UNITIL ENERGY SYSTEMS, INC.

DIRECT TESTIMONY

OF

JENNIFER E. NELSON

EXHIBIT JEN-1

New Hampshire Public Utilities Commission

Docket No. DE 21-030

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I. INTRODUCTION & PURPOSE

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

A. My name is Jennifer E. Nelson. I am an Assistant Vice President at Concentric Energy Advisors. My business address is 293 Boston Post Road West, Suite 500, Marlborough, Massachusetts, 01742.

Q. On whose behalf are you submitting this testimony?

A. I am submitting this direct testimony ("Direct Testimony") before the New Hampshire Public Utilities Commission ("Commission") on behalf of Unitil Energy Systems, Inc. ("UES" or the "Company").

Q. Please describe your professional experience and educational background.

A. I have worked in the energy industry for nearly thirteen years, having served as a consultant and energy/regulatory economist for state government agencies. Since 2013, I have provided consulting services to utility and regulated energy clients on a range of financial and economic issues including rate case support (*e.g.*, cost of capital and integrated resource planning) and policy and strategy issues (*e.g.*, alternative ratemaking and natural gas distribution expansion). Prior to consulting, I was a staff economist at the Massachusetts Department of Public Utilities, where I worked on regulatory filings related to energy efficiency, renewable power contracts, smart grid and electric grid modernization, and retail choice; prior to that, I was a petroleum economist at the State of Alaska Department of Revenue.

I hold a Bachelor's degree in Business Economics from Bentley College (now Bentley University) and a Master's degree in Resource and Applied Economics from the University of Alaska.

A summary of my professional and educational background, including a list of my testimony filed before regulatory commissions, is included as Exhibit JEN-2.

Q. Have you previously submitted testimony to the New Hampshire Public Utilities Commission?

A. No, I have not. However, I have previously filed testimony before regulatory commissions in Arkansas, Kentucky, Maine, New Mexico, Texas, and West Virginia. During my time as a consultant, I have supported the development of expert witness testimony and analyses regarding the Return on Equity ("ROE")[1] and capital structure for regulated utilities in more than 100 proceedings filed before numerous U.S. state regulatory commissions and the Federal Energy Regulatory Commission.

Q. What is the purpose of your Direct Testimony?

A. The purpose of my Direct Testimony is to present evidence and provide the Commission with a recommendation regarding UES's ROE and to assess the reasonableness of the Company's requested capital structure. My analyses and conclusions are supported by the data presented in Exhibit JEN-3 through Exhibit JEN-10.

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1 Throughout my testimony, I interchangeably use the terms "ROE" and "Cost of Equity."

Q. Were your testimony and exhibits prepared by you or under your direction?

A. Yes.

II. SUMMARY AND OVERVIEW OF TESTIMONY

Q. What are your conclusions regarding the appropriate Cost of Equity and capital structure for UES?

A. My analyses indicate that UES's Cost of Equity currently is in the range of 9.90 percent to 10.50 percent. Based on the quantitative and qualitative analyses discussed throughout my Direct Testimony, and considering UES's risk profile and the current volatile capital market environment, I conclude that an ROE of 10.20 percent is reasonable and appropriate. Further, I conclude that the Company's requested capital structure consisting of 52.91 percent common equity, 0.10 percent preferred equity, 46.99 percent long-term debt, and 0.00 percent short-term debt is reasonable and should be used for ratemaking purposes.

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

A. The Cost of Equity, which is the return required by equity investors to assume the risks of ownership, is a market-based concept. Because it is not directly observable, the Cost of Equity is estimated based on financial models that rely on market data. Since all financial models are subject to various assumptions and constraints, equity analysts and investors tend to use multiple methods to develop their return requirements. As such, I relied on three widely accepted approaches to develop my ROE determination: (1) the constant growth and quarterly forms of the 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. The results of those analytical approaches are summarized in Table 1 below.

Table 1: Summary of Results[2]

Constant Growth DCF	**Low**	**Mean**	**High**
30-Day Average	8.45%	9.20%	9.83%
90-Day Average	8.44%	9.06%	9.75%
180-Day Average	8.48%	9.09%	9.84%
Quarterly Growth DCF	**Low**	**Mean**	**High**
30-Day Average	8.55%	9.29%	9.99%
90-Day Average	8.52%	9.14%	9.91%
180-Day Average	8.55%	9.21%	9.99%
***Value Line*-based CAPM**		**Current 30-Year Treasury Yield (1.97%)**	**Projected 30-Year Treasury Yield (2.72%)**
Proxy Group Average		12.82%	12.91%
Proxy Group Median		12.48%	12.59%
***Value Line*-based Empirical CAPM**		**Current 30-Year Treasury Yield (1.97%)**	**Projected 30-Year Treasury Yield (2.72%)**
Proxy Group Average		13.20%	13.27%
Proxy Group Median		12.95%	13.03%
Bond Yield Plus Risk Premium			
Current 30-Year Treasury Yield (1.97%)		9.89%	
Projected 30-Year Treasury Yield (2.72%)		9.80%	

2 *See*, Exhibits JEN-3, JEN-4, JEN-6, JEN-7. DCF model results represent the average of the mean and median proxy group results.

In addition to the methods noted above, I considered the Company's small size relative to the proxy group and its proposed revenue decoupling mechanism in my recommendation. I also considered the currently unstable capital market and macroeconomic environment in which utilities such as UES operate. Although those factors are relevant to investors, their effect on the Company's Cost of Equity cannot be directly quantified. Therefore, rather than make explicit adjustments to my ROE estimates in connection with those factors, I considered them in determining where the Company's Cost of Equity falls within the range of analytical results.

Q. How did you determine your recommended range from the methods and results summarized above?

A. As noted earlier, the Cost of Equity is not directly observable and must be estimated based on both quantitative and qualitative information. As my Direct Testimony explains, no single model is more reliable than all others under all market conditions. All models used to estimate the Cost of Equity are subject to certain assumptions, which may become more or less relevant as market conditions change. Each model's results must be assessed in the context of current and expected capital market conditions, as well as relative to appropriate benchmarks. Consequently, many finance texts recommend using multiple approaches to estimate the Cost of Equity.[3] Because estimating the Cost of Equity is an approximation of investor behavior and cannot be precisely quantified, analysts and investors gather and evaluate relevant data from a wide variety of sources

[3] *See, for example*, 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.

and rely on multiple analytical approaches. The use of various financial models provides different perspectives on investor return requirements, which enables a more robust and comprehensive assessment of the Cost of Equity.

Simply, each model has its strengths and weaknesses, and it is important to recognize those differences when estimating the Cost of Equity. For example, the Constant Growth DCF model requires constant assumptions, inputs, and results in perpetuity, while Risk Premium-based methods provide the ability to reflect investors' views of risk, future market returns, and the relationship between interest rates and the Cost of Equity. Other Risk Premium approaches (*e.g.*, the Bond Yield Plus Risk Premium approach) reflect the well-documented finding that the Cost of Equity does not move in lockstep with interest rates.

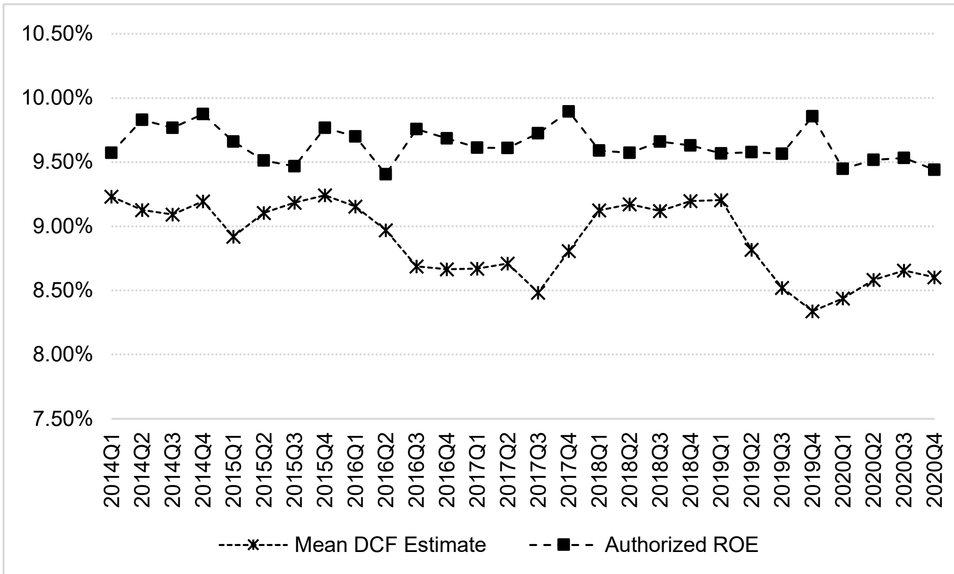
My recommendation therefore recognizes that estimating the Cost of Equity is not an entirely mathematical exercise. It relies on both quantitative and qualitative data and analyses, all of which are used to inform the judgment that necessarily must be applied in determining the Cost of Equity for a particular company at a particular time. As such, I considered my analytical results in the context of Company-specific factors and current capital market conditions. The wide range of analytical results summarized in Table 1 above reflect the considerable uncertainty surrounding the scope and duration of the current economic and capital market associated with the COVID-19 pandemic. In developing my recommendation, I considered the quantitative results produced by each model and their comparability to returns available to other similarly-situated electric utilities, as well as each model's consistency with, and reflection of, the current capital market environment.

As discussed below, the DCF model may not be producing reasonable results for the proxy group in the current market environment. Because Risk Premium-based methods more directly reflect increased risk associated with market volatility and uncertainty, it is reasonable to give more weight to Risk premium-based estimates than to the DCF-based estimates. Nonetheless, even if each of the analytical results shown in Table 1 are given equal weight – including the low and high estimates – the average is 10.29 percent. Although current market conditions suggest the investor-required ROE now falls toward the higher end of my recommended range, I conclude an ROE of 10.20 percent, within a range of 9.90 percent to 10.50 percent, is conservative and reasonably reflects the market uncertainty reflected in methods on which investors rely.

Q. Why do you believe the Constant Growth DCF model does not provide an accurate estimate of UES's Return on Equity?

A. As discussed below, the period over which my analyses were performed included market data that were inconsistent with that model's fundamental assumptions and produced results that are not consistent with current capital market conditions. Since 2014, the DCF model has produced results (*i.e.,* mean results) consistently and meaningfully below authorized returns (*see*, Chart 1, below). That data suggests state regulatory commissions have recognized the DCF model's mean results are not necessarily reliable estimates of the Cost of Equity, and that other methods should be given meaningful weight in determining the ROE.

Chart 1: Mean DCF Results vs. Authorized ROE Over Time[4]



Q. Have other state regulatory commissions declined to rely on the DCF model results?

A. Yes. For example, in its June 2018 *Order Accepting Stipulation* in which it authorized a 9.90 percent ROE for Duke Energy Carolinas, the North Carolina Utilities Commission noted it "carefully evaluated the DCF analysis recommendations" of the ROE witnesses (which ranged from 8.45 percent to 8.80 percent) and determined that "all of these DCF analyses in the current market produce unrealistically low results."[5]

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4 DCF results are based on quarterly average stock prices and the average projected Earnings Per Share growth rate from *Value Line*, Zacks, and First Call for all companies classified as electric utilities by *Value Line*. Authorized ROEs are quarterly averages. Source: S&P Global Market Intelligence.

5 State of North Carolina Utilities Commission, Docket No. E-7, Sub 1146, In the Matter of Application of Duke Energy Carolinas, LLC, for Adjustment of Rates and Charges Applicable to Electric Utility Service in North Carolina, Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction, June 22, 2018, at 62.

Q. Are there aspects of the DCF model that may explain why the Commission should not rely principally on it when determining the Cost of Equity?

A. Yes, the DCF model's underlying structure and assumptions are not compatible with the recent capital market and economic environment. In particular, the dividend yield component and the expected growth rate component of the DCF model are theoretically and fundamentally linked. In one sense, relatively low dividend yields should be associated with relatively high growth rates. That is, relatively low dividend yields are the result of relatively high stock prices which, in turn, should be associated with relatively high growth rates. If those relationships do not hold, the model's results should be viewed with some caution.

In recent years, the Price/Earnings ratio for the proxy group has been above its long-term average (*see*, Chart 2 below), indicating higher valuations that produce lower dividend yields (*see*, Chart 3 below).

