D.P.U. 17-05
SREF-DJG-1
April 28, 2017
Hearing Officer Tassone

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

Petition of NSTAR Electric Company and Western Massachusetts Electric Company each d/b/a Eversource Energy for Approval of an Increase in Base Distribution Rates for Electric Service Pursuant to G.L. c. 164, § 94 and 220 C.M.R. § 5.00	D.P.U. 17-05

INITIAL TESTIMONY OF

DAVID J. GARRETT

DISTRIBUTED GENERATION AND THE COST OF CAPITAL

ON BEHALF OF

SUNRUN, INC.
AND
THE ENERGY FREEDOM COALITION OF AMERICA, LLC

APRIL 28, 2017

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I. INTRODUCTION

Q. State your name and occupation.

A. My name is David J. Garrett. I am a consultant specializing in public utility regulation. I am the managing member of Resolve Utility Consulting, PLLC. I focus my practice on the primary capital recovery mechanisms for public utility companies: cost of capital and depreciation.

Q. Summarize your educational background and professional experience.

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

issues. A more complete description of my qualifications and regulatory experience is included in my curriculum vitae.[1]

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

A. I am testifying on behalf of Sunrun, Inc. ("Sunrun") and the Energy Freedom Coalition of America, LLC ("EFCA").

Q. Describe the scope of your testimony.

A. In this case I am testifying on the cost of capital and awarded rate of return requested in the petition of NSTAR Electric Company ("NSTAR") and Western Massachusetts Electric Company ("WMEC"), each d/b/a Eversource Energy (collectively, "Eversource" or the "Companies").

II. EXECUTIVE SUMMARY

Q. What is the purpose of your testimony?

A. The primary purpose of my testimony is to address the ways in which the Companies' requested return on equity ("ROE") in this proceeding may serve to disincentivize investment in distributed energy resources ("DER"). I will also address Eversource's allegations that the addition of DER to the traditional cost recovery models for electric

[1] Exhibit SREF-DJG-2.

utilities and electricity markets will warrant an elevated ROE for the Companies.[2] Finally, I will evaluate the Companies' proposed ROE, and make recommendations for the Commission to establish a ROE level that: (1) would be just and reasonable under the circumstances; (2) would balance the interests of customers and shareholders; and (3) would reduce the impact of the Companies' proposed monthly minimum reliability contribution ("MMRC"), which at its proposed level would disincentivize DER on the Companies' system.

Q. Has Massachusetts passed a law designed to encourage investment in DER?

A. Yes. Massachusetts has passed several laws and implemented a variety of policies to encourage investment in DER. For example, an Act Relative to Green Communities, 2008 Mass. Ch. 169, codified at G.L. c. 164, § 162 directs the Department "to remove any impediments to the development of efficient, low-emissions distributed generation . . . ." The state's objective in this regard was furthered by the Department's Order in the Electric Grid Modernization proceeding (D.P.U. 12-76-B). According to the Department:

[2] *See* Exhibit RBH-1, p. 52, lines 12 – 15.

> Integrating distributed resources, such as renewables, EVs, microgrids, and storage, is key to achieving the Commonwealth's climate and resiliency goals and statutory requirements… Grid modernization will enable the safe interconnection and full integration of greater quantities of intermittent distributed resources.[3]

Further, An Act to Promote Energy Diversity, Chapter 188 of the Acts of 2016, directed the establishment of the nation's third storage mandate, if the Department of Energy Resources found that setting a target would be prudent and cost effective. Thus, it is clear that Massachusetts is encouraging investment in DER.

Q. Describe how an overstated ROE can disincentivize investments in DER.

A. Under the Companies' proposal, net energy metering customers would be required to pay a monthly minimum reliability contribution ("MMRC") as part of their payment for service. I am not testifying as to the propriety of the proposed MMRC. Rather, my testimony speaks to the size of the proposed MMRC, which, under the Company's purported cost of service approach, is influenced by the size of the Company's revenue requirement. And as the Companies' ROE is one of the most significant drivers of the revenue requirement in this case,[4] the level of ROE will have a direct impact on DER customers because it will affect the level of the proposed MMRC.[5] In other words, an

[3] D.P.U. 12-76-B, *Investigation by the Department of Public Utilities on its own Motion into Modernization of the Electric Grid*, Order, June 12, 2014, at 12-13.

[4] *See* Exhibit SREF-DJG-22.

[5] *See* Direct Testimony of Tim Woolf and Melissa Whited on behalf of Sunrun Inc. and the Energy Freedom Coalition of America, LLC.

inflated ROE would result in an overstated revenue requirement, which in turn would result in higher proposed MMRC charges on DER customers. Customers are incentivized to invest in DER because it can reduce their electric costs over time. If an MMRC is approved and incorporates an awarded ROE that is higher than the Companies' market-based cost of equity, it will reduce even further the potential savings realized by customers who choose to invest in DER. Therefore, it is important that the Commission set the awarded ROE based on the Companies' market-based cost of equity; otherwise, an overstated ROE may undermine the Commonwealth's desire to incentivize DER.

Q. Does an increasing prevalence of DER customers have an increasing effect on the Companies' risk and cost of equity?

A. No. According to the Companies' witness Robert B. Hevert, increasing prevalence of distributed generation could have an increasing effect on the Companies' risk. Although Mr. Hevert apparently did not increase his ROE recommendation by a stated amount to account for distributed generation, he states that he "considered" it.[6] I disagree with the premise that the presence of distributed generation on the system materially affects the Companies' market risk or creates uncertainty that must be mitigated by an elevated ROE.

[6] Direct Testimony of Robert B. Hevert, p. 51:21-23.

