost, thus reducing the net cash flow to discount, or by incorporating the cost into the cost of equity capital. Since flotation costs typically are not applied to operating cash flow, they must be incorporated into the cost of equity capital.[40]

Similarly, Morningstar has commented on the need to reflect flotation costs in the cost of capital:

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38 Roger A. Morin, PhD, New Regulatory Finance, Public Utility Reports, Inc., 2006, at 321.
39 *Id.*, at 327.
40 Shannon P. Pratt, Roger J. Grabowski, Cost of Capital: Applications and Examples, 4th ed. (John Wiley & Sons, Inc., 2010), at 586.

> Although the cost of capital estimation techniques set forth later in this book are applicable to rate setting, certain adjustments may be necessary. One such adjustment is for flotation costs (amounts that must be paid to underwriters by the issuer to attract and retain capital).[41]

Q. Have you estimated the effects of flotation costs?

A. Yes, I modified the DCF calculation to derive the dividend yield that would reimburse investors for direct issuance costs. Based on the weighted average issuance costs shown in DEW Exhibit 2.10, a reasonable estimate of flotation costs is approximately 0.05 percent (five basis points).

Q. Are you proposing to adjust your recommended ROE by five basis points to reflect the effect of flotation costs on DEW's ROE?

A. No, I am not. Rather, I have considered the effect of flotation costs, in addition to the Company's other business risks, in determining where the Company's ROE should be set within the reasonable range of results.

VI. CAPITAL MARKET ENVIRONMENT

Q. Does your recommendation consider the current capital market environment?

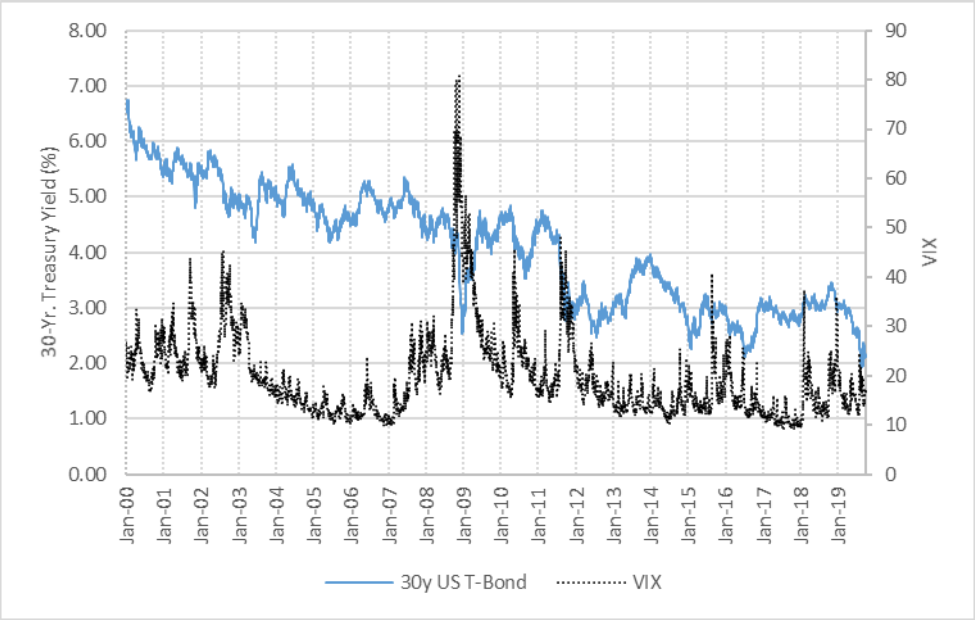
A. Yes, it does. From an analytical perspective, it is important that the inputs and assumptions used to arrive at an ROE recommendation, including assessments of capital market conditions, are consistent with the recommendation itself. Although all analyses require an element of judgment, the application of that judgment must be made in the context of the quantitative and qualitative information available to the analyst and the capital market environment in which the analyses were undertaken.

41 Morningstar, Inc., Ibbotson SBBI 2013 Valuation Yearbook, at 25.

Q. Is there a relationship between equity market volatility and interest rates?

A. Yes, there is. Significant and abrupt increases in volatility tend to be associated with declines in Treasury yields. That relationship makes intuitive sense; as investors see increasing risk, their objectives may shift principally to capital preservation (that is, avoiding a capital loss). A means of doing so is to allocate capital to the relative safety of Treasury securities, in a "flight to safety". Because Treasury yields are inversely related to Treasury bond prices, as investors bid up the prices of bonds, they bid down the yields. As Chart 3, below demonstrates, decreases in the 30-year Treasury yield are coincident with significant increases in the VIX.

Chart 3: 30-Year Treasury Yields vs. VIX (1/2000 – 9/2019)[42]



In those instances, the fall in yields does not reflect a reduction in required returns, it reflects an increase in risk aversion and, therefore, an increase in required equity returns.

42 Sources: S&P Global Market Intelligence; and Bloomberg Professional.

Q. Has market volatility changed recently?

A. Yes, it has. A visible and widely reported measure of expected volatility is the Chicago Board Options Exchange ("Cboe") Volatility Index, often referred to as the VIX. As Cboe explains, the VIX "is a calculation designed to produce a measure of constant, 30-day expected volatility of the U.S. stock market, derived from real-time, mid-quote prices of S&P 500® Index (SPX℠) call and put options."[43] Simply, the VIX is a market-based measure of expected volatility. Because volatility is a measure of risk, increases in the VIX, or in its volatility, are a broad indicator of expected increases in market risk.

Although the VIX is not expressed as a percentage, it should be understood as such. That is, if the VIX stood at 15.00, it would be interpreted as an expected standard deviation in annual market returns of 15.00 percent over the coming 30 days. Since 1990, the VIX has averaged about 19.19, which is highly consistent with the long-term standard deviation on annual market returns (19.80 percent, as reported by Duff & Phelps).[44]

Table 8, below, demonstrates the increase in market uncertainty from 2017 to 2019. As the table notes, the standard deviation (that is, the volatility of volatility) from 2018 through 2019 is about 3.11 times higher than its 2017 level (1.36).

43 Source: http://www.cboe.com/vix.
44 Source: Duff & Phelps, 2019 SBBI Yearbook, at 6-17.

Table 8: VIX Levels and Volatility[45]

VIX Level and Volatility	
Long-term Average	19.19
2018-2019 Average	16.31
2018-2019 Maximum	37.32
2018-2019 Minimum	9.15
2018-2019 Standard Deviation	4.22
2017 Average	11.09
2017 Maximum	16.04
2017 Minimum	9.14
2017 Standard Deviation	1.36

The increase in volatility is not surprising as market participants reassess the Federal Reserve's long-term objective of monetary policy normalization, and the increasing risks associated with federal trade policy initiatives.