Chart 2: Proxy Group Price/Earnings Ratio (1997-2021)[6]

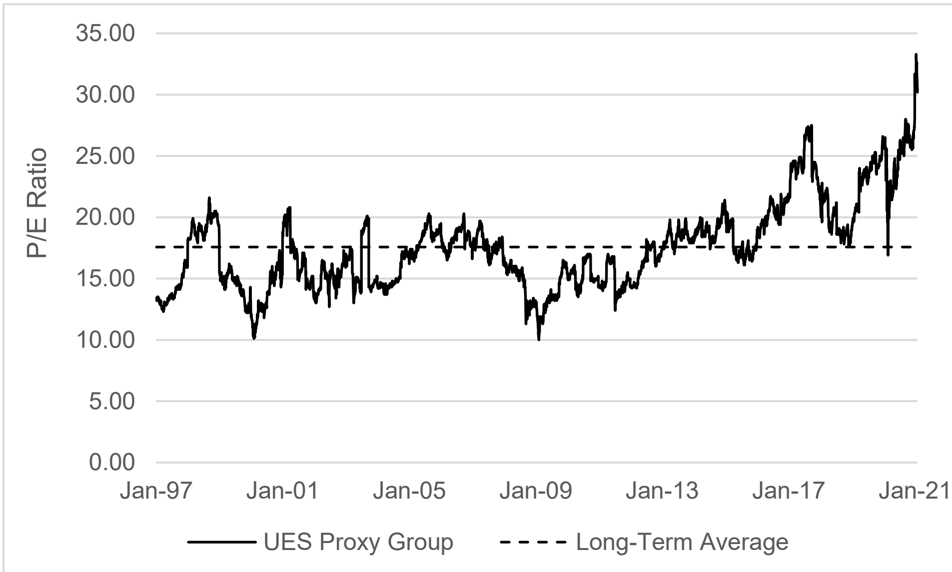

Chart 3: Proxy Group Dividend Yield (1997-2021)[7]

6 Source: S&P Global Market Intelligence. Proxy group calculated as an index.
7 Source: S&P Global Market Intelligence. Proxy group calculated as an index.

However, the average proxy group growth rate applied in my DCF analyses (5.39 percent[8]) is below the arithmetic average capital appreciation[9] rate (6.28 percent) for the proxy group between the end of 1996 and the end of 2020.[10] From that perspective, the fundamental relationship between the dividend yield and growth rates under the DCF model may not currently hold for the proxy group. Stated differently, relatively high stock prices (and therefore relatively low dividend yields) and relatively low growth rates have combined to produce DCF results that are inconsistent with the fundamental theory underlying the model.

Moreover, the DCF model assumes investors use its fundamental structure to find the "intrinsic" value of stock, that is, the price they are willing to pay.[11] In practice, investors also consider relative valuation multiples – Price/Earnings, Market/Book, Enterprise Value/EBITDA[12] – in their buying and selling decisions. They do so because no single financial model produces the most accurate measure of fundamental value, or the most reliable estimate of the Cost of Equity, at all times.

Whereas the Constant Growth and Quarterly Growth DCF models assume existing capital market conditions will remain constant, Risk Premium based methods more directly reflect the volatile capital market environment described in Section III.B. below. Because the DCF model's underlying fundamental relationship may not currently hold

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[8] *See* Exhibit JEN-3 and Exhibit JEN-4.
[9] Under the Constant Growth DCF model's assumptions, the growth rate equals the rate of capital appreciation. *See, e.g.,* Roger A. Morin, Ph.D., New Regulatory Finance, at 256 (2006).
[10] Source: S&P Global Market Intelligence. Proxy group calculated as an index.
[11] *See*, Equations [1] and [2].
[12] Earnings Before Interest, Taxes, Depreciation, and Amortization.

for the proxy group, I conclude it should be given less weight than other methods in determining the Company's ROE. Regardless of the method employed, however, an authorized ROE that is well below returns authorized for other utilities: (1) runs counter to the *Hope*[13] and *Bluefield*[14] "comparable risk" standard; and (2) would make it difficult for the Company to compete for capital at reasonable terms, placing it at a competitive disadvantage.

Q. Is it your view that the DCF model should be given no weight in determining the company's Cost of Equity?

A. No, it is not. It is my view, however, that we should carefully consider the range of results the model produces in arriving at ROE recommendations. Considering the potential disconnect in the fundamental relationship between the current proxy group dividend yield and growth rates, if the Commission gives weight to the DCF model, it is my opinion that more weight should be given to the upper end of the DCF results.

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

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

- <u>Section III</u> – Provides a summary of issues and regulatory guidelines regarding Cost of Equity estimation in regulatory proceedings, discusses the current capital market conditions and their effect on UES's Cost of Equity, explains my selection of the

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13 *See, Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944).

14 *See, Bluefield Waterworks & Improvement Co., v. Public Service Commission of West Virginia*, 262 U.S. 679, 692-93 (1923); and *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944).

proxy group used to develop my analytical results, and describes my analyses on which my ROE determination is based;

- Section IV – Discusses the specific business risks that have a direct bearing on UES's Cost of Equity;
- Section V – Assesses the Company's requested capital structure; and
- Section VI – Summarizes my conclusions and recommendations.

III. COST OF EQUITY ESTIMATION

A. Regulatory Guidelines and Financial Considerations

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 that investors require to make an equity investment in a firm. Investors will provide funds to a firm only if the return they *expect* is equal to, or greater than, the return they *require* to accept the risk of providing 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" as measures of those costs; 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, represents a forgone opportunity to invest in alternative assets. For any investment to be sensible, its expected return must be at least equal to the return expected on alternative, comparable risk investment opportunities. Because investments with similar risks should offer similar returns, the opportunity cost of an investment should equal the return available on an investment of comparable risk. In that important respect, the returns required by debt and equity investors represent a cost to the Company.

Although both debt and equity have required costs, they differ in 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. 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 the "residual risk," they take greater risks and require higher returns than debt holders. In essence, 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 applied to various financial models. As discussed throughout my Direct Testimony, each of those models is subject to certain assumptions, which may be more or less applicable under differing market conditions. Because the Cost of Equity is premised on opportunity costs, the models are typically 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 the model results all require the application of reasoned judgment. That judgment should consider data and information that is 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 the subject company's 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, or its expected growth, relative to other utilities. That is, although utilities may be viewed as a "sector," not all require the same return.

Q. Please briefly summarize the guidelines established by the United States Supreme Court (the "Supreme Court") for the purpose of determining the Return on Equity.

A. The Supreme 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.* ("*Bluefield*");[15] and (2) *Federal Power Comm'n v. Hope Natural Gas Co.* ("*Hope*").[16] In *Bluefield*, the Court stated:

> A public utility is entitled to such rates as will permit it to earn a return upon the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit, and enable it to raise the money necessary for the proper discharge of its public duties[17]

The Supreme Court therefore recognized that: (1) a regulated public utility cannot remain financially sound unless the return it is allowed to earn on its invested capital is at least

[15] *Bluefield Water Works and Improvement Co. v. Public Service Comm'n.*, 262 U.S. 679, 692 (1923).
[16] *Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944).
[17] *Bluefield Water Works and Improvement Co. v. Public Service Comm'n.*, 262 U.S. 679, 692 (1923).

equal to the Cost of Capital (the principle relating to the demand for capital); and (2) a regulated public utility will not be able to attract capital if it does not offer investors an opportunity to earn a return on their investment equal to the return they expect to earn on other investments of similar risk (the principle relating to the supply of capital).

In *Hope*, the Supreme Court reiterates the financial integrity and capital attraction principles of the *Bluefield* case:

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock... By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.[18]

In summary, the Supreme Court has recognized that the fair rate of return on 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. Intuitively, a fair rate of return satisfies all three standards.

Q. Does New Hampshire precedent provide similar guidance?

A. Yes. The Commission's decision in Order No. 26,007 stated that in determining just and reasonable rates, the Commission "balance[s] the interests of the customers' desire to pay no higher rates than reasonably necessary and the investors' right to earn a reasonable

[18] *Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944).

return on their investment."[19] Furthermore, the Commission's decision in Order No. 24,972 indicates that the Commission adheres to the capital attraction standard articulated in the *Hope* and *Bluefield* decisions.[20] Order No. 24,972 also states that the Commission is:

> [B]ound to set a rate of return that falls within a zone of reasonableness, neither so low to result in a confiscation of company property, nor so high as to result in extortionate charges to customers. A rate falling within that zone should, at a minimum, be sufficient to yield the cost of debt and equity capital necessary to provide the assets required for the discharge of the company's responsibility.[21]

Based on those standards, the authorized ROE should provide the Company with the opportunity (which is not a guarantee) to earn a fair and reasonable return and 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 capital at reasonable terms?

A. A return that is adequate to attract capital at reasonable terms enables the utility to provide safe and reliable 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 for investments of equivalent risk.

The ratemaking process is based on the principle that, for investors and companies to commit the capital needed to provide safe and reliable utility services, the utility must

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[19] Unitil Energy Systems, Inc., *Petition for Distribution Rate Increase*, Docket No. DE 16-384, Order No. 26,007, at 17 (April 20, 2017).

[20] *See*, EnergyNorth Natural Gas, Inc. d/b/a National Grid NH, *Notice of Intent to File Rate Schedules*, Docket No. DG 08-009, Order No. 24,972, at 54-55 (May 29, 2009).

[21] *Ibid.*, at 54. *See also*, *Appeal of Conservation Law Foundation*, 127 N.H. 606 (N.H. 1986).

have the opportunity to recover the return of, and the market-required return on, invested capital. The allowed ROE should enable the subject utility to maintain its financial integrity in a variety of economic and capital market conditions. In order to preserve and enhance service reliability, UES must generate adequate cash flow from operations and have efficient access to external capital needed to undertake its capital investment plan regardless of the economic and capital market conditions at the time. A return that is adequate to attract capital at reasonable terms enables the utility to provide safe, reliable service while maintaining its financial soundness.

Further, the financial community carefully monitors utility companies' current and expected financial conditions, as well as the regulatory environment in which those companies operate. In that respect, the regulatory environment is one of the most important factors considered in both debt and equity investors' assessments of risk.[22] That consideration is especially important during uncertain economic and financial conditions in which the utility may require access to capital markets.

The outcome of the Commission's order in this case, therefore, should provide UES with the opportunity to earn an ROE that enables the Company to attract capital at reasonable terms in a variety of market environments, ensures its financial integrity, and is commensurate with returns on investments in enterprises having corresponding risks. To the extent UES is provided a reasonable opportunity to earn its market-based Cost of Equity, neither customers nor shareholders are disadvantaged. In fact, a return that is

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22 *See*, *e.g.*, Moody's Investor Service, *Rating Methodology: Regulated Electric and Gas Utilities*, June 23, 2017, at 4.

adequate to attract capital at reasonable terms enables UES to provide safe, reliable service while maintaining its financial integrity.

Q. Does the regulatory environment influence utilities' efficient access to capital?

A. Yes, it does. The regulatory environment is a key driver of investors' risk assessment for utilities. Investors and rating agencies understand that a constructive regulatory environment is critical to support utilities' credit ratings and financial integrity, especially during adverse market conditions.

Moody's Investors Service ("Moody's") considers the regulatory structure to be so important that 50.00 percent of the factors that weigh in a ratings determination are related to the nature of regulation.[23] Among the factors considered by Moody's in assessing the regulatory framework are the predictability and consistency of regulatory actions:

> As the revenues set by the regulator are a primary component of a utility's cash flow, the utility's ability to obtain predictable and supportive treatment within its regulatory framework is one of the most significant factors in assessing a utility's credit quality. The regulatory framework generally provides more certainty around a utility's cash flow and typically allows the company to operate with significantly less cushion in its cash flow metrics than comparably rated companies in other industrial sectors.
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> ***
>
> In situations where the regulatory framework is less supportive, or is more contentious, a utility's credit quality can deteriorate rapidly.[24]

[23] *See,* Moody's Investors Service, Rating Methodology; *Regulated Gas and Electric Utilities*, at 4 (June 23, 2017).

[24] Moody's Investors Service, *Regulatory Frameworks – Ratings and Credit Quality for Investor-Owned Utilities*, at 2 (June 18, 2010).

Similarly, as Standard & Poor's ("S&P") notes, "Regulatory advantage is the most heavily weighted factor when S&P Global Ratings analyzes a regulated utility's business risk profile."[25]

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

A. Regulated utilities primarily use common stock and long-term debt to finance their permanent property, plant, and equipment. The rate of return for a regulated utility is based on its weighted average Cost of Capital, in which the costs of the individual sources of capital are weighted by their respective book values.