Q. Describe Eversource's position regarding the cost of equity in this case.[7]

A. In this Application, Eversource has proposed a cost of equity of 10.5% for both NSTAR and WMEC. For NSTAR, Eversource has requested a capital structure consisting of 45.69% long-term debt, 0.94% preferred stock, and 53.37% common equity, equating to an overall weighted average return of 7.61%.[8] For WMEC, Eversource has requested a capital structure consisting of 46.66% long-term debt and 53.34% common equity, equating to an overall weighted average return of 7.62%.[9] The Companies' proposed weighted average cost of capital is 7.61%.[10] The Companies' cost of capital proposals are presented in the testimony of Eversource witness Robert B. Hevert.

Q. Please summarize your analyses and conclusions regarding Eversource's cost of equity.

A. I find that the Companies' proposed ROE is overstated. Furthermore, as stated above, I am concerned that an adoption of the Companies' position could negatively impact the MMRC, thereby discouraging customers from investing in DER. Accordingly, and again, without conceding the propriety of an MMRC, I recommend a more appropriate ROE that will not have these negative effects. In formulating my recommendation, I performed a thorough, independent analysis to estimate Eversource's cost of equity. To

[7] I define "cost of capital," "weighted cost of capital," and other terms in Appendix G.

[8] *See* Exhibit ES-DPH-2 (East), Schedule DPH-31.

[9] *See* Exhibit ES-DPH-2 (West), Schedule DPH-31.

[10] Company Schedule DPH-31.

do this, I selected a proxy group of companies that represents a relevant sample with asset and risk profiles similar to those of Eversource. In fact, I selected the same proxy group as Mr. Hevert. Based on this proxy group, I evaluated the results of two widely-accepted financial models for calculating cost of equity: (1) the Discounted Cash Flow ("DCF") model; and (2) the Capital Asset Pricing Model ("CAPM"). Applying reasonable inputs and assumptions to these models reveals that Eversource's estimated cost of equity is 7.5%. My general approach is summarized in Appendix H. Appendix E summarizes my conclusions based upon my DCF and CAPM models.

Q: Summarize your analyses and conclusions regarding Eversource's capital structure.

A. In this testimony, I present evidence that Eversource's requested capital structure is not reflective of one that would exist in a competitive environment and is therefore inappropriate for ratemaking purposes. As discussed in my testimony, I recommend the Commission impute a debt ratio of 51% for Eversource. This proposal better aligns the Companies' capital structure with one that we would see in a competitive environment, and it also reflects the capital structures of other regulated utilities in the proxy group. Appendix F summarizes my conclusions as to capital structure.

Q. What is your awarded return recommendation?

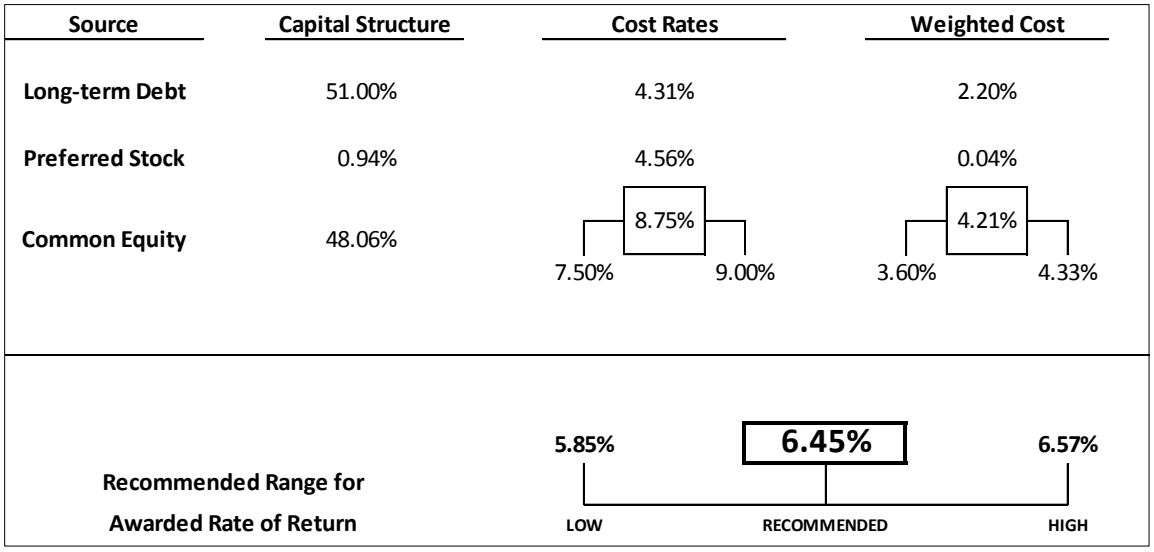
A. Pursuant to the legal and technical standards guiding this issue, the awarded rate of return should be based on, or reflective of, the weighted average cost of the utility's cost of equity and cost of debt. As discussed above, Eversource's actual cost of equity is about

7.5%. The legal standards governing this issue indicate that the awarded return should reflect the actual cost of equity. However, these legal standards also provide that the "end result" be fair and reasonable under the circumstances. Specifically, in *Federal Power Commission v. Hope Natural Gas Co*., the Supreme Court found that although the awarded return should be based on a utility's cost of capital, it is also indicated that the "end result" should be just and reasonable.[11] If the Commission were to award a return on equity reflective of Eversource's actual cost of equity of 7.5% it would be technically correct under the rate base rate of return model, and it would not violate any legal standards. However, if the Commission were to set the awarded return at 7.5%, it would arguably represent an abrupt change in Eversource's awarded return. One of the primary reasons Eversource's