Q. Is market volatility expected to increase from its current levels?

A. Yes, it is. One means of assessing market expectations regarding the future level of volatility is to review Cboe's "Term Structure of Volatility." As Cboe points out:

> The implied volatility term structure observed in SPX options markets is analogous to the term structure of interest rates observed in fixed income markets. Similar to the calculation of forward rates of interest, it is possible to observe the option market's expectation of future market volatility through use of the SPX implied volatility term structure.[46]

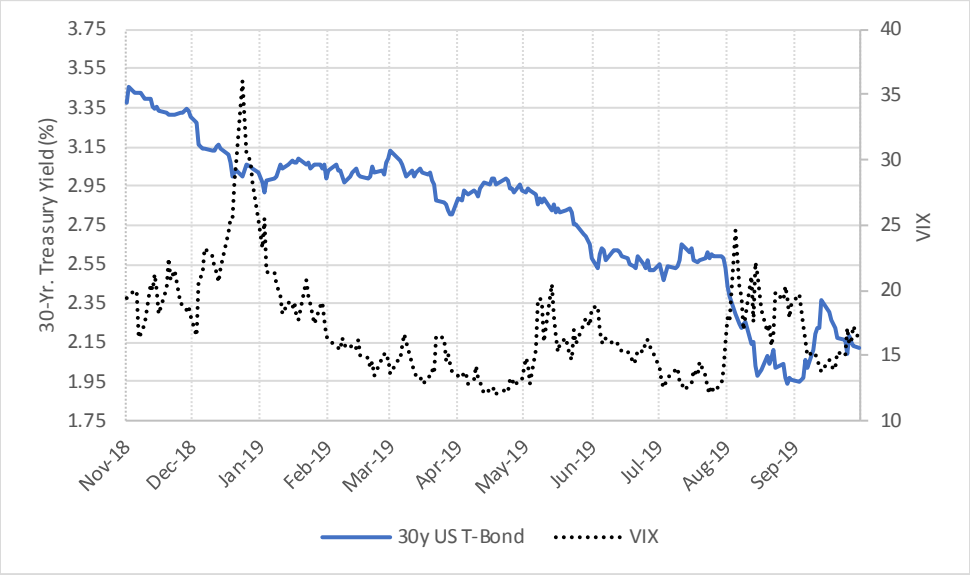
Cboe's term structure data is upward sloping, indicating market expectations of increasing volatility. The expected VIX value in December 2020 is 20.03, suggesting investors see a reversion to long-term average volatility over the coming months.[47]

45 Source: Bloomberg Professional.
46 Source: http://www.cboe.com/trading-tools/strategy-planning-tools/term-structure-data.
47 Source: http://www.cboe.com/trading-tools/strategy-planning-tools/term-structure-data, accessed October 14, 2019.

657 **Q. Have recent declines in Treasury yields been associated with increases in market**
658 **volatility?**

659 A. Yes, they have. Since November 2018, the periods during which Treasury yields fell
660 coincided with increases in the VIX (*see*, Chart 4, below).

661 **Chart 4: 30-Year Treasury Yields vs. VIX (11/2018 – 9/2019)[48]**



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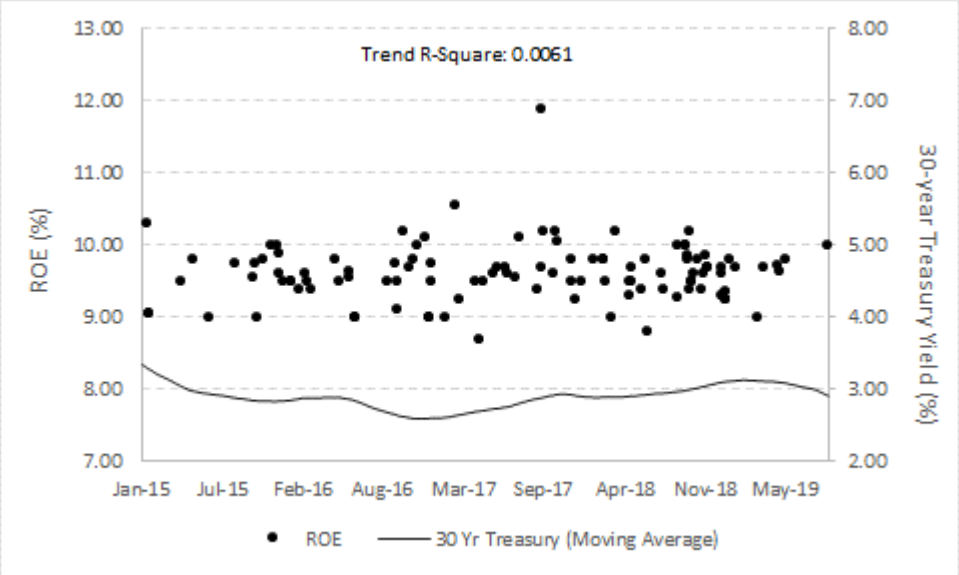
663 **Q. Have authorized returns moved in step with the low interest rate environment?**

664 A. No, they have not. As Chart 5 (below) demonstrates, despite the decline in yields in 2015
665 and 2016, and again in late 2018 through 2019, regulatory commissions have not been
666 inclined to reduce authorized returns. The constancy of authorized returns as interest
667 rates fell also is consistent with the widely accepted principle that the Equity Risk
668 Premium increases as interest rates fall.

48 Sources: S&P Global Market Intelligence; and Bloomberg Professional.

Chart 5: Authorized Returns (2015 – 2019)[49]



Q. What conclusions do you draw from those analyses?

A. It is important to consider whether changes in long-term interest rates reflect fundamental changes in investor sentiment, or whether they reflect potentially transitory factors. The recent, sudden decline in interest rates appears to be related to the increase in equity market volatility, which may be event-driven rather than a fundamental change. To be clear, I am not suggesting that rates should be set based on temporary events. Rather, in my view, the analytical results should be reviewed within the context of the market environment. Because the methods used to estimate the Cost of Equity are forward-looking, it is important to consider those distinctions in assessing model results.

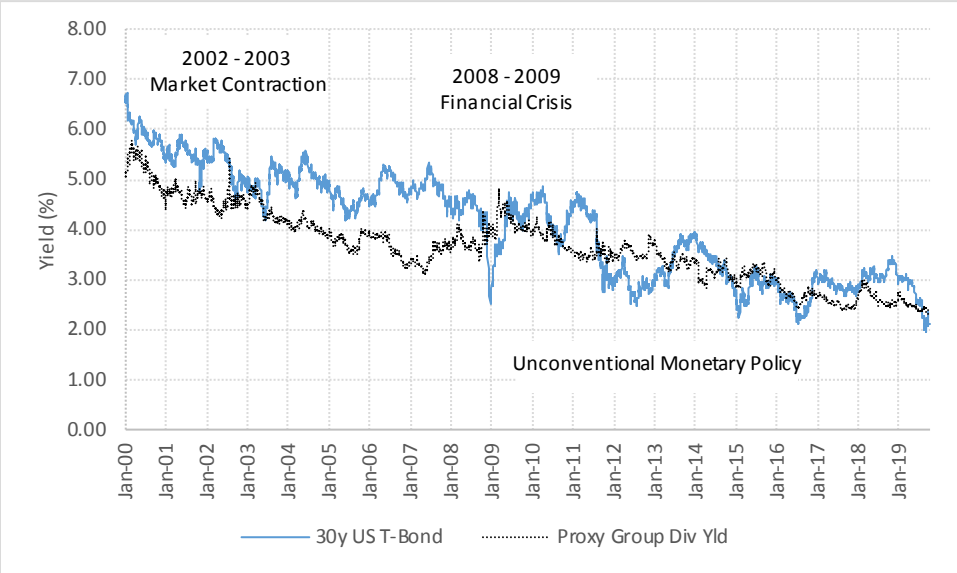
Q. Have natural gas utility dividend yields closely followed long-term Treasury yields?

A. Although they have been directionally related over time, the fundamental relationship between Treasury yields and natural gas utility[50] dividend yields changed after the

[49] Excludes Limited Issue Rate Riders. Source: Regulatory Research Associates.
[50] Defined as the proxy group calculated as an index.

683 2008/2009 financial crisis. From 2000 through 2008, Treasury yields generally exceeded
684 natural gas utility dividend yields; the exception was the 2002-2003 market contraction.
685 Then, in 2008-2009, investors sought the safety of Treasury securities, accepting lower
686 Treasury yields in exchange for a greater likelihood of capital preservation. Once the
687 contraction ended (in latter half of 2009), the relationship fluctuated as the Federal
688 Reserve implemented and maintained "unconventional" monetary policies in reaction to
689 the financial crisis (*i.e.*, Quantitative Easing) with the intended consequence of lowering
690 long-term interest rates (*see*, Chart 6, below). As the Federal Reserve began to
691 "normalize" its monetary policy, the relationship was restored.