As noted earlier, the ROE is market-based and is estimated by applying observable market data to various financial models. By their nature, those models produce a range of results from which the ROE is determined. Although quantitative models are used to estimate the ROE, it cannot be precisely quantified through a strict mathematical solution. Other regulatory commissions have found no individual model is more reliable than all others under all market conditions.[26] Consistent with investor practice, it is both prudent and appropriate to use multiple methods to mitigate the effects of assumptions and inputs associated with any single approach. The key consideration in determining the ROE is to ensure the overall analysis reasonably reflects investors' view of financial

[25] S&P Global Ratings, *Assessing U.S. Investor-Owned Utility Regulatory Environments*, at 2 (August 10, 2016).

[26] *See*, *for example*: (1) Public Utilities Commission of the State of Hawaii, Docket No. 7700, Decision and Order No. 13704, *In the Matter of the Application of Hawaiian Electric Company, Inc. For Approval of Rate Increases and Revised Rate Schedules and Rules*, December 28, 1994 at 92; (2) The Commonwealth of Massachusetts Department of Public Utilities, *Investigation by the Department of Public Utilities*, Docket D.P.U. 15-155, September 30, 2016, at 376-378; and (3) State of North Carolina Utilities Commission, *In the Matter of Application of Public Service Company of North Carolina, Inc. for a General Increase in its Rates and Charges*, Docket No. G-5, Sub 565, Order Approving Rate Increase and Integrity Management Tracker, October 28, 2016, at 35-36.

markets in general, and the subject company (in the context of the proxy companies), in particular.

In summary, practitioners, academics, and regulatory commissions recognize that financial models are not precise quantifications of investor behavior but are tools to be used in the ROE estimation process. They appreciate that the strict adherence to any single approach, or to the specific results of any single approach, can lead to flawed or misleading conclusions.[27] A reasonable ROE estimate therefore considers multiple methods and the reasonableness of their individual and collective results in the context of observable, relevant market information.

B. <u>Capital Market Environment</u>

Q. Do economic conditions influence the required Cost of Capital and required return on common equity?

A. Yes. The required Cost of Capital, including the ROE, is a function of prevailing and expected economic and capital market conditions. As discussed below, the models used to estimate the Cost of Equity are influenced by current and expected capital market conditions. In addition, all analytical models used to estimate the required ROE are based on simplifying assumptions that may not hold true under certain market circumstances. Therefore, it is important to assess the reasonableness of any financial model's results in the context of observable market data. To the extent that certain ROE estimates are incompatible with such data or inconsistent with basic financial principles,

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[27] This is consistent with the *Hope* and *Bluefield* principle establishing it is the analytical result, as opposed to the method employed, that controls in determining just and reasonable rates.

it is appropriate to consider whether alternative estimation methods are likely to provide more meaningful and reliable results.

Q. Please describe the recent capital market dislocation and its implications for estimating the Company's Cost of Equity.

A. It is well recognized that there have been dramatic shifts in the capital markets brought about by the COVID-19 pandemic. The speed and severity of the increase in risk and the loss in value cut across all market sectors, including utilities. Notably:

- From February 12 to March 23, 2020, the Standard & Poor's ("S&P") 500 Index lost approximately 34.00 percent of its value, as did the utility sector.[28]
- At the same time, the Chicago Board Options Exchange ("CBOE") Volatility Index ("VIX", a measure of expected market volatility), increased six-fold (from 13.68 on February 14, 2020 to 82.69 on March 16, 2020).[29]
- On March 9, 2020, the 30-year Treasury yield fell below 1.00 percent for the first time.[30]

Although government and central bank actions have stabilized the capital markets somewhat, as explained in more detail below, volatility (and, therefore, risk) remain elevated for the utility sector, which has important implications on ROE analyses.

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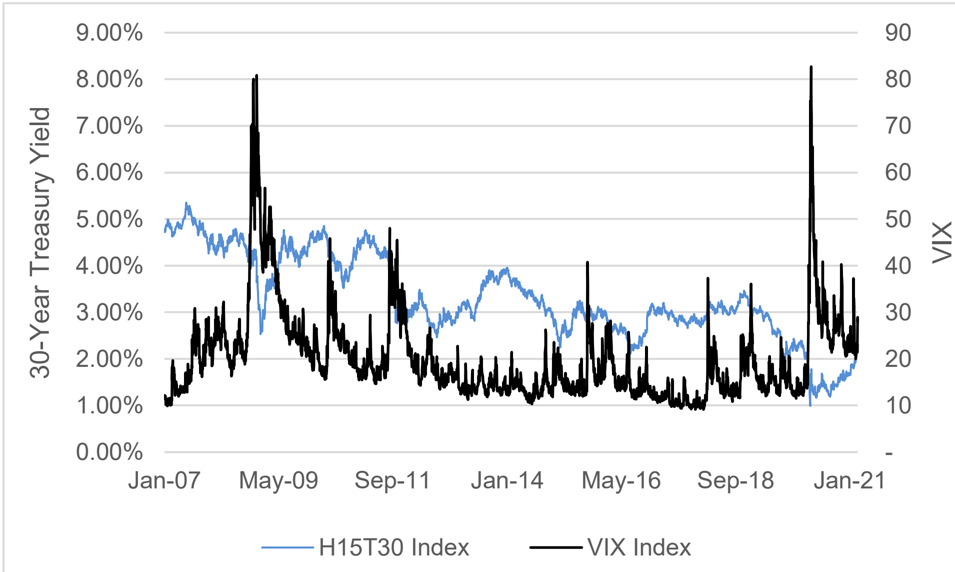
[28] Source: Yahoo! Finance. Utility sector measured by the XLU and Dow Jones Utility Average.
[29] Source: Bloomberg Professional Service.
[30] Source: Bloomberg Professional Service.

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 avoid capital losses (that is, capital preservation). A means of doing so is to allocate capital to the relative safety of Treasury securities, in a "flight to safety." Because Treasury yields tend to be inversely related to Treasury bond prices, as investors bid up the prices of bonds, they bid down the yields. As Chart 4 below demonstrates, decreases in the 30-year Treasury yield are coincident with significant increases in the VIX. In those instances, the decline 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 as investors favor the relative security of bonds during volatile markets. Simply put, in volatile markets, investors require higher returns to move from safe Treasury bond investments to riskier equity investments.

Chart 4: 30-Year Treasury Yields vs. VIX[31]



Q. Has volatility remained elevated relative to historical levels in recent months?

A. Yes. A visible and widely reported measure of expected volatility is the VIX. As CBOE explains, the VIX calculation is 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 call and put options.[32] 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. That is, if the level of 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 19.49, which is consistent with the long-term standard deviation on

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31 Source: Bloomberg Professional Service.
32 Source: www.cboe.com/vix.

annual market returns as reported by Duff & Phelps.[33] From February 12, 2020 to February 26, 2021, the VIX averaged 30.08, or more than 54.00 percent above its long-term average.[34] In other words, since the onset of the COVID-19 pandemic, market volatility has been approximately 54.00 percent higher on average than the market's long-term average volatility.

A further measure of market uncertainty is the volatility of the VIX itself. That is, we can look to the expected volatility of volatility, as measured by the CBOE VVIX Index ("VVIX"), which is a traded index of the expected volatility of the VIX. Over the long-term, the VVIX has averaged approximately 91.11. As Table 2 below shows, the average VVIX in 2020, and so far in 2021, was at its highest level since the index's inception in 2006.

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33 Source: Duff & Phelps, 2020 SBBI Yearbook, at 6-17.
34 Source: Bloomberg Professional Service.

Table 2: Annual Average VVIX (2006-2021)[35]

Calendar Year	Average VVIX
2006	78.75
2007	87.68
2008	81.85
2009	79.78
2010	88.36
2011	92.94
2012	94.84
2013	80.64
2014	83.01
2015	94.82
2016	92.80
2017	90.01
2018	102.26
2019	91.00
2020	118.47
2021	119.01
Average 2006 - 2019	88.77
Average 2020 - 2021	118.54
Average 2006 - 2021	91.11

From a different perspective, the VVIX averaged 88.77 between 2006 and 2019; in 2020 and 2021, the average VVIX was approximately 34.00 percent higher (118.54), indicating that expected volatility is currently well above the long-term average. Stated differently, a relatively high VVIX suggests the VIX might be more volatile in the future, which in turn suggests expectations for higher market volatility in the future.

35 Source: Bloomberg Professional Service.

The important analytical question is whether we can infer that historically low Treasury yields imply a Cost of Equity that is well below recently authorized returns. Given the inverse relationship between Treasury bond yields and the VIX, it is difficult to conclude that fundamental risk aversion and investor return requirements have fallen. Rather, the decline in Treasury yields signify an increase in investor-required equity returns, not a decrease, as equity investors require higher returns to compensate them for greater market risk.

Q. Is market volatility expected to remain elevated in the near term?

A. Yes. One means of assessing market expectations regarding the future level of volatility is to review CBOE's "Term Structure of Volatility", which is described by CBOE as:

> 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.[36]

As shown in Table 3 below, the implied volatility is expected to remain nearly 50.00 percent above historical volatility[37] until at least March 2022.

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36 Source: www.cboe.com/trading-tools/strategy-planning-tools/term-structure-data.

37 The long-term average price of VIX is approximately 19.49, which, as discussed above, is similar to the long-term standard deviation of annual market returns.

Table 3: CBOE Term Structure of Volatility[38]

Date	Projected VIX
March 2021	28.21
April 2021	28.44
May 2021	29.59
June 2021	30.12
July 2021	30.71
August 2021	31.02
September 2021	31.75
December 2021	31.13
January 2022	29.15
March 2022	29.02

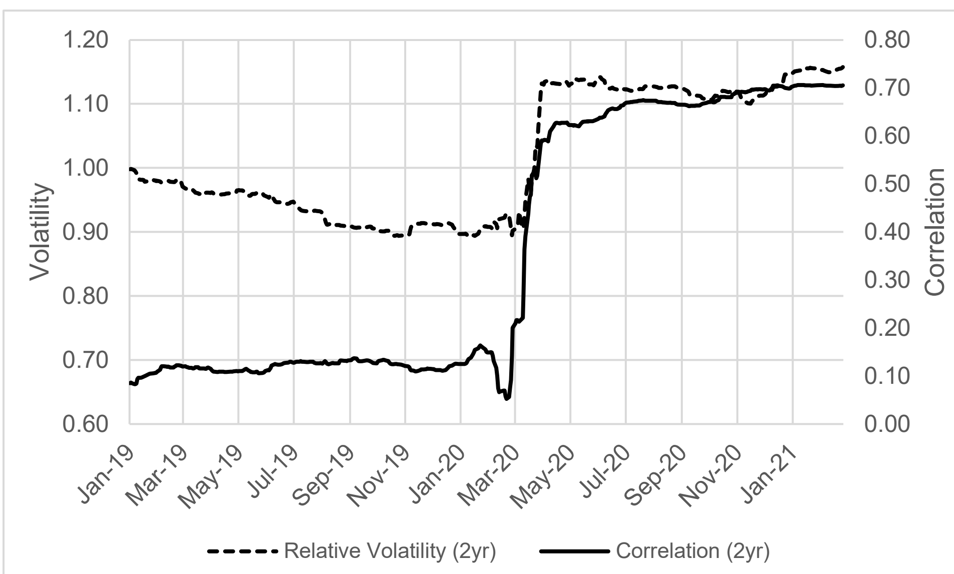
In short, investors reacted to the increase in market uncertainty associated with the COVID-19 pandemic by moving away from equity securities (including utilities) to Treasury securities, thereby pushing down long-term Treasury yields. Consequently, the current relatively low levels of interest rates are the result of a volatility-driven "flight to safety" on the part of investors, indicating increased risk aversion, and therefore a corresponding increase in investors' required equity returns. As shown in Chart 4 above, although volatility has declined somewhat from their March 2020 highs (as Treasury yields have begun to increase), it remains – and is expected to remain – above historical levels in the near term.

38 Source: http://www.cboe.com/trading-tools/strategy-planning-tools/term-structure-data, as of February 26, 2021.

Q. Are there additional measures that indicate the Cost of Equity has increased for utilities?

A. Yes. As explained later in this section, Beta coefficients are a function of two parameters: (1) relative volatility (the standard deviation of the subject company's returns relative to the standard deviation of the market return); and (2) the correlation between the subject company's returns and the market return.[39] Under the CAPM, higher Beta coefficients indicate an increase in the Cost of Equity, all else equal. As Chart 5 below demonstrates, both the relative correlation and relative volatility between the proxy group and the overall market (as measured by the S&P 500) increased substantially in March 2020.

Chart 5: Components of Proxy Group (Two-Year) Beta Coefficients[40]



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[39] *See*, Equation [5].