692 **Chart 6: Utility Dividend Yields and 30-Year Treasury Yields**[51]



693

694 During the 2008/2009 financial crisis, Treasury bond prices increased (yields
695 decreased), and utility stock prices decreased (dividend yields increased) such that the
696 prior relationship became less stable. As the Federal Reserve implemented and
697 maintained "unconventional" monetary policies in reaction to the financial crisis (*i.e.*,

51 Proxy Group Dividend Yield calculated as an index. Source: S&P Global Market Intelligence

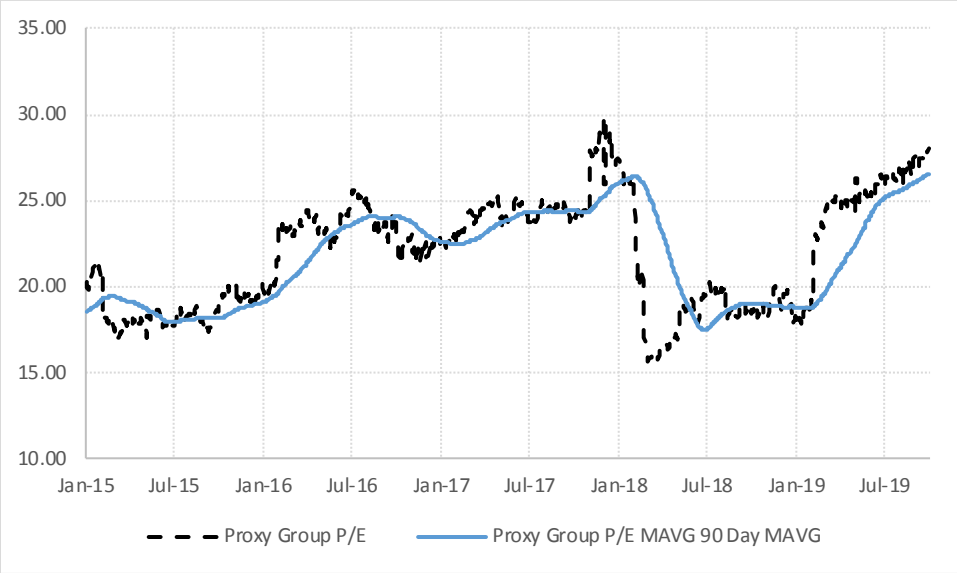
Quantitative Easing) with the intended consequence of lowering long-term interest rates, the unstable relationship between Treasury yields and utility dividend yields persisted.

Even though the "yield spread"[52] became inverted for a period following the financial crisis, it has not been static. That is, as Treasury yields fell in response to central bank policies, dividend yields did not fall to the same degree, or necessarily exhibit similar movements. In fact, at times the yield spread has widened (*see*, Chart 6, above). That data suggests that, although utility prices are sensitive to long-term Treasury yields, the relationship is not unbounded.

Q. Is that relationship also seen in utility Price/Earnings ("P/E") ratios?

A. Yes, it is. Looking to the period following the Federal Reserve's Quantitative Easing policy, the proxy group P/E ratio has varied, often reverting once it has largely breached its 90-day moving average (*see*, Chart 7, below).

Chart 7: Proxy Group Average Price/Earnings Ratio[53]

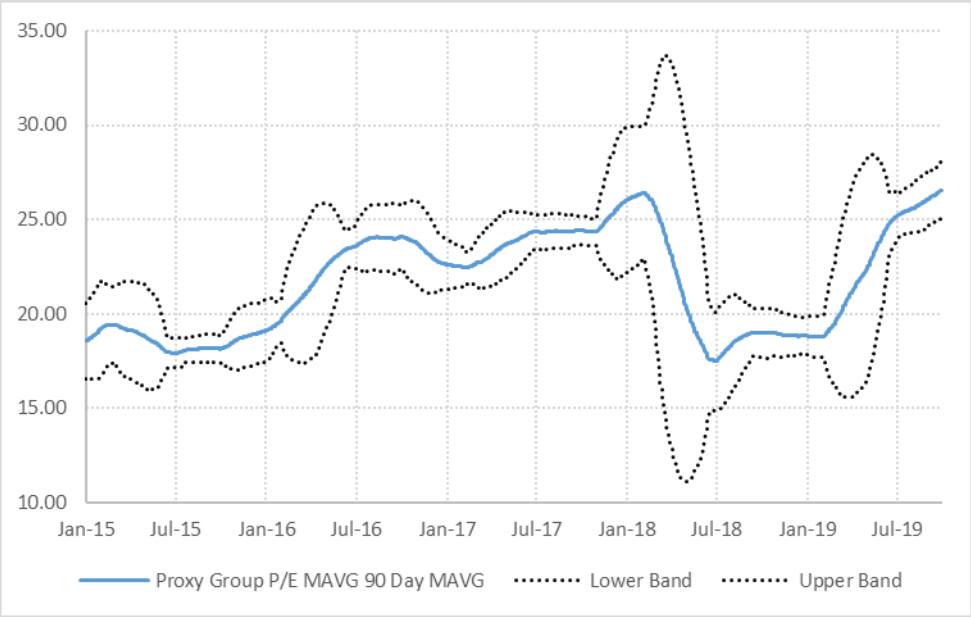


[52] Defined here as dividend yields less Treasury yields.

53 Calculated as an index. Source: S&P Global Market Intelligence.

From a somewhat different perspective, the proxy group's P/E ratio has traded within a two-standard deviation range, although that range recently has widened, indicating increasing variability in the group's valuation (*see*, Chart 8, below).

Chart 8: Proxy Group Average P/E Ratio Bands[54]



That data supports the conclusion discussed earlier, that utility stock prices are sensitive to changes in interest rates, to a degree. The "reach for yield" that sometimes occurs when interest rates fall has a limit; investors will not accept the incremental risk of capital losses when utility valuation levels become "stretched". That also may be the case when investors see interest rates reacting to market volatility that is event-driven, rather than a fundamental change in the capital market environment or investor risk tolerances. The increasing variability can be seen in Chart 8 (above), when the bands

54 Calculated as an index. Bands represent two standard deviations calculated over 90 days. Source: S&P Global Market Intelligence.

around the 90-day moving average P/E ratios widen. During those periods, the risk of capital loss increases, implying a further limit on valuation levels.

Q. Does the reduction in the Federal Funds target rate by the Federal Reserve or an inverted yield curve alter any of the conclusions above?

A. No, it does not. As explained above, utility stock prices are sensitive to changes in interest rates, but only to a point. To the extent investors expect further reductions in the Federal Funds Target Rate or an inversion to the yield curve, the effects on utility stock prices are not certain to be directionally related. Further, although the Federal Open Market Committee ("FOMC") reduced the overnight Federal Funds rate by a quarter percentage point at each of the last two FOMC meetings, it noted that in determining the timing and size of future rate adjustments,

> …the Committee will assess realized and expected economic conditions relative to its maximum employment objective and its symmetric 2 percent inflation objective. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments.[55]

As to the longer-term, the FOMC's September 2019 Projection Materials suggest an increase in the Federal Funds rate over the "longer-run".[56]

Regarding expectations of an inverted yield curve, whether an inverted yield curve may cause a recession, the issue of causality is not settled. As the Federal Reserve Bank of Chicago (the "Chicago Fed") observed, the analyses discussed in its recent

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55 *Federal Reserve Press Release*, September 18, 2019.

56 Federal Open Market Committee, *Table 1. Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents, under their individual assumptions of projected appropriate monetary policy, September 2019.* The projection materials explain that "[l]onger-run projections represent each participant's assessment of the rate to which each variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy."

research on the topic "do not imply that a yield-curve inversion causes a recession." The Chicago Fed further explained that, "[r]ather, it could be that the slope itself fluctuates to reflect changing expectations about the economy, and these expectations are useful predictors of economic downturns."[57]

Lastly, the yield curve's ability to predict inflation has come under question since the Federal Reserve implemented its policy of Quantitative Easing. A May 2019 article in Barron's, for example, observed that by taking Treasury and mortgage-backed securities off the private market, the Federal Reserve "may be depressing the term premium and tilting the yield curve negatively."[58] In that case, a yield curve inversion may not be due to the macroeconomic factors that otherwise would suggest an impending recession.

Q. What conclusions do you draw from your analyses of the current capital market environment, and how do those conclusions affect your ROE recommendation?

A. Because certain models used to estimate the Cost of Equity require long-term assumptions, it is important to understand whether those assumptions hold. The current market environment is one in which changes in interest rates may be associated with events, more than they are a function of fundamental economic conditions. Further, utility valuations have a limit, even when investors look to them for an alternate source of income as interest rates fall.

On balance, it remains important to consider changes in market conditions, the likely causes of those changes, and how model results are affected by them. Those

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[57] Chicago Fed Letter, *Why does the yield-curve slope predict recessions*, Essays on Issues, 2018 Number 404, at 5.

[58] Randall W. Forsyth, *An Inverted Yield Curve Is Usually Scary. Not this Time*. *Barron's*, May 31, 2019.

assessments necessarily involve the application of reasoned and experience judgment. As discussed throughout my testimony, that judgment supports my recommended range of 9.90 percent to 10.75 percent.

VII. CAPITAL STRUCTURE

Q. What is the Company's proposed capital structure?

A. While the Company's actual projected 2019 equity ratio is 60.00 percent, the Company has proposed a capital structure consisting of 55.00 percent common equity and 45.00 percent long-term debt.

Q. How does the capital structure affect the Cost of Equity?

A. The capital structure relates to a company's financial risk, which represents the risk that a company may not have adequate cash flows to meet its financial obligations, and is a function of the percentage of debt (or financial leverage) in its capital structure. As the percentage of debt in the capital structure increases, so do the fixed obligations for the repayment of that debt. Consequently, as the degree of financial leverage increases, the risk of financial distress (*i.e.*, financial risk) also increases. That risk is particularly relevant given the long-lived nature of utility assets. The average useful life of the DEI's gas distribution utility plant in service is more than 40 years.[59] Because equity is perpetual and helps extend the average tenor of the securities financing the rate base, it is appropriate to consider the ratios of long-term debt and equity in determining the capital structure. Lastly, because the capital structure can affect the subject company's overall

59 *See* Dominion Energy, Inc., SEC Form 10-K for the year ended December 31, 2018, at 101.

level of risk,[60] it is an important consideration in establishing a just and reasonable rate of return.

Q. Please discuss your analysis of the capital structures of the proxy group companies.

A. Because it is appropriate to normalize the relative relationship between the capital components over a period of time when making the comparison to the Company's capital structure, I calculated the average capital structure for each of the proxy group companies over the last eight quarters. As shown in DEW Exhibit 2.11, the mean of the proxy group actual capital structures is 52.29 percent common equity and 47.71 percent long-term debt. The average common equity ratios (on a company-specific basis) range from 40.35 percent to 62.09 percent. Based on that review, it is apparent that the Company's actual and proposed capital structure are generally consistent with the capital structures of the proxy group companies.

Q. What is your conclusion regarding an appropriate capital structure for DEW?

A. Considering the proxy group companies' average common equity ratios range from 40.35 percent to 62.09 percent, I believe that DEW's actual common equity ratio of 60.00 percent and proposed common equity ratio of 55.00 percent are appropriate as each is consistent with the proxy group companies.

VIII. COST OF DEBT

Q. What Cost of Debt has the Company requested in this proceeding?

A. The Company has proposed a Cost of Debt of 4.37 percent.

60 *See* Roger A. Morin, New Regulatory Finance, Public Utility Reports, Inc., 2006, at 45-46.

Q. Please discuss your analysis of the Company's Cost of Debt.

A. To test the reasonableness of the Company's proposed Cost of Debt, I reviewed the yield on equivalent debt at the time of issuance. As shown in DEW Exhibit 2.12, I compared the cost of each individual issuance to the Moody's A and BBB Utility Index at the time of the issuance.[61] The expected Cost of Debt, based on the Moody's A and BBB Utility Bond Index (the "Moody's Index") ranges from 4.30 percent to 4.69 percent, indicating that the Company's 4.37 percent proposed weighted average Cost of Debt is reasonable.

IX. CONCLUSIONS AND RECOMMENDATION

Q. What is your conclusion regarding the Company's Cost of Equity and capital structure?

A. As discussed throughout my Direct Testimony, and in keeping with the *Hope* and *Bluefield* standards described earlier, it is prudent and appropriate to consider multiple methodologies to arrive at an ROE recommendation for DEW. As discussed in Section X and as shown in DEW Exhibit 2.2 through DEW Exhibit 2.12, I have performed several analyses to estimate DEW's Cost of Equity. In light of those results, and taking into consideration other relevant and observable market data, including certain risk factors the Company faces, I believe that an ROE in the range of 9.90 percent to 10.75 percent represents the range of returns required by equity investors under current and expected market conditions. Within that range, I conclude that an ROE of 10.50 percent represents an appropriate estimate of the Cost of Equity for DEW considering its risk profile. Specifically, my recommendation also considers (but does not make specific adjustments for) (1) the risk associated with electrification; (2) the Company's planned

61 DEW Exhibit 2.12.

capital expenditures and the effect, if any, of certain regulatory mechanisms; and (3) the direct costs associated with equity issuances. Lastly, I conclude that the Company's proposed capital structure, which includes 55.00 percent common equity and 45.00 percent long-term debt, and proposed Cost of Debt of 4.37 percent, are reasonable and appropriate.

Q. Does this conclude your Direct Testimony?

A. Yes, it does.

X. APPENDIX A

A. Constant Growth Discounted Cash Flow Model

Q. Please more fully describe the Constant Growth DCF approach.

A. The Constant Growth DCF approach is based on the theory that a stock's current price represents the present value of all expected future cash flows. In its simplest form, the Constant Growth DCF model expresses the Cost of Equity as the discount rate that sets the current price equal to expected cash flows:

$$P = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \ldots + \frac{D_\infty}{(1+k)^\infty} \qquad [4]$$

where P represents the current stock price, $D_1 \ldots D_\infty$ represent expected future dividends, and k is the discount rate, or required ROE. Equation [4] is a standard present value calculation that can be simplified and rearranged into the familiar form:

$$k = \frac{D_0\ (1+g)}{P} + g \qquad [5]$$

Equation [5] often is referred to as the "Constant Growth DCF" model, in which the first term is the expected dividend yield and the second term is the expected long-term annual growth rate.

Q. What assumptions are inherent in the Constant Growth DCF model?

A. The Constant Growth DCF model assumes: (1) earnings, book value, and dividends all grow at the same, constant rate in perpetuity; (2) a constant dividend payout ratio in perpetuity; (3) the observed P/E ratio will remain constant in perpetuity; and (4) estimated Cost of Equity will remain constant, also in perpetuity.

Q. What market data did you use to calculate the dividend yield in your Constant Growth DCF model?

A. The dividend yield is based on each proxy company's current annualized dividend and average closing stock price over the 30-, 90-, and 180-trading day periods as of September 30, 2019, as explained more fully below.