[40] Source: S&P Global Market Intelligence. Weekly returns calculated over 24 months.

This increase in correlation between returns for the proxy group and the S&P 500 is not surprising. As Morningstar recently explained, during volatile markets there often is little distinction in returns across assets or portfolios. That is, "correlations go to 1."[41] When that happens, utility stocks lose their "defensive" quality. Not surprisingly, the increased correlation and relative volatility combine to produce significantly increased (adjusted) Beta coefficients. As shown in Table 4, below, the average Beta coefficients for the proxy group reported by *Value Line* and Bloomberg increased by approximately 1.6x and 2.1x, respectively between February 2020 and February 2021.

Table 4: Average *Value Line* and Bloomberg Proxy Group Beta Coefficients[42]

Date	February 2020	February 2021
Value Line Average	0.557	0.877
Bloomberg Average	0.476	1.021

Q. Does your recommendation also consider the interest rate environment?

A. Yes, it does. As discussed below, prevailing interest rates have begun to increase. That increase is consistent with expectations for increases in U.S. economic growth and inflation.[43] 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. Because the Cost of Equity is forward-looking, the salient issue is whether investors see the likelihood of

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41 Morningstar, *Correlations Going to 1: Amid Market Collapse, U.S. Stock Fund Factors Show Little Differentiation*, March 6, 2020.

42 Sources: *Value Line* and Bloomberg Professional Service as of February 28, 2020 and February 26, 2021.

43 See, e.g., *Blue Chip Financial Forecasts*, Vol. 40, No. 3, March 1, 2021, at 1.

increased interest rates during the period in which the rates set in this proceeding will be in effect. With respect to long-term interest rates, the 50 economists surveyed by *Blue Chip Financial Forecast* ("*Blue Chip*") expect the 30-year Treasury yield to increase from the current 30-day average of 1.97 percent[44] to 2.80 percent on average over the five-year period 2022-2026.[45]

Q. Are there other indications that investors expect long-term interest rates to rise in the future?

A. Yes. Treasury bond prices, and therefore yields, are influenced by inflation expectations. As such, we can look to market data regarding investors' expectations for inflation as an indicator of future Treasury yields. As a recent article in *Barron's* explains, "While all Treasury yields reflect future interest rate expectations and inflation risk, longer-term securities' performance is more sensitive to rising interest rates and yields and their value is eroded by more inflation."[46] As such, when long-term Treasury yields increase faster than short-term yields (*i.e.*, the yield curve steepens), it is an indication that investors expect stronger economic growth and inflation.[47] As Chart 6 shows, the yield curve has steepened since August 2020, and is expected to widen further by the second quarter of 2022.

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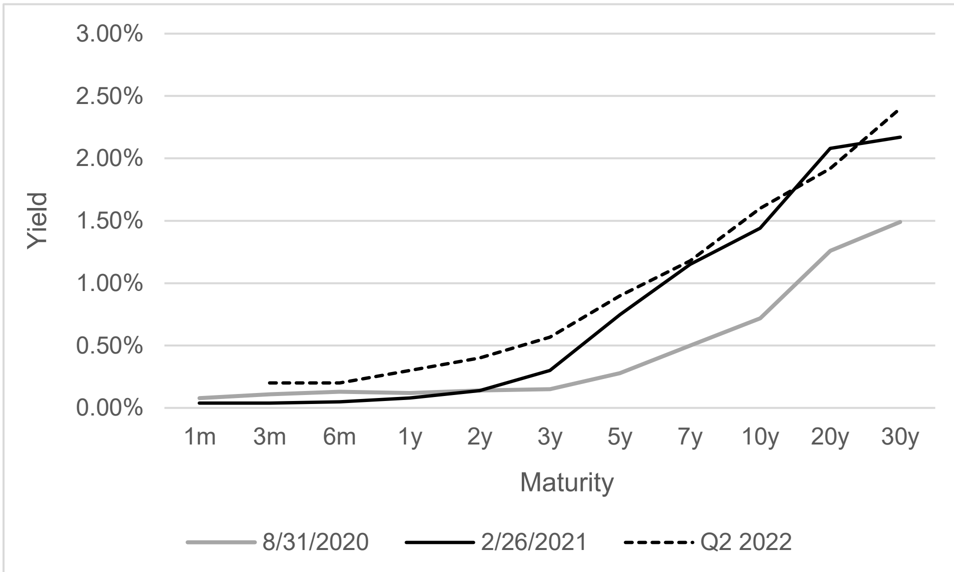
44 Source: Bloomberg Professional Service. *See*, Exhibit JEN-6.

45 *See,* Blue Chip Financial Forecasts, Vol. 39 No. 12, December 1, 2020, at 14.

46 Alexandra Scaggs, "The Yield Curve is the Steepest It Has Been in Years. Here's What That Means for Investors.", *Barron's*, February 4, 2021.

47 Alexandra Scaggs, "The Yield Curve is the Steepest It Has Been in Years. Here's What That Means for Investors.", *Barron's*, February 4, 2021.

Chart 6: Treasury Yield Curve[48]



Q. Has the Federal Reserve changed its inflation policy recently?

A. Yes, it has. On August 27, 2020, Federal Reserve Chair Jerome H. Powell released a statement noting that Federal Open Market Committee will take an approach towards inflation that "could be viewed as a flexible form of average inflation targeting", meaning that following periods in which inflation has run below 2.00 percent, "appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time."[49]

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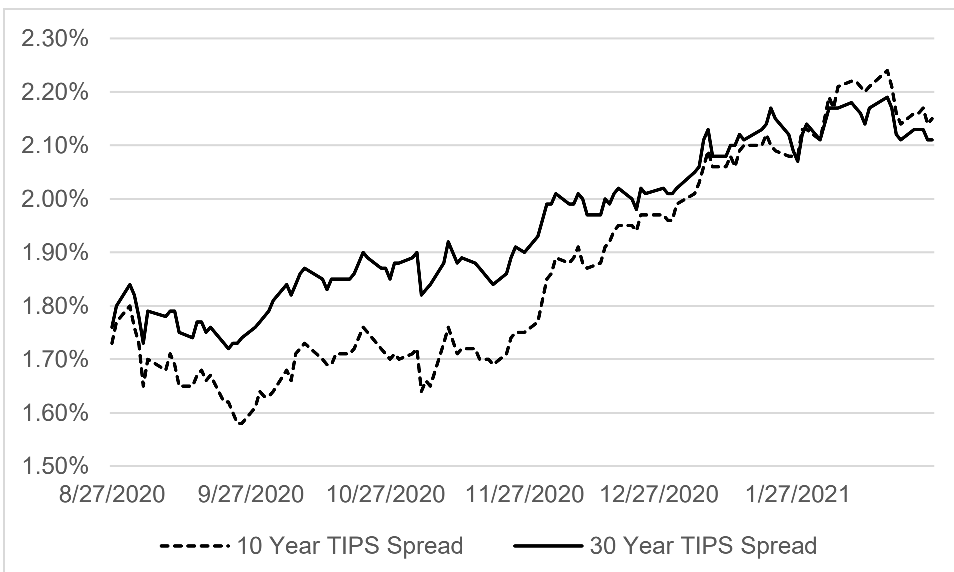
48 Source: Federal Reserve Board of Governors H.15 interest rate data. Q2 2022 projections from *Blue Chip Financial Forecasts*, Vol. 40, No. 3, March 1, 2021, at 2. Three-year, seven-year, and 20-year projected yields are interpolated.

49 *New Economic Challenges and the Fed's Monetary Policy Review*, Remarks by Jerome H. Powell, Chair Board of Governors of the Federal Reserve System, August 27, 2020, at 5.

Since Chairman Powell's remarks, the breakeven inflation rate of 10-year and 30-year Treasury securities,[50] represented as the spread between constant maturity Treasury securities and Treasury Inflation-Protected Securities ("TIPS"), has increased from 1.73 percent and 1.76 percent, respectively, to 2.15 percent and 2.11 percent respectively, as of February 26, 2021. Further, as shown in Chart 7 below, breakeven inflation has trended upward since the Federal Reserve's target inflation policy change at a relative consistent pace.

Chart 7: Breakeven Inflation Rate[51]



Given these market-based indications of higher inflation expectations in the future, it is reasonable to expect long-term Treasury yields to also increase.

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50 The 10-year breakeven inflation rate represents a measure of expected inflation derived from 10-Year Treasury Constant Maturity Securities and 10-Year Treasury Inflation-Indexed Constant Maturity Securities. The latest value implies what market participants expect inflation to be in the next 10 years, on average. The 30-year breakeven inflation rate represents a measure of expected inflation derived from 30-Year Treasury Constant Maturity Securities and 30-Year Treasury Inflation-Indexed Constant Maturity Securities. The latest value implies what market participants expect inflation to be in the next 30 years, on average. Source: Federal Reserve Bank of St. Louis.

51 Source: Federal Reserve Board of Governors H.15 interest rate data.

Q. What conclusions do you draw from your review of the current capital market environment and its implications on the Company's Cost of Equity?

A. In short, during a period of heightened and possibly prolonged market uncertainty, observable market information makes clear that utility equity investors now face greater risks and therefore require higher returns. When markets become uncertain and disrupted, investors increase their equity return requirements. Estimating that additional return, however, becomes increasingly complex. When utility investors are faced with such extraordinary market uncertainty, regulatory supportiveness becomes critically important.

I appreciate that the Commission has the difficult task of balancing the interests of customers and investors. I also appreciate that doing so becomes increasingly difficult under stressed economic and financial conditions. However, one should not lose sight of the common interest customers and investors have in a financially strong utility, particularly during uncertain market environments. On balance, it is my opinion that the Company's Cost of Equity falls in the range of 9.90 percent to 10.50 percent. Although the uncertainty surrounding the scope and duration of the current market dislocation supports an ROE toward the upper end of my recommended range, an ROE of 10.20 percent is a reasonable, if not conservative, estimate of the Company's Cost of Equity, and balances the interests of utility customers and investors.

C. 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 UES?

A. First, it is important to bear in mind that the Cost of Equity for a given enterprise depends on the risks attendant to the business in which the company is engaged. According to financial theory, the value of a given company is equal to the aggregate market value of its constituent business units. The value of the individual business units reflects the risks and opportunities inherent in the business sectors in which those units operate. In this proceeding, we are focused on estimating the Cost of Equity for UES, which is a wholly owned subsidiary of Unitil Corporation ("Unitil"). Because the ROE is a market-based concept, and UES is not a separate entity with its own stock price, it is necessary to establish a group of companies that are both publicly traded and comparable to the Company in certain fundamental respects to serve as its "proxy" in the ROE estimation process. Even if the Company were a publicly traded entity, short-term events could bias its market value during a given time period. A significant benefit of using a proxy group is that it moderates the effects of anomalous, temporary events associated with any one company.

Q. Does the selection of a proxy group suggest that analytical results will be narrowly clustered around average results?

A. Not necessarily. For example, the Constant Growth DCF approach defines the Cost of Equity as the sum of the expected dividend yield and projected long-term growth. Despite the care taken to ensure risk comparability, market expectations with respect to future risks and growth opportunities will vary from company to company. Therefore, even within a group of similarly situated companies, it is common for analytical results to reflect a seemingly wide range. Consequently, at issue is how to estimate the Cost of Equity from within that range. Such a determination necessarily must consider both quantitative and qualitative information.

Q. Please provide a summary profile of UES.

A. UES provides electric distribution service to approximately 66,000 residential and 11,000 commercial and industrial customers in New Hampshire.[52] The Company's service territory encompasses the capital city of Concord and various towns in the southeastern and seacoast regions of New Hampshire. UES has long-term ratings of BBB+ (Outlook: Negative) from S&P and Baa1 (Outlook: Stable) from Moody's. Unitil has long-term ratings of BBB+ (Outlook: Negative) from S&P and Baa2 (Outlook: Stable) from Moody's.[53]

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

A. Because estimating the Cost of Equity is a comparative exercise, it is necessary to develop a proxy group of companies with risk profiles comparable to the subject company. In selecting a proxy group, my objective was to balance the competing interests of selecting companies that are representative of the risks and prospects faced by UES, while at the same time ensuring that there is a sufficient number of companies in the proxy group. Based on those two considerations, I began with the universe of

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[52] *See*, Unitil Corporation, SEC Form 10-K for the fiscal year ended December 31, 2020, at 3.
[53] Source: S&P Global Market Intelligence.

companies that *Value Line* classifies as Electric Utilities, and applied the following screening criteria:

- Because certain of the models used in my analyses assume that earnings and dividends grow over time, I excluded companies that do not consistently pay quarterly cash dividends, or have cut their dividend within the last five years;
- To ensure that the growth rates used in my analyses are not biased by a single analyst, all the companies in my proxy group are consistently covered by at least two utility industry equity analysts;
- All the companies in my proxy group have investment grade senior unsecured bond and/or corporate credit ratings from S&P and/or Moody's;
- To incorporate companies that are primarily regulated electric utilities, I excluded companies with less than 60.00 percent of net operating income from regulated operations and 60.00 percent of regulated electric operating income, on average, over the last three years; and
- I eliminated companies that have recent merger activity (or other significant transaction) or have had a recent financial event that could affect its market data or financial condition.