Q. Why did you use three averaging periods to calculate an average stock price?

A. I did so to ensure the model's results are not skewed by anomalous events that may affect stock prices on any given trading day. At the same time, the averaging period should be reasonably representative of expected capital market conditions over the long term. In my view, using 30-, 90-, and 180-trading day averaging periods reasonably balances those concerns.

Q. Did you make any adjustments to the dividend yield to account for periodic growth in dividends?

A. Yes, I did. Because utility companies tend to increase their quarterly dividends at different times throughout the year, it is reasonable to assume that dividend increases will be evenly distributed over calendar quarters. Given that assumption, it is appropriate to calculate the expected dividend yield by applying one-half of the long-term growth rate to the current dividend yield. That adjustment ensures that the expected dividend yield is, on average, representative of the coming twelve-month period, and does not overstate the dividends to be paid during that time.

Q. Is it important to select appropriate measures of long-term growth in applying the DCF model?

A. Yes. In its Constant Growth form, the DCF model (*i.e.*, as presented in Equation [5] above) assumes a single growth estimate in perpetuity. Accordingly, to reduce the long-term growth rate to a single measure, one must assume a fixed payout ratio, and the same constant growth rate for earnings per share ("EPS"), dividends per share, and book value per share. Since dividend growth can only be sustained by earnings growth, the model should incorporate a variety of measures of long-term earnings growth. This can be accomplished by averaging those measures of long-term growth that tend to be least influenced by capital allocation decisions that companies may make in response to near-term changes in the business environment. Because such decisions may directly affect near-term dividend payout ratios, estimates of earnings growth are more indicative of long-term investor expectations than are dividend growth estimates. Therefore, for the purposes of the Constant Growth DCF model, growth in EPS represents the appropriate measure of long-term growth.

Q. Please summarize the findings of academic research on the appropriate measure for estimating equity returns using the DCF model.

A. The relationship between various growth rates and stock valuation metrics has been the subject of much academic research.[62] As noted over 40 years ago by Charles Phillips in The Economics of Regulation:

> For many years, it was thought that investors bought utility stocks largely on the basis of dividends. More recently, however, studies

62 *See, for example,* Robert S. Harris, *Using Analysts' Growth Forecasts to Estimate Shareholder Required Rate of Return,* Financial Management, Spring 1986.

> indicate that the market is valuing utility stocks with reference to total per share earnings, so that the earnings-price ratio has assumed increased emphasis in rate cases.[63]

Phillips' conclusion continues to hold true. Subsequent academic research has clearly and consistently indicated that measures of earnings and cash flow are strongly related to returns, and that analysts' forecasts of growth are superior to other measures of growth in predicting stock prices.[64] For example, Vander Weide and Carleton state that, "[our] results…are consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy-and-sell decisions."[65] Other research specifically has noted the importance of analysts' growth estimates in determining the Cost of Equity, and in the valuation of equity securities. Dr. Robert Harris noted that "a growing body of knowledge shows that analysts' earnings forecasts are indeed reflected in stock prices."[66] Citing Cragg and Malkiel, Dr. Harris notes that those authors "found that the evaluations of companies that analysts make are the sorts of ones on which market valuation is based."[67] As Brigham, Shome and Vinson noted, "evidence in the current literature indicates that (i) analysts' forecasts are superior to

63 Charles F. Phillips, Jr., The Economics of Regulation, Revised Edition, 1969, Richard D. Irwin, Inc., at 285.

64 *See, for example*, Christofi, Christofi, Lori and Moliver, *Evaluating Common Stocks Using Value Line's Projected Cash Flows and Implied Growth Rate*, Journal of Investing (Spring 1999); Harris and Marston, *Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts*, Financial Management, 21 (Summer 1992); and Vander Weide and Carleton, *Investor Growth Expectations: Analysts vs. History*, The Journal of Portfolio Management, Spring 1988.

65 Vander Weide and Carleton, *Investor Growth Expectations: Analysts vs. History*, The Journal of Portfolio Management, Spring 1988.

66 Robert S. Harris, *Using Analysts' Growth Forecasts to Estimate Shareholder Required Rate of Return*, Financial Management, Spring 1986.

67 *Id*.

forecasts based solely on time series data; and (ii) investors do rely on analysts' forecasts."[68]

To that point, the research of Carleton and Vander Weide found earnings growth projections had a statistically significant relationship to stock valuation levels, whereas dividend growth rates did not.[69] Those findings suggest that investors form their investment decisions based on expectations of growth in earnings, not dividends. Consequently, earnings growth not dividend growth, is the appropriate estimate in the Constant Growth DCF model.

Q. Please summarize your inputs to the Constant Growth DCF model.

A. I applied the DCF model to the proxy group of natural gas utility companies using the following inputs for the price and dividend terms:

- The average daily closing prices for the 30-, 90-, and 180-trading days ended September 30, 2019 for the term P_0; and
- The annualized dividend per share as of September 30, 2019 for the term D_0.

I then calculated my DCF results using each of the following growth terms:

- The Zacks consensus long-term earnings growth estimates;
- The First Call consensus long-term earnings growth estimates;
- The Value Line long-term earnings growth estimates; and
- An estimate of retention growth.

68 Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility's Cost of Equity*, Financial Management, Spring 1985.

69 *See* Vander Weide and Carleton, *Investor Growth Expectations: Analysts vs. History*, The Journal of Portfolio Management, Spring 1988.

As explained below, I calculated a low, mean, and high DCF result for each proxy company (*see*, DEW Exhibit 2.2).

Q. Please describe the retention growth estimate as applied in your DCF model.

A. The Retention Growth model, which is a generally recognized and widely taught method of estimating long-term growth, is an alternative approach to the use of analysts' earnings growth estimates. The model estimates growth as a function of (1) expected earnings, and (2) the extent to which earnings are retained. In its simplest form, the model represents long-term growth as the product of the retention ratio (*i.e.*, the percentage of earnings not paid out as dividends (referred to below as "b") and the expected return on book equity (referred to below as "r")). Thus, the simple "b x r" form of the model projects growth as a function of internally generated funds. That form of the model is limiting, however, in that it does not provide for growth funded from external equity.

The "br + sv" form of the Retention Growth estimate used in my DCF analysis is meant to reflect growth from both internally generated funds (*i.e.*, the "br" term) and from issuances of equity (*i.e.*, the "sv" term). The first term, which is the product of the retention ratio (*i.e.*, "b", or the portion of net income not paid in dividends) and the expected Return on Equity (*i.e.*, "r") represents the portion of net income that is "plowed back" into the Company as a means of funding growth. The "sv" term is represented as:

$$\left(\frac{M}{B}\text{-}1\right) \text{ x Growth rate in Common Shares} \quad [6]$$

where $\frac{M}{B}$ is the Market-to-Book ratio. In this form, the "sv" term reflects an element of growth as the product of (a) the growth in shares outstanding, and (b) that portion of the

market-to-book ratio that exceeds unity. As shown in DEW Exhibit 2.3, all components of the Retention Growth model may be derived from data provided by Value Line.

Q. How did you calculate the mean high and mean low DCF results?

A. For each proxy company, I calculated the high DCF result by combining the maximum EPS growth rate estimate as reported by Value Line, Zacks, and First Call with the subject company's dividend yield. The mean high result simply is the average of those estimates. I used the same approach to calculate the low DCF result, using instead the minimum of the Value Line, Zacks, and First Call estimate for each proxy company, and calculating the average result for those estimates.

Q. What are the results of your Constant Growth DCF analysis?

A. My Constant Growth DCF results are summarized in Table 9 below (*see also,* DEW Exhibit 2.2).

Table 9: Mean Constant Growth DCF Results[70]

	Mean Low	Mean	Mean High
30-Day Average	7.51%	9.95%	13.98%
90-Day Average	7.51%	9.94%	13.97%
180-Day Average	7.58%	10.01%	14.05%

B. CAPM Analysis and Empirical CAPM Analysis

Q. Please briefly describe the general form of the CAPM analysis.

A. The CAPM analysis is a risk premium method that estimates the Cost of Equity for a given security as a function of a risk-free return plus a risk premium (to compensate investors for the non-diversifiable or "systematic" risk of that security). As shown in

70 DEW Exhibit 2.2.

Equation [6], the CAPM is defined by four components, each of which theoretically must be a forward-looking estimate:

$$K_e = r_f + \beta(r_m - r_f) \qquad [7]$$

where:

K_e = the required market ROE for a security;

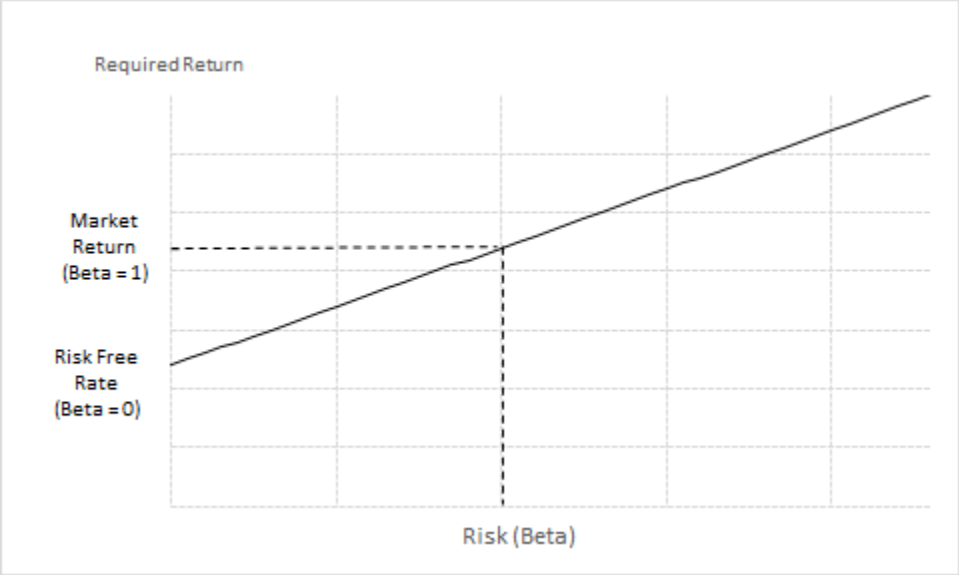
β = the Beta coefficient of that security;

r_f = the risk-free rate of return; and

r_m = the required return on the market as a whole.

Equation [6] describes the Security Market Line ("SML"), or the CAPM risk-return relationship, which is graphically depicted in Chart 9, below. The intercept is the risk-free rate (r_f), which has a Beta coefficient of zero, the slope is the expected Market Risk Premium ($r_m - r_f$). By definition, r_m, the return on the market has a Beta coefficient of 1.00. Under the CAPM, the expected Equity Risk Premium for a given security is proportional to its Beta coefficient.

Chart 9: Security Market Line



In Equation [6], the term $(r_m - r_f)$ represents the Market Risk Premium.[71] According to the theory underlying the CAPM, because unsystematic risk can be diversified away by adding securities to investment portfolios, the market will not compensate investors for bearing that risk. Therefore, investors should be concerned only with systematic or non-diversifiable risk. Non-diversifiable risk is measured by the Beta coefficient, which is defined as:

$$\beta_j = \frac{\sigma_j}{\sigma_m} \text{ x } \rho_{j,m} \quad [8]$$

where σ_j is the standard deviation of returns for company "j," σ_m is the standard deviation of returns for the broad market (as measured, for example, by the S&P 500 Index), and $\rho_{j,m}$ is the correlation of returns in between company j and the broad market. The Beta coefficient therefore represents both relative volatility (*i.e.*, the standard deviation) of

71 The Market Risk Premium is defined as the incremental return of the market portfolio over the risk-free rate.

returns, and the correlation in returns between the subject company and the overall market.

Intuitively, companies with higher Beta coefficients have had more volatile returns and have moved more closely with the overall market. The implication is that a company with a Beta coefficient of 1.00 is as risky as the overall market; companies with Beta coefficients less than 1.00 are less risky, and those whose Beta coefficients are greater than 1.00 have greater risk than the overall market.

Q. What assumptions did you include in your CAPM analysis?

A. Because utility assets represent long duration investments, I used two different measures of the risk-free rate: (1) the current 30-day average yield on 30-year Treasury bonds (2.11 percent)[72]; and (2) the near-term projected 30-year Treasury yield (2.28 percent).[73]

Q. Why have you relied on the 30-year Treasury yield for your CAPM analysis?

A. In determining the risk-free rate, it is important to select the term (or maturity) that best matches the life of the underlying investment. Natural gas distribution utilities typically are long-duration investments and as such, the 30-year Treasury yield is most suitable for the purpose of calculating the Cost of Equity.

Q. Please describe your *ex-ante* (*i.e.*, forward-looking) approach to estimating the Market Risk Premium.

A. The approach is based on the market required return, less the current 30-year Treasury yield. To estimate the market required return, I calculated the market capitalization weighted average ROE based on the Constant Growth DCF model. To do so, I relied on

72 Source: Bloomberg Professional.
73 Source: Blue Chip Financial Forecast, Vol. 38, No. 5, October 1, 2019, at 2.

data from two sources: (1) Bloomberg; and (2) Value Line. With respect to Bloomberg-derived growth estimates, I calculated the expected dividend yield (using the same one-half growth rate assumption described earlier), and combined that amount with the projected earnings growth rate to arrive at the market capitalization weighted average DCF result. I performed that calculation for each of the S&P 500 companies for which Bloomberg provided consensus growth rates. I then subtracted the current 30-year Treasury yield from that amount to arrive at the market DCF-derived *ex-ante* market risk premium estimate. In the case of Value Line, I performed the same calculation, again using all companies for which five-year earnings growth rates were available. The results of those calculations are provided in DEW Exhibit 2.4.

Q. How did you apply your expected Market Risk Premium and risk-free rate estimates?

A. I relied on the *ex-ante* Market Risk Premia discussed above, together with the current and near-term projected 30-year Treasury yields as inputs to my CAPM analyses.

Q. What Beta coefficient did you use in your CAPM model?

A. As shown in DEW Exhibit 2.5, I considered Beta coefficients reported by two sources, Bloomberg and Value Line. Although both services adjust their calculated (or "raw") Beta coefficients to reflect the tendency to regress to the market mean of 1.00, Value Line calculates the Beta coefficient over a five-year period, whereas Bloomberg's calculation is based on two years of data.

Q. What are the results of your CAPM analysis?

A. As shown in Table 10, below, the CAPM analyses suggest an ROE range of 9.14 percent to 10.58 percent (*see also,* DEW Exhibit 2.6).