Q. What companies met your screening criteria?

A. The criteria discussed above resulted in a proxy group of the following 24 companies:

Table 5: Proxy Group Screening Results

Company	Ticker
ALLETE, Inc.	ALE
Alliant Energy Corporation	LNT
Ameren Corporation	AEE
American Electric Power Company, Inc.	AEP
Avista Corporation	AVA
CMS Energy Corporation	CMS
Consolidated Edison, Inc.	ED
DTE Energy Company	DTE
Duke Energy Corporation	DUK
Entergy Corporation	ETR
Evergy, Inc.	EVRG
Eversource Energy	ES
Hawaiian Electric Industries, Inc.	HE
IDACORP, Inc.	IDA
NextEra Energy, Inc.	NEE
NorthWestern Corporation	NWE
OGE Energy Corp.	OGE
Otter Tail Corporation	OTTR
Pinnacle West Capital Corporation	PNW
Portland General Electric Company	POR
Public Service Enterprise Group Inc.	PEG
Southern Company	SO
WEC Energy Group, Inc.	WEC
Xcel Energy Inc.	XEL

D. Cost of Equity Models

Q. What analytical approaches did you use to determine the Company's ROE?

A. As noted earlier, I relied on the constant growth and quarterly forms of the DCF model, the traditional and empirical forms of the CAPM, and the Bond Yield Plus Risk Premium approach.

I rely on these models for two reasons. First, the purpose of an ROE analysis is to estimate the return that investors require; therefore, it is important to use the models on which investors rely. The models that I apply are commonly used in practice. Second, the models focus on different aspects of return requirements, and provide different insights to investors' views of risk and return. Using multiple methods provides a broader and, therefore, more reliable perspective on investors' return requirements.

1. Constant Growth DCF Model

Q. Please 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. DCF theory assumes that an investor buys a stock for an expected total return rate, which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate). 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:

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

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 [1] is a standard present value calculation that can be simplified and rearranged into the familiar form:

$$k = \frac{D_0\ (1+g)}{P} + g \qquad [2]$$

Equation [2] 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 in perpetuity.

Q. What assumptions underlie the Constant Growth DCF model?

A. The Constant Growth DCF model assumes: (1) a constant average annual growth rate for earnings and dividends; (2) a stable dividend payout ratio; (3) a constant Price/Earnings multiple; and (4) a discount rate greater than the expected growth rate. The model also assumes that the current Cost of Equity will remain constant 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 the proxy companies' current quarterly dividend multiplied by four, and the average closing stock prices over the 30-, 90-, and 180-trading day periods as of February 26, 2021.

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

A. I did so to ensure that 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. 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 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 12-month period, and does not overstate the dividends to be paid during that time.

Q. What measures of long-term growth did you apply in the Constant Growth DCF model?

A. I have applied analysts' consensus projected earnings per share ("EPS") growth rates. In its Constant Growth form, the DCF model (*i.e.*, as presented in Equation [2] above) assumes a single expected growth estimate in perpetuity. Accordingly, in order to reduce the long-term growth rate to a single measure, one must assume a fixed payout ratio, and the same constant growth rate in 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. For the purposes of the

Constant Growth DCF model, therefore, growth in EPS represents the appropriate measure of long-term growth.

Q. Does academic research support the use of analysts' earnings growth projections as the appropriate measure for estimating equity returns in the Constant Growth DCF model?

A. Yes. The relationship between various growth rates and stock valuation metrics has been the subject of much academic research.[54] 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 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.[55]

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.[56] 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."[57] Other research specifically notes

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[54] *See*, Robert S. Harris, *Using Analysts' Growth Forecasts to Estimate Shareholder Required Rate of Return*, Financial Management (Spring 1986).

[55] Charles F. Phillips, Jr., The Economics of Regulation, at 285 (Rev. ed. 1969).

[56] *See*, *e.g.*, Andreas C. Christofi, Petros C. Christofi, Marcus Lori and Donald M. 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 James H. Vander Weide and Willard T. Carleton, *Investor Growth Expectations: Analysts vs. History*, The Journal of Portfolio Management (Spring 1988).

[57] James H. Vander Weide and Willard T. Carleton, *Investor Growth Expectations: Analysts vs. History*, The Journal of Portfolio Management, at 81 (Spring 1988).

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." 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."[58] Similarly, Brigham, Shome, and Vinson noted that "evidence in the current literature indicates that (i) analysts' forecasts are superior to forecasts based solely on time series data; and (ii) investors do rely on analysts' forecasts."[59]

To that point, the research of Vander Weide and Carleton demonstrates that earnings growth projections have a statistically significant relationship to stock valuation levels, while dividend growth rates do not.[60] 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 for the purpose of the Constant Growth DCF model.

Q. Did you consider additional measures of projected growth rates beyond projected earnings growth estimates?

A. For the reasons explained above, projected earnings growth estimates are the appropriate measure of growth for use in the DCF model. However, I understand that in recent

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58 Robert S. Harris, *Using Analysts' Growth Forecasts to Estimate Shareholder Required Rate of Return*, Financial Management, at 56 (Spring 1986).

59 Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility's Cost of Equity*, Financial Management, at 36 (Spring 1985).

60 *See*, James H. Vander Weide and Willard T. Carleton, *Investor Growth Expectations: Analysts vs. History*, The Journal of Portfolio Management (Spring 1988).

proceedings before the Commission, projected dividend growth rates and book value growth rates have been considered by ROE witnesses in their DCF analyses. Therefore, to assess the reasonableness of the projected earnings growth rates applied in my DCF analysis, I reviewed *Value Line's* average and median long-term projected dividend growth rates and projected book value growth rates for the proxy companies. As Table 6 below shows, the average and median proxy group projected earnings growth rates of 5.39 percent and 5.71 percent, respectively, are generally within *Value Line's* average and median projected dividend growth rates and book value growth rates[61] for the proxy companies.

Table 6: Comparison of Growth Rate Projections for the Proxy Group

	Earnings Growth[62]	***Value Line* Dividend Growth[63]**	***Value Line* Book Value Growth[64]**
Average	5.39%	5.23%	4.19%
Median	5.71%	5.50%	3.75%

Moreover, as explained below, I calculate a range of DCF-based ROE estimates based on the lowest and highest earnings growth rates; therefore, my DCF analyses reflect a wide range of growth rate expectations. In other words, the earnings growth projections applied in my DCF analyses generally encompass *Value Line's* projected dividend growth and book value growth rates shown in Table 6 above. For these reasons, I

61 *Value Line* is the only source I am aware of that provides dividend and book value growth rate projections.
62 Average of Zacks, Yahoo! Finance, and *Value Line*. *See*, Exhibit JEN-3.
63 Source: *Value Line* five-year dividend growth estimate.
64 Source: *Value Line* five-year book value growth estimate.

conclude the earnings growth projections applied in the DCF analyses are reasonable and appropriate.

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

A. I applied the Constant Growth DCF model to the proxy group of electric 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 February 26, 2021, for the term P_0; and
- The annualized dividend per share as of February 26, 2021, for the term D_0.

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

- *Value Line's* long-term earnings growth estimates;
- Zacks' consensus long-term earnings growth estimates; and
- First Call's consensus long-term earnings growth estimates.

Q. How did you calculate the DCF results?

A. For each proxy company, I calculated the low, mean, and high DCF results. For the mean result, I combined the average of the three EPS growth rate estimates listed above with the subject company's expected dividend yield for each proxy company and then calculated the mean and median result for those estimates. I calculated the high DCF result by combining the maximum EPS growth rate estimate with the subject company's expected dividend yield. I used the same approach to calculate the low DCF result, using instead the minimum EPS growth estimate for each proxy company. Finally, I calculated the average of the mean and median low, mean, and high DCF results for the proxy group to develop the Constant Growth DCF results summarized in Table 7 below (*see also*, Exhibit JEN-3).

Table 7: Constant Growth DCF Results[65]

	Low	**Mean**	**High**
30-Day Average	8.45%	9.20%	9.83%
90-Day Average	8.44%	9.06%	9.75%
180-Day Average	8.48%	9.09%	9.84%

2. Quarterly Growth DCF Model

Q. Please describe the Quarterly Growth DCF model.

A. As noted earlier, the Constant Growth DCF model is based on several limiting assumptions, one of which is that dividends are paid annually. However, most dividend-paying companies, including utilities, pay dividends on a quarterly (as opposed to an annual) basis. Although the dividend yield adjustment discussed earlier is meant to address that assumption (by increasing the observed dividend yield by one-half of the expected growth rate), it does not fully reflect the quarterly receipt and reinvestment of dividends. As a consequence, the Constant Growth DCF model likely understates the Cost of Equity. The Quarterly Growth DCF model specifically incorporates investors' expectations of the quarterly payment of dividends, and the associated quarterly compounding of those dividends as they are reinvested at the required ROE. As noted by Dr. Roger Morin:

[65] *See*, Exhibit JEN-3. Average of the proxy group mean and median results.

> Clearly, given that dividends are paid quarterly and that the observed stock price reflects the quarterly nature of dividend payments, the market-required return must recognize quarterly compounding, for the investor receives dividend checks and reinvests the proceeds on a quarterly schedule... The annual DCF model inherently understates the investors' true return because it assumes all cash flows received by investors are paid annually.[66]

Q. How is the dividend yield portion of the Quarterly DCF model calculated?

A. To more accurately reflect the timing and compounding of quarterly dividends, the model replaces the "D" component of the Constant Growth DCF model with the following equation:

$$D = d_1 (1 + k)^{0.75} + d_2 (1 + k)^{0.50} + d_3 (1 + k)^{0.25} + d_4 (1 + k)^{0} \quad [3]$$

where:

d_1, d_2, d_3, d_4 = expected quarterly dividends over the coming year; and

k = the required Return on Equity.

Because the required ROE (k) is a variable in the dividend calculation, the Quarterly Growth DCF model is solved in an iterative fashion.

To calculate the expected dividends over the coming year for the proxy companies (*i.e.*, d_1, d_2, d_3, and d_4), I obtained the last four paid quarterly dividends for each company and multiplied them by one plus the growth rate (*i.e.*, $1 + g$). For the P_0 component of the dividend yield, I used the same average stock prices applied in the Constant Growth DCF analysis (*i.e.*, 30-, 90-, and 180-trading day averages ended February 26, 2021 for each proxy company.

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66 Roger A. Morin, Ph.D., New Regulatory Finance, at 344 (2006).

Q. What are the results of your Quarterly Growth DCF analyses?

A. My Quarterly Growth DCF results are summarized in Table 8 below (*see also*, Exhibit JEN-4).

Table 8: Quarterly Growth DCF Results[67]

	Low	**Mean**	**High**
30-Day Average	8.55%	9.29%	9.99%
90-Day Average	8.52%	9.14%	9.91%
180-Day Average	8.55%	9.21%	9.99%

Q. Earlier you stated that more weight should be given to the upper end of the DCF results given the current economic and capital market environments. Why do you believe it is reasonable to give more weight to the high end of the DCF results that is based on the highest earnings growth rate projections?

A. It is reasonable and appropriate to rely on the high end of the DCF model results for several reasons. First, as explained earlier, the fundamental relationship between dividend yields and expected growth rates does not appear to currently hold. The average and median high projected earnings growth rates for the proxy group are 6.20 percent and 6.00 percent, respectively. Those growth rates are consistent with the proxy group's average annual capital appreciation rate noted earlier of 6.28 percent,[68] as well as the long-term compound average annual GDP growth rate of 6.00 percent.[69] Consequently,

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67 *See*, Exhibit JEN-4. Average of the proxy group mean and median results.
68 Proxy Group calculated as an Index.
69 Source: U.S. Bureau of Economic Analysis as of February 25, 2021. Compound annual average growth from 1929-2020.

it is reasonable to give more weight to the high earnings growth estimates and, therefore, the High DCF results.