Table 10: Summary of CAPM Results[74]

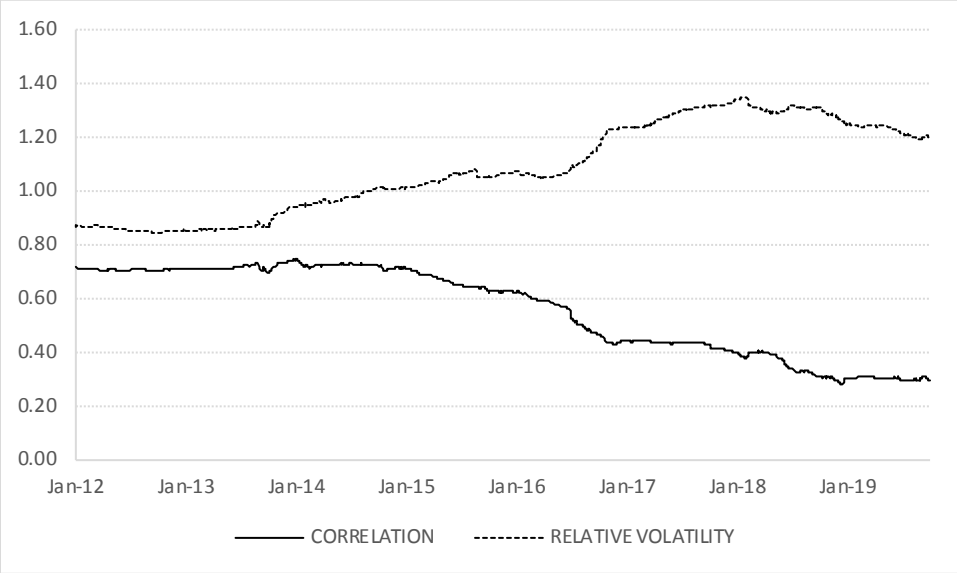
	Bloomberg Derived Market Risk Premium	Value Line Derived Market Risk Premium
Average Bloomberg Beta Coefficient		
Current 30-Year Treasury (2.11%)	9.14%	9.30%
Near Term Projected 30-Year Treasury (2.28%)	9.31%	9.47%
Average Value Line Beta Coefficient		
Current 30-Year Treasury (2.11%)	10.22%	10.41%
Near Term Projected 30-Year Treasury (2.28%)	10.40%	10.58%

Q. Does the recent decline in the proxy group average Beta coefficient imply a decrease in risk relative to the market?

A. Not necessarily. Although the proxy group average Beta coefficient reported by Bloomberg has fallen from approximately 0.72 in 2014 to 0.58 in September 2019, as Chart 10, below, demonstrates, when the Beta coefficient is deconstructed into its components shown in Equation [8] above, we see that the correlation between the proxy group companies and the S&P 500 has declined, while the relative risk has increased. Given that the correlation between the proxy group companies and the S&P 500 has declined since 2014, while the relative risk has increased, the CAPM in the form presented here may not adequately reflect the expected systematic risk, and therefore, the returns required by investors in low-Beta coefficient companies such as utilities.

74 DEW Exhibit 2.6.

Chart 10: Components of Beta Coefficients Over Time[75]



Q. Did you consider another form of the CAPM in your analysis?

A. Yes. I also included the ECAPM approach, which calculates the product of the adjusted Beta coefficient and the Market Risk Premium, and applies a weight of 75.00 percent to that result. The model then applies a 25.00 percent weight to the Market Risk Premium, without any effect from the Beta coefficient.[76] The results of the two calculations are summed, along with the risk-free rate, to produce the ECAPM result, as noted in Equation [9] below:

$$k_e = r_f + 0.75\beta(r_m - r_f) + 0.25(r_m - r_f) \qquad [9]$$

where:

k_e = the required market ROE.

β = Adjusted Beta coefficient of an individual security.

r_f = the risk-free rate of return.

75 Calculated as an index. Source: S&P Global Market Intelligence.
76 *See, e.g.*, Roger A. Morin, New Regulatory Finance, 189-90 (2006).

r_m = the required return on the market as a whole.

Q. What is the benefit of the ECAPM approach?

A. The ECAPM addresses the tendency of the CAPM to under-estimate the Cost of Equity for companies, such as regulated utilities, with low Beta coefficients. As discussed below, the ECAPM recognizes the results of academic research indicating that the risk-return relationship is different (in essence, flatter) than estimated by the CAPM, and that the CAPM under-estimates the alpha, or the constant return term.[77]

Numerous tests of the CAPM have measured the extent to which security returns and Beta coefficients are related as predicted by the CAPM. The ECAPM method reflects the finding that the actual Security Market Line (SML) described by the CAPM formula is not as steeply sloped as the predicted SML.[78] Fama and French state that "[t]he returns on the low beta portfolios are too high, and the returns on the high beta portfolios are too low."[79] Similarly, Morin states:

> With few exceptions, the empirical studies agree that . . . low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted. . . .
>
> Therefore, the empirical evidence suggests that the expected return on a security is related to its risk by the following approximation:
>
> $$K = R_F + x(R_M - R_F) + (1-x)\ \beta(R_M - R_F)$$
>
> where x is a fraction to be determined empirically. The value of x that best explains the observed relationship Return = 0.0829 + 0.0520 β is between 0.25 and 0.30. If x = 0.25, the equation becomes:

77 *Id.*, at 191 ("The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks.").

78 *Id.*, at 175. The Security Market Line plots the CAPM estimate on the Y-axis, and Beta coefficients on the X-axis.

79 Eugene F. Fama & Kenneth R. French, *The Capital Asset Pricing Model: Theory and Evidence*, Journal of Economic Perspectives, Vol. 18, No. 3, Summer 2004, at 33.

$$K = R_F + 0.25(R_M - R_F) + 0.75\ \beta(R_M - R_F)$$ [80]

Some analysts claim that using adjusted Beta coefficients addresses the empirical issues with the CAPM by increasing the expected returns for low Beta coefficient stocks and decreasing the returns for high Beta coefficient stocks, concluding that there is no need for the ECAPM approach. I disagree with that conclusion. Beta coefficients are adjusted because of their general regression tendency to converge toward 1.00 over time, *i.e.*, over successive calculations. As also noted earlier, numerous studies have determined that at any given point in time, the SML described by the CAPM formula is not as steeply sloped as the predicted SML. To that point, Morin states:

> Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend, an ECAPM analysis results in double-counting. This argument is erroneous. Fundamentally, the ECAPM is not an adjustment, increase or decrease, in beta. This is obvious from the fact that the expected return on high beta securities is actually lower than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks. Even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to Figure 6-1, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary. [81]

Therefore, it is appropriate to rely on adjusted Beta coefficients in both the CAPM and ECAPM. As with the CAPM, my application of the ECAPM uses the Market DCF-derived *ex-ante* Market Risk Premium estimate, the current yield on 30-year Treasury

80 Roger A. Morin, New Regulatory Finance, 175, 190 (2006).
81 *Id.*, at 191.

securities as the risk-free rate, and two estimates of the Beta coefficient. The results of my ECAPM analyses are shown in DEW Exhibit 2.6 and summarized in Table 11, below.

Table 11: Summary of ECAPM Results[82]

	Bloomberg Derived Market Risk Premium	**Value Line Derived Market Risk Premium**
Average Bloomberg Beta Coefficient		
Current 30-Year Treasury (2.11%)	10.40%	10.59%
Near Term Projected 30-Year Treasury (2.28%)	10.57%	10.76%
Average Value Line Beta Coefficient		
Current 30-Year Treasury (2.11%)	11.22%	11.43%
Near Term Projected 30-Year Treasury (2.28%)	11.39%	11.60%

C. Bond Yield Plus Risk Premium Approach

Q. Please generally describe the Bond Yield Plus Risk Premium approach.

A. This approach is based on the basic financial principle that because equity investors bear the residual risk associated with ownership, they require a premium over the return they would have earned as a bondholder. That is, because returns to equity holders are more risky than returns to bondholders, equity investors must be compensated for bearing that additional risk. Risk premium approaches, therefore, estimate the Cost of Equity as the sum of the equity risk premium and the yield on a particular class of bonds. As noted in my discussion of the CAPM, because the equity risk premium is not directly observable, it typically is estimated using a variety of approaches, some of which incorporate *ex-ante*,

82 DEW Exhibit 2.6.

or forward-looking estimates of the Cost of Equity, and others that consider historical, or *ex-post*, estimates. An alternative approach is to use actual authorized returns for natural gas utilities to estimate the Equity Risk Premium.