In the end, it is the reasonableness of the ROE itself, rather than the approach used in its estimation, that is paramount in determining just and reasonable rates. An ROE that meets the *Hope* and *Bluefield* standards is one that is comparable to returns available to other utilities of similar risk. As shown in Exhibit JEN-3 and Exhibit JEN-4, the mean and median High DCF results range from approximately 9.60 percent to nearly 10.20 percent. Between January 2017 and February 2021, the average authorized ROE for electric utilities was 9.64 percent; for the operating companies within the proxy group, the average was 9.65 percent.[70] Moreover, during that same period, more than 54.00 percent of authorized ROEs for electric utilities were 9.60 percent or higher, whereas approximately 12.00 percent were within the range of the Low and Mean DCF results (below 9.30 percent). Moreover, more than 25.00 percent were 9.90 percent (the low end of my recommended range) and higher. From that perspective, the High DCF results are more consistent with recently authorized ROEs for electric utilities, including the proxy group, than are the low and mean DCF results. For these reasons, it is reasonable to give more weight to the High DCF results.

[70] Source: Regulatory Research Associates. Excludes ROEs authorized as part of Illinois or Vermont Formula Rate Plans that are tied to U.S. Treasury bond yields and the 8.25% ROE authorized for Central Maine Power in February 2020 as it included a 100-basis point management penalty.

3. Capital Asset Pricing Model and Empirical Capital Asset Pricing Model

Q. Please describe the general form of the CAPM.

A. The CAPM 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). The CAPM describes the relationship between a security's investment risk and the market rate of return. The CAPM assumes that all non-market or unsystematic risk can be eliminated through diversification. The risk that cannot be eliminated through diversification is called market, or systematic, risk. In addition, the CAPM presumes that investors require compensation only for systematic risk that is the result of macroeconomic and other events that affect the returns on all assets.

As shown in Equation [4], the CAPM is defined by four components, each of which theoretically is a forward-looking estimate:

$$K_e = r_f + \beta(r_m - r_f) \qquad [4]$$

where:

K_e = the required market ROE for a security;

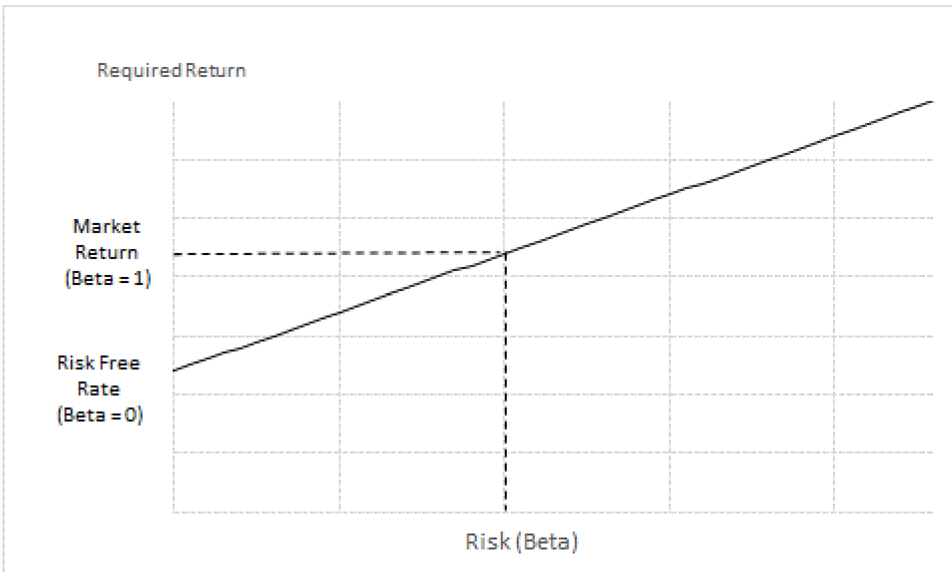
β = the Beta coefficient of that security;

r_f = the risk-free rate of return; and

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

Equation [4] describes the Security Market Line ("SML"), or the CAPM risk-return relationship, which is graphically depicted in Chart 8 below. The intercept is the risk-free rate (r_f) which has a Beta coefficient of zero, and 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. CAPM states that in well-behaving capital markets, the expected equity risk premium on a given security is proportional to its Beta coefficient.

Chart 8: Security Market Line



Intuitively, higher Beta coefficients indicate that the subject company's returns have been relatively volatile and have moved in tandem with the overall market. Consequently, if a company has a Beta coefficient of 1.00, it is as risky as the market and does not provide any diversification benefit.

In Equation [4], the term ($r_m - r_f$) represents the Market Risk Premium ("MRP").[71] According to the theory underlying the CAPM, since 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

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

systematic or non-diversifiable risk. Non-diversifiable risk is measured by the Beta coefficient, which is defined as:

$$\beta_j = \frac{\sigma_j}{\sigma_m} \text{ x } \rho_{j,m} \quad [5]$$

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 between company *j* and the broad market. The Beta coefficient, therefore, represents both relative volatility (*i.e.*, the standard deviation) of returns, and the correlation in returns between the subject company and the overall market.

Q. What risk-free rates did you assume in your CAPM analysis?

A. I used two different estimates of the risk-free rate: (1) the current 30-day average yield on 30-year Treasury bonds (*i.e.*, 1.97 percent)[72] and (2) a projected 30-year Treasury yield (*i.e.*, 2.72 percent).[73]

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

A. In determining the security most relevant to the application of the CAPM, it is important to select the term (or maturity) that best matches the life of the underlying investment. Electric utilities typically are long-term investments and, as such, the 30-year Treasury yield is more suitable for the purpose of calculating the Cost of Equity.

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72 Source: Bloomberg Professional Service.

73 The average of: (1) the average projected 30-year Treasury yield for the six quarters ended Q2 2022; and (2) the average long-term projected 30-year Treasury yield for the years 2022-2026 and 2027-2031 reported by *Blue Chip Financial Forecast. See*, *Blue Chip Financial Forecasts*, Vol. 40, No. 3, March 1, 2021, at 2 and *Blue Chip Financial Forecasts*, Vol. 39, No. 12, December 1, 2020, at 14.

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

A. It is my usual practice to consider the Beta coefficients reported by two sources: Bloomberg and *Value Line*. Both of those services adjust their calculated (or "raw") Beta coefficients to reflect the tendency of the Beta coefficient to regress toward the market mean of 1.00; *Value Line* calculates the Beta coefficient over a five-year period, while Bloomberg's calculation is based on two years of data. The proxy group mean and median Beta coefficients from *Value Line* and Bloomberg are shown in Table 9 below.

Table 9: Proxy Group Beta Coefficients[74]

	Value Line	**Bloomberg**
Proxy Group Average	0.877	1.021
Proxy Group Median	0.850	1.027

To be conservative, I have relied on the *Value Line* Beta coefficients in my CAPM and Empirical CAPM ("ECAPM") analyses.

Q. Please describe your forward-looking (*i.e.*, *ex-ante*) approach to estimating the market required return.

A. It is my usual practice to develop two estimates of the market required return by calculating the market capitalization-weighted average ROE based on the Constant Growth DCF model for the S&P 500 companies using data from Bloomberg and *Value Line (see* Exhibit JEN-5*)*. With respect to Bloomberg-derived growth estimates, I calculated the expected dividend yield (using the same one-half growth rate assumption

[74] Sources: *Value Line* and Bloomberg Professional Services as of February 26, 2021.

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, which produces an expected market required return of 16.35 percent. In the case of *Value Line*, I performed the same calculation, again using all companies for which five-year earnings growth rates were available, which produces an expected market required return of 14.34 percent.

While my usual practice is to apply the average of the Bloomberg-derived and *Value Line*-derived expected market return estimates, in order to be conservative, my CAPM and ECAPM analyses presented in my Direct Testimony rely on the *Value Line*-derived expected market return estimate.

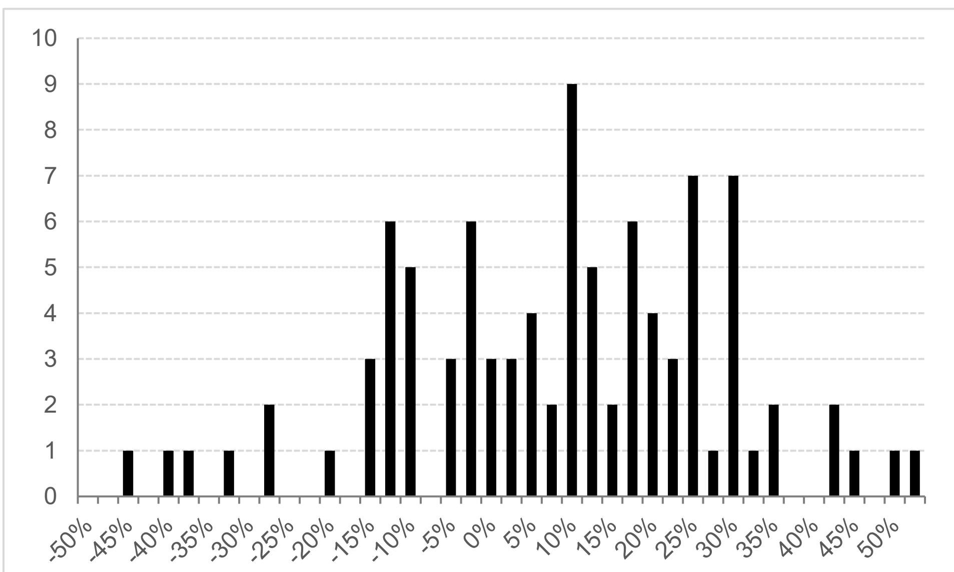
Q. With the risk-free rates and *ex-ante* market required return estimates described above, how did you calculate the MRP?

A. Because I apply two estimates of the risk-free rate, I calculated two estimates of the MRP. The first MRP estimate takes the *Value Line ex-ante* market required return described above (14.34 percent) and subtract the current 30-day average 30-year Treasury yield (1.97 percent). My second MRP estimate subtracts the projected 30-year Treasury yield (2.72 percent) *Value Line ex-ante* market required return (14.34 percent). These calculations result in *ex-ante* MRP estimates using the current and projected 30-year Treasury yield of 12.37 percent and 11.62 percent, respectively.

Q. Have you undertaken any analyses to determine the reasonableness of your *ex-ante* MRP estimates?

A. Yes. To do so, I considered how often various ranges of MRPs have been observed over the 1926 to 2019 period. To perform that analysis, I gathered the annual Market Risk Premia reported by Duff & Phelps and produced a histogram of those observations. The results of that analysis, which are presented in Chart 9, demonstrate that MRPs in the range of 12.00 percent (the average of my *Value Line*-derived MRP estimates) and higher occurred quite frequently, approximately 42.00 percent of the time.

Chart 9: Frequency Distribution of MRP (1926-2019)[75]



75 Source: Duff & Phelps, 2020 SBBI Yearbook, Appendix A-1, A-7.

Q. What are the results of your CAPM analysis?

A. As shown in Table 10, the proxy group average and median CAPM results using the MRP and Beta coefficients based on *Value Line* data suggest an ROE range of 12.48 percent to 12.91 percent (*see also*, Exhibit JEN-6).

Table 10: Summary of CAPM Results[76]

	Current 30-Year Treasury Yield (1.97%)	**Projected 30-Year Treasury Yield (2.72%)**
Proxy Group Average	12.82%	12.91%
Proxy Group Median	12.48%	12.59%

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.[77] The results of the two calculations are summed, along with the risk-free rate, to produce the ECAPM result, as noted in Equation [6] below:

$$k_e = r_f + 0.75\beta(r_m - r_f) + 0.25(r_m - r_f) \quad [6]$$

where:

k_e = the required market ROE;

β = the adjusted Beta coefficient of an individual security;

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[76] *See*, Exhibit JEN-6. *Value Line*-based results.

[77] *See*, *e.g.*, Roger A. Morin, Ph.D., New Regulatory Finance, at 189-190 (2006).

r_f = the risk-free rate of return; and

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.[78]

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 SML described by the CAPM formula is not as steeply sloped as the predicted SML.[79] 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."[80] Similarly, Dr. 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:

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[78] *Ibid*., 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.").

[79] *Ibid*., at 175. The Security Market Line plots the CAPM estimate on the Y-axis, and Beta coefficients on the X-axis.

[80] 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.

$$K = R_F + x\,(R_M - R_F) + (1\text{-}x)\beta(R_M - R_F)$$

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:

$$K = R_F + 0.25(R_M - R_F) + 0.75\,\beta(R_M - R_F)$$ [81]

Q. Does the application of adjusted Beta coefficients in the ECAPM address the empirical issues with the CAPM?

A. No, it does not. 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, Dr. 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.[82]

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[81] Roger A. Morin, Ph.D., New Regulatory Finance, at 175, 190 (2006).
[82] *Ibid.*, at 191.

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* MRP estimate from *Value Line*, the current yield and projected yield on 30-year Treasury securities as the risk-free rate, and the *Value Line* Beta coefficient. The results of my ECAPM analyses are shown on Exhibit JEN-6 and summarized in Table 11 below.

Table 11: Summary of Empirical CAPM Results[83]

	Current 30-Year Treasury Yield (1.97%)	**Projected 30-Year Treasury Yield (2.72%)**
Proxy Group Average	13.20%	13.27%
Proxy Group Median	12.95%	13.03%

4. Bond Yield Plus Risk Premium Approach

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

A. The Bond Yield Plus Risk Premium approach is based on the basic financial principle of risk and return; that is, equity investors require a premium over the return they would have earned as a bondholder to account for the residual risk associated with equity ownership. In other words, since returns to equity holders are riskier 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.

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83 *See*, Exhibit JEN-6. *Value Line*-based estimates.

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

A. I first defined the Equity Risk Premium as the difference between the authorized ROE and the 30-year Treasury yield. I then gathered data for 1,657 electric utility rate proceedings between January 1, 1980 and February 26, 2021. 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 period between the filing of the case and the date of the final order (approximately 200 days).

Because the data cover a number of economic cycles, the analysis also may be used to assess the change in the Equity Risk Premium over time. Prior research, for example, has shown that the Equity Risk Premium is inversely related to the level of interest rates.[84] That analysis is particularly relevant given the relatively low level of current Treasury yields.

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

A. To analyze the relationship between interest rates and the Equity Risk Premium, I performed a regression analysis, in which the observed Equity Risk Premium is the dependent variable, and the average 30-year Treasury yield is the independent variable. To account for the variability in interest rates and authorized ROEs over several decades,

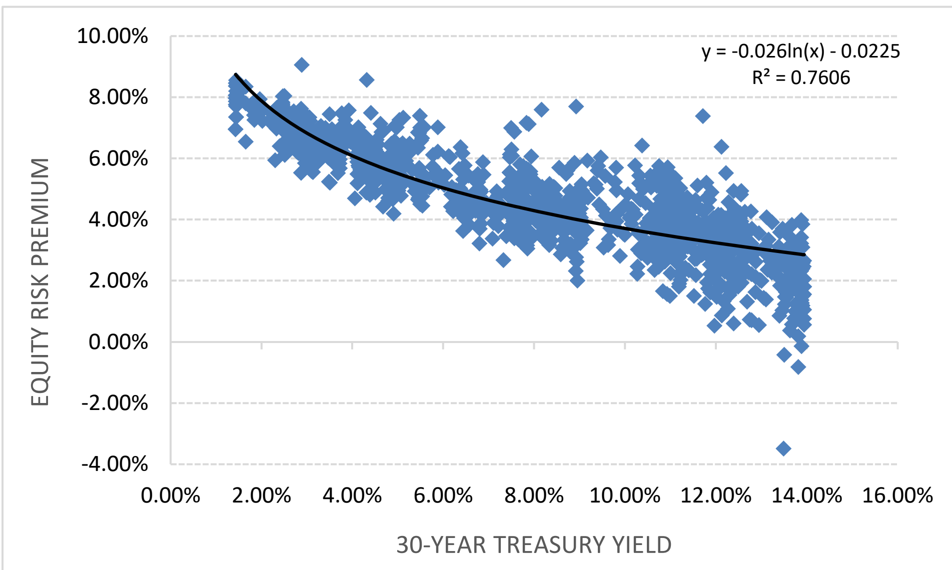
[84] *See*, *for example*, Robert S. Harris and Felicia C. Marston, *Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts*, Financial Management, (Summer 1992), at 63-70; Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility's Cost of 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.

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:

$$RP = \alpha + \beta\,(\mathrm{LN}(T_{30})) \quad [7]$$

As shown on Chart 10 (below), the semi-log form is useful when measuring an absolute change in the dependent variable (in this case, the Equity Risk Premium) relative to a proportional change in the independent variable (the 30-year Treasury yield).

Chart 10: Equity Risk Premium[85]



As Chart 10 illustrates, over time there has been a statistically significant, negative relationship between the 30-year Treasury yield and the Equity Risk Premium. Based on the regression coefficients in Chart 10, the implied ROE is between 9.89 percent and 9.80 percent (*see*, Table 12 below and Exhibit JEN-7).

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[85] *See*, Exhibit JEN-7.

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

	Return on Equity
Current 30-Year Treasury Yield (1.97%)	9.89%
Projected 30-Year Treasury Yield (2.72%)	9.80%

Q. Is your Bond Yield Plus Risk Premium analysis forward-looking?

A. Yes, it is. As explained earlier, because the Cost of Equity is forward-looking, it is important to apply forward-looking inputs and methodologies to estimate the Cost of Equity. Although the analysis incorporates historical authorized ROEs and 30-year Treasury yields to model the long-term relationship between the Equity Risk Premium and Treasury yields through a regression analysis, the analysis applies current and projected interest rates to the regression coefficients to produce forward-looking ROE estimates.

IV. <u>BUSINESS RISKS AND OTHER CONSIDERATIONS</u>

Q. Do the mean model results for the proxy group provide an appropriate estimate for the Cost of Equity for UES?

A. No, the mean model results do not necessarily provide an appropriate estimate of the Cost of Equity for UES. In my view, there are additional factors that must be taken into consideration when determining where the Company's Cost of Equity falls within the range of results. Specifically, I considered (1) UES's small size relative to the proxy group and (2) the Company's proposed revenue decoupling mechanism. As discussed

[86] *See*, Exhibit JEN-7.

below, these elements should be considered in terms of their overall effect on UES's business risk and, therefore, its Cost of Equity.

A. Small Size Effect

Q. Please explain the implications on the Cost of Equity associated with the small size of a firm.

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."[87] While empirical evidence of the size effect often is based on studies of industries beyond regulated utilities, utility analysts also have noted the risks associated with small market capitalizations. Specifically, a senior consultant with 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.[88]

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.

Q. How does the smaller size of UES affect its business risks relative to the proxy group?

A. It is important to bear in mind that my ROE recommendation for UES is developed based on market data applied to a risk-comparable proxy group. Consequently, an evaluation of the Company's risk associated with its small size is necessarily based on a comparison of

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[87] *See*, Mario Levis, *The record on small companies: A review of the evidence*, Journal of Asset Management, March 2002, at 368-397, for a review of literature relating to the size effect.

[88] Michael Annin, *Equity and the Small-Stock Effect*, Public Utilities Fortnightly, at 1 (October 15, 1995).

its size relative to the proxy group. The Company's smaller size relative to the proxy companies indicates greater relative business risk for the Company because, all else equal, size has a material bearing on risk.

In general, smaller companies, including regulated utilities, are less able to withstand adverse events that affect their revenues and expenses. Any material changes to expected operations and maintenance expenses can have severe consequences on a company's level of operating leverage. For example, smaller companies face more risk exposure to business cycles and economic conditions, both nationally and locally. Taken together, 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 existence of 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."[89] The author, who referred to that finding as the "size effect," suggested that the 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."[90] Since then, additional empirical research has focused on explaining the size effect as a function of

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89 R. W. Banz, *The Relationship Between Return and Market Value of Common Stocks*, Journal of Financial Economics, at 3-4 (1981).

90 *Ibid*., at 16.

lower trading volume and other factors, but the proposition that Beta coefficients fail to reflect the risks of smaller firms persists.[91]

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."[92]

Simply put, investors generally demand greater returns from smaller firms to compensate for less marketability and liquidity of their securities. Duff & Phelps discusses the nature of the small-size phenomenon, providing an indication of the magnitude of the size premium based on several measures of size. In discussing "Size as a Predictor of Equity Returns," Duff & Phelps states:

> The size effect is based on the empirical observation that companies of smaller size are associated with greater risk and, therefore, have greater cost of capital [sic]. The "size" of a company is one of the most important risk elements to consider when developing cost of equity capital estimates for use in valuing a business simply because size has been shown to be a *predictor* of equity returns. In other words, there is a significant (negative) relationship between size and historical equity returns - as size

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

[92] Morningstar, Ibbotson SBBI 2013 Valuation Yearbook, at 109.

decreases, returns tend to *increase*, and vice versa. (footnote omitted) (emphasis in original)[93]

Q. Are you aware of other studies regarding the existence of a size premium for regulated utilities?

A. Yes. A 2002 study by Thomas M. Zepp concludes that size premia do exist for smaller utilities. Developed in response to a 1993 study by Annie Wong, the Zepp study focuses specifically on the utility industry and the effect of the size premium in a regulated environment. For example, one study reviewed by Zepp found that smaller water utilities had a cost of equity that, on average, was 99 basis points higher than the average cost of equity for the larger water utilities, and the result was statistically significant at the 90.00 percent level.[94] Zepp concludes that "to the extent water utilities are representative of all utilities, there is support for smaller utilities being more risky than larger ones."[95]

Q. Is it appropriate to consider the risk associated with UES's small size even though it is a subsidiary of a larger entity?

A. Yes. The widely accepted "stand-alone" regulatory principle treats each utility subsidiary as its own company. Parent entities, like other investors, have capital constraints and must look at the attractiveness of the expected risk-adjusted return of each investment alternative in their capital budgeting process. The "opportunity cost" concept applies regardless of the source of the funding. When funding is provided by a parent entity, the

93 Duff & Phelps 2019 Cost of Capital Navigator, at Chapter 4-1.

94 Thomas M. Zepp, *Utility stocks and the size effect – revisited*, The Quarterly Review of Economics and Finance, 43 (2003), at 580-581.

95 Thomas M. Zepp, *Utility stocks and the size effect – revisited*, The Quarterly Review of Economics and Finance, 43 (2003), at 582.

return still must be sufficient to provide an incentive to allocate equity capital to the subsidiary or business unit rather than other internal or external investment opportunities. That is, the regulated subsidiary must compete for capital with all the parent company's affiliates, as well as with other, similarly situated utility companies. In that regard, investors value corporate entities on a sum-of-the-parts basis and expect each division within the parent company to provide an appropriate risk-adjusted return. Therefore, it is important that the authorized ROE reflects the risks and prospects of the regulated utility's operations and supports the regulated utility's financial integrity from a stand-alone perspective.

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

A. UES's electric utility operations are significantly smaller than the proxy companies. Exhibit JEN-8 estimates the implied market capitalization for UES. The implied market capitalization is calculated by applying the median market-to-book ratio for the proxy group of 1.79 to UES's implied total common equity of approximately $119.58 million.[96] The implied market capitalization based on that calculation is approximately $214.19 million, which is approximately 1.24 percent of the proxy group median market capitalization of approximately $17.25 billion. Even if we were to compare the Company's parent, Unitil Corporation, to the proxy group, Unitil Corporation's market

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[96] The equity value of UES is estimated based on the approximate value of the proposed rate base and recommended capital structure.

capitalization of approximately $630 million[97] is less than half of the smallest proxy company, Otter Tail Corporation.

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

A. In its *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 UES, therefore, is the difference in the Ibbotson size risk premia for the proxy group median market capitalization relative to the implied market capitalization for UES.

As shown on Exhibit JEN-8, according to recent market data, the median market capitalization of the proxy group is approximately $17.25 billion, which corresponds to the 2nd decile of Ibbotson market capitalization data. Based on the Duff & Phelps analysis, that decile corresponds to a size premium of 0.49 percent (or 49 basis points). The implied market capitalization for UES is approximately $214.19 million, which falls within the 9th decile and corresponds to a size premium of 2.29 percent (or 229 basis points). The difference between those size premia is 180 basis points (2.29 percent – 0.49 percent).

97 Source: S&P Global Market Intelligence. 30-trading day average market capitalization as of February 26, 2021. A market capitalization of $630 million places Unitil in Duff & Phelps' 8th size decile as shown in Exhibit JEN-8.

Q. Have you considered the comparatively small size of UES in your estimated return on common equity?

A. Yes. While I have quantified the small size effect, rather than proposing a specific premium, I have considered the relatively small size of UES in determining where, within a reasonable range of returns, UES's required ROE appropriately falls.