Q. Please explain how you performed your Bond Yield Plus Risk Premium analysis.

A. As suggested above, I first defined the Risk Premium as the difference between the authorized ROE and the then-prevailing level of the long-term (*i.e.*, 30-year) Treasury yield. I then gathered data for 1,123 natural gas utility rate proceedings between January 1980 and September 30, 2019. In addition to the authorized ROE, I also calculated the average period between the filing of the case and the date of the final order (the "lag period"). To reflect the prevailing level of interest rates during the pendency of the proceedings, I calculated the average 30-year Treasury yield over the average lag period (approximately 187 days).

Because the data covers multiple economic cycles, the analysis also may be used to assess the stability of the Equity Risk Premium. Prior research, for example, has shown that the Equity Risk Premium is inversely related to the level of interest rates.[83] That analysis is particularly relevant given the relatively low, but increasing level of current Treasury yields.

[83] *See, for example*, Robert S. Harris and Felicia C. Marston, *Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts*, Financial Management, (Summer 1992), at 63-70; Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility's Cost of Equity*, Financial Management, (Spring 1985), at 33-45; and Farris M. Maddox, Donna T. Pippert, and Rodney N. Sullivan, *An Empirical Study of Ex Ante Risk Premiums for the Electric Utility Industry*, Financial Management, (Autumn 1995), at 89-95.

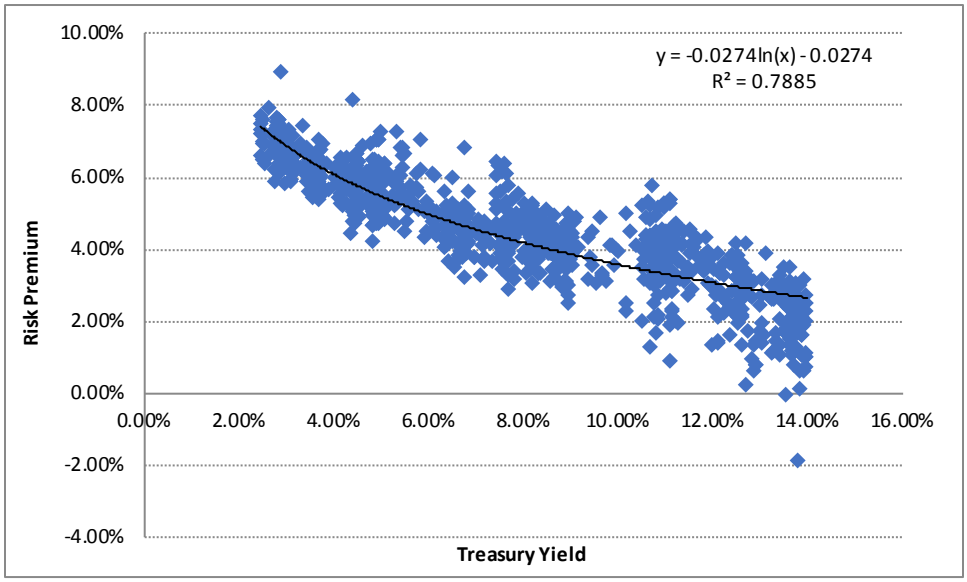
Q. How did you model the relationship between interest rates and the Equity Risk Premium?

A. The basic method used was regression analysis, in which the observed Equity Risk Premium is the dependent variable, and the average 30-year Treasury yield is the independent variable. Relative to the long-term historical average, the analytical period includes interest rates and authorized ROEs that are quite high during one period (*i.e.*, the 1980s) and that are quite low during another (*i.e.*, the post-Lehman bankruptcy period). To account for that variability, I used the semi-log regression, in which the Equity Risk Premium is expressed as a function of the natural log of the 30-year Treasury yield:

$$RP = \alpha + \beta\left(LN(T_{30})\right) \quad [10]$$

As shown on Chart 11, below, the semi-log form is useful when measuring an absolute change in the dependent variable (in this case, the Risk Premium) relative to a proportional change in the independent variable (the 30-year Treasury yield).

Chart 11: Equity Risk Premium[84]



84 DEW Exhibit 2.7.

As Chart 11 illustrates, the Equity Risk Premium increases as interest rates fall. That finding, that there is an inverse relationship between interest rates and the Equity Risk Premium is supported by published research. For example, Dr. Roger Morin notes that: "… [p]ublished studies by Brigham, Shome, and Vinson (1985), Harris (1986), Harris and Marston (1992, 1993), Carleton, Chambers, and Lakonishok (1983), Morin (2005), McShane (2005), and others demonstrate that, beginning in 1980, risk premiums varied inversely with the level of interest rates - rising when rates fell and declining when interest rates rose."[85] Consequently, simply applying the long-term average Equity Risk Premium of 4.70 percent would significantly understate the Cost of Equity and produce results well below any reasonable estimate. Based on the regression coefficients in Chart 11, however, the implied ROE is between 9.96 percent and 10.01 percent (*see*, Table 12, below, and DEW Exhibit 2.7).

Table 12: Summary of Bond Yield Plus Risk Premium Results[86]

	Return on Equity
Current 30-Year Treasury (2.92%)	9.96%
Near-Term Projected 30-Year Treasury (3.08%)	9.91%
Long-Term Projected 30-Year Treasury (4.05%)	10.01%

D. Expected Earnings Analysis

Q. Please describe the Expected Earnings analysis.

A. The Expected Earnings analysis is based on the principle of opportunity costs. Because investors may invest in, and earn returns on alternative investments of similar risk, those

85 Roger A: Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, at 128 [clarification added]
86 DEW Exhibit 2.7.

rates of return can provide a useful benchmark in determining the appropriate rate of return for a firm. Further, because those results are based solely on the returns expected by investors, exclusive of market-data or models, the Expected Earnings approach provides a direct comparison.

Q. Please explain how the Expected Earnings analysis is conducted.

A. The Expected Earnings analysis typically takes the actual earnings on book value of investment for each of the members of the proxy group and compares those values to the rate of return in question. Although the traditional approach uses data based on historical accounting records, it is common to use forecasted data in conducting the analysis. Projected returns on book investment are provided by various industry publications (*e.g.*, Value Line), which I have used in my analysis.

I relied on Value Line's projected Return on Common Equity for the period 2022-2024, and adjusted those projected returns to account for the fact that they reflect common shares outstanding at the end of the period, rather than the average shares outstanding over the course of the year.[87] The results range from 9.08 percent to 12.09 percent, with an average value of 10.73 percent and median value of 10.24 percent (*see*, DEW Exhibit 2.8).

87 The rationale for that adjustment is straightforward: Earnings are achieved over the course of a year, and should be related to the equity that was, on average, in place during that year. *See,* Leopold A. Bernstein, Financial Statement Analysis: Theory, Application, and Interpretation, Irwin, 4th Ed., 1988, at 630.

Commonwealth of Massachusetts)

) ss.

County of Worcester)

I, Robert B. Hevert, being first duly sworn on oath, state that the answers in the foregoing written testimony are true and correct to the best of my knowledge, information and belief. Except as stated in the testimony, the exhibits attached to the testimony were prepared by me or under my direction and supervision, and they are true and correct to the best of my knowledge, information and belief. Any exhibits not prepared by me or under my direction and supervision are true and correct copies of the documents they purport to be.

Robert B. Hevert

SUBSCRIBED AND SWORN TO this November 1, 2019.

Notary Public

KIMBERLY H. DAO
NOTARY PUBLIC
COMMONWEALTH OF MASSACHUSETTS
MY COMM. EXPIRES MARCH 11, 2022