B. Revenue Decoupling

Q. Please briefly describe the Company's proposed revenue decoupling mechanisms.

A. As explained in the direct testimony of Timothy S. Lyons, the Company is proposing a full revenue decoupling mechanism that reconciles monthly actual and authorized revenue per customer by rate class, in which revenue shortfalls (*i.e.*, actual revenue per customer is less than the authorized revenue per customer) during the measurement period will result in a surcharge for the customers. Conversely, revenue surpluses (*i.e.*, actual revenue per customer is greater than authorized revenue per customer) during the measurement period will result in a credit or refund to the customers. The monthly variances will be aggregated over 12 months to develop the revenue decoupling adjustment and will be allocated to each rate class.

Q. How common are revenue stabilization and cost recovery mechanisms within the industry in general?

A. There is little question that revenue stabilization and cost recovery structures have become increasingly common. The increased interest in such mechanisms has generally resulted from the growing cost of maintaining system reliability, coupled with flat or declining sales volume brought on by energy efficiency. Adjustment mechanisms to recover fuel costs, purchased power expenses, energy efficiency and demand-side program costs, new plant investment, and other expenses are common.[98] In addition, full or partial decoupling mechanisms have been implemented by electric utilities in 35 states.[99] Although the specific form of the Company's proposed mechanisms may be unique, the adoption and implementation of alternative regulation mechanisms in general is quite common and has become an increasingly visible issue to investors.

Q. Are cost recovery and revenue stabilization mechanisms common among the proxy companies?

A. Yes, they are. Exhibit JEN-9 provides a summary of revenue stabilization mechanisms and cost trackers currently in effect at each electric utility subsidiary of the proxy companies. As Exhibit JEN-9 demonstrates, all the proxy companies employ cost recovery mechanisms similar to those in place at the Company. Nearly all the proxy companies' operating subsidiaries recover fuel, as well as energy efficiency costs through a cost recovery mechanism. As to decoupling mechanisms, 16 of the 24 proxy companies have either a full or partial decoupling mechanism in place in at least one operating subsidiary. Exhibit JEN-9 also includes a summary of the alternative regulation and incentive plans currently in effect at the proxy companies, including

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98 *See*, Exhibit JEN-9.

99 *See*, *e.g.*, *Adjustment Clauses: A State-by-State Overview*, Regulatory Research Associates Regulatory Focus, November 12, 2019; *Alternative ratemaking plans in the U.S.*, Regulatory Research Associates Regulatory Focus, April 16, 2020; ACEEE, State and Local Policy Database, Utility Business Model, https://database.aceee.org/state/utility-business-model.

formula-based rate plans, which provide comprehensive adjustment mechanisms that automatically adjust rates if the earned return is above or below an authorized range.

Q. Are you aware of any studies that have addressed the relationship between revenue decoupling mechanisms, generally, and the Cost of Capital?

A. Yes. In March 2014, The Brattle Group ("Brattle") published a study addressing the effect of revenue decoupling structures on the Cost of Capital for electric utilities.[100] In its report, which extended a prior analysis focused on natural gas distribution utilities, Brattle pointed out that although decoupling structures may affect revenue, net income still can vary.[101] Brattle further noted that the distinction between diversifiable and non-diversifiable risk is important to equity investors, and the relationship between revenue decoupling and the Cost of Equity should be examined in that context. To that point, Brattle noted that although reductions in total risk may be important to bondholders, only reductions in non-diversifiable business risk would justify a reduction to the ROE.[102] In November 2016, the Brattle study was updated based on data through the fourth quarter of 2015.[103]

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100 *See,* The Brattle Group, *The Impact of Revenue Decoupling on the Cost of Capital for Electric Utilities: An Empirical Investigation, Prepared for The Energy Foundation, March 20, 2014.*

101 *Ibid*. at 7.

102 *Ibid*. at 8.

103 *See*, The Brattle Group, *Effect on the Cost of Capital of Innovative Ratemaking that Relaxes the Linkage between Revenue and kWh Sales – An Updated Empirical Investigation of the Electric Industry*, November 2016. Also available at http://files.brattle.com/files/5711_effect_on_the_cost_of_capital_of_ratemaking_that_relaxes_the_linkage_between_revenue_and_kwh_sales.pdf.

Brattle's empirical analysis examined the relationship between decoupling and the After-Tax Weighted Average Cost of Capital for a group of electric utilities that had implemented decoupling structures in various jurisdictions throughout the United States. As with Brattle's 2014 study, the updated study found no statistically significant link between the Cost of Capital and revenue decoupling structures.[104]

In addition, Dr. Richard A. Michelfelder, together with Dylan W. D'Ascendis and Pauline M. Ahern, examined the relationship between decoupling and the Cost of Equity among electric, gas, and water utilities. Using the generalized consumption asset pricing model, they found decoupling to have no statistically significant effect on investor perceived risk, and the Cost of Equity.[105]

Q. How have you reflected that information in your assessment of the Company's Cost of Equity?

A. First, my analyses and conclusions recognize that developing the Cost of Equity necessarily is a comparative assessment. As such, even if it were the case that revenue stabilization mechanisms mitigate "risk," they only would affect the Cost of Equity if: (1) the effect of the mechanism was to reduce risk below the levels faced by the subject company's peers in the proxy group; and (2) investors knowingly reduced their return requirements for the Company as a direct consequence of the mechanisms. The first

104 *Ibid.*

105 *See*, Dr. Richard A. Michelfelder, Pauline M. Ahern, Dylan W. D'Ascendis, *Decoupling impact and public utility conservation investment*, Energy Policy 130 (2019) 311-319.

analytical step, therefore, is to understand whether revenue stabilization mechanisms are in place at the proxy companies.

The question of the extent to which revenue stabilization mechanisms are in place at comparable companies is addressed in Exhibit JEN-9. As noted earlier, a majority of the 24 proxy companies have a decoupling mechanism in place in at least one jurisdiction. Some proxy group operating companies that do not have a revenue decoupling mechanism have other mechanisms such as a formula rate plan that adjusts revenue annually to a target ROE. Because revenue stabilization mechanisms are common among electric distribution utilities, there is no evidence that the Company is less risky than its peers. Lastly, as discussed above, multiple studies have shown no statistically significant link between the Cost of Capital and revenue decoupling structures.

Q. In your opinion, is a reduction in the Cost of Equity in connection with the Company's proposed revenue decoupling mechanism warranted?

A. No. While the proposed decoupling mechanism would support UES's financial integrity, approval of the Company's proposed decoupling mechanism simply renders it more comparable to its peers. Because the Cost of Equity is a comparative exercise, to the extent decoupling mechanisms reduce a utility's risk, any risk-reducing effects are already reflected in the proxy group and, therefore, in the analytical results that underlie my recommended ROE range. Consequently, no adjustment to UES's ROE is warranted as a result of its proposed decoupling mechanism.

V. CAPITAL STRUCTURE

Q. What capital structure is UES requesting?

A. As explained in the direct testimony of Company witness Todd Diggins, UES is requesting its actual capital structure consisting of 52.91 percent common equity, 0.10 percent preferred stock equity, 46.99 percent long-term debt, and 0.00 percent short-term debt[106] is reasonable and should be used for ratemaking purposes for UES.

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

A. The capital structure relates to 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. In that regard, 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. In essence, even if two firms face the same business risks, a company with meaningfully higher levels of debt in its capital structure is likely to have a higher cost of both debt and equity. Since the capital structure can affect the subject company's overall level of risk, it is an important consideration in establishing a just and reasonable rate of return. The higher the proportion of senior capital in the capital structure, the higher the financial risk that must be factored into the Cost of Equity.

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106 *See,* Schedules RevReq-5 and RevReq-5-1.

Q. Is there support for the proposition that capital structure is a key consideration in establishing an appropriate ROE?

A. Yes. The Supreme Court and various utility commissions have long recognized the role of capital structure in the development of a just and reasonable rate of return for a regulated utility. In particular, a utility's leverage, or debt ratio, has been explicitly recognized as an important element in determining a just and reasonable rate of return:

> Although the determination of whether bonds or stocks should be issued is for management, the matter of debt ratio is not exclusively within its province. Debt ratio substantially affects the manner and cost of obtaining new capital. It is therefore an important factor in the rate of return and must necessarily be considered by and come within the authority of the body charged by law with the duty of fixing a just and reasonable rate of return.[107]

Perhaps ultimate authority for balancing the issues of cost and financial integrity is found in the Supreme Court's statement in *Hope*:

> The rate-making process under the Act, *i.e.*, the fixing of 'just and reasonable rates,' involves a balancing of the investor and the consumer interests.[108]

As the U.S. Court of Appeals, District of Columbia Circuit found in *Communications Satellite Corp. et. al. v. FCC*:

> The equity investor's stake is made less secure as the Company's debt rises, but the consumer rate-payer's burden is alleviated.[109]

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107 *New England Telephone & Telegraph Co. v. State*, 98 N.H. 211, 220, 97 AM213, 220 (1953), citing *New England Tel. & Tel. Co. v. Department of Pub. Util., (Mass.)*, 97 N.E. 2d 509, 514 (1951); *Petitions of New England Tel. & Tel. Co.*, 80 A2d 671, at 6 (1951).

108 *Federal Power Commission v. Hope Natural Gas Co.,* 320 U.S., at 603 (1944).

109 *Communications Satellite Corp. v. Federal Communications Commission and United States of America*, 611 F.2d 883, at 19 (1977).

Consequently, the principles of fairness and reasonableness with respect to the allowed Return on Equity and capital structure are considered at both the federal and state levels. Additionally, Dr. Morin states:

> [t]he mix of debt and equity employed in computing the weighted average cost of capital influences the return required by debt and equity capital suppliers. For example, increasing the proportion of low-cost debt financing lowers the overall cost of capital but increases the financial risk of the company to the detriment of shareholders who require a higher return in compensation for the increased risk. As the utility employs relatively more debt capital, the low-cost advantage of debt may be more than offset by the increased cost of equity.[110]

Q. How did you assess the reasonableness of UES's requested capital structure with respect to the proxy group?

A. The proxy group has been selected to reflect comparable companies in terms of financial, business, and regulatory risks. Therefore, it is appropriate to compare the capital structures of the utility operating companies held by the proxy companies to that of the subject company in order to assess whether the requested capital structure is consistent with industry standards for companies with commensurate risk profiles.

Q. Please describe your analysis of UES's requested capital structure relative to industry practice.

A. As a measure of industry practice, I calculated the average capital structure for each of the electric utility operating companies held by the proxy companies over the last five fiscal quarters and the last eight fiscal quarters. As shown in Exhibit JEN-10, the proxy group average capital structure over those two averaging periods includes approximately

[110] Roger A. Morin, Ph.D., New Regulatory Finance, at 25 (2006).

53.10 percent common equity, 46.70 percent long-term debt, and 0.20 percent preferred equity. The common equity ratio ranges from approximately 48.00 percent to 60.00 percent. Based on that review, the requested capital structure is consistent with actual capital structures in place at the proxy companies.

Q. What is the basis for using average capital components rather than a point-in-time measurement?

A. Measuring the capital components at a particular point in time can skew the capital structure by the specific circumstances of a particular period. Therefore, it is more appropriate to normalize the relative relationship between the components over a period of time.

Q. Is there a generally accepted approach to developing the appropriate capital structure for a regulated electric utility?

A. Yes, there are several generally accepted approaches to developing the appropriate capital structure. The reasonableness of the approach depends on the nature and circumstances of the subject company. Regardless of the approach taken, however, it is important that the capital structure enable the subject company to maintain its financial integrity, thereby enabling access to capital at competitive rates under a variety of economic and financial market conditions. Therefore, I conclude the requested capital structure of 52.91 percent common equity, 0.10 percent preferred stock equity, 46.99 percent long-term debt, and 0.00 percent short-term debt is reasonable for ratemaking purposes in this proceeding and should be approved.

VI. SUMMARY AND CONCLUSION

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

A. As discussed throughout my Direct Testimony, it is important to consider a variety of quantitative and qualitative information in reviewing analytical results and arriving at ROE determinations. Based on my review of the results from three commonly used analytical approaches, I conclude an ROE in the range of 9.90 percent to 10.50 percent represents the range of equity investors' required return for investment in electric utilities similar to UES in today's volatile capital market environment. Within that range, I conclude that an ROE of 10.20 percent represents the Cost of Equity for UES. That conclusion is a conservative estimate, particularly when UES's small size relative to the proxy companies is also considered.

As to the capital structure, I conclude that a capital structure consisting of 52.91 percent common equity, 0.10 percent preferred stock equity, 46.99 percent long-term debt, and 0.00 percent short-term debt is consistent with capital structures in place at the proxy group and, therefore, is reasonable for ratemaking purposes.

Q. Does this conclude your Direct Testimony?

A. Yes, it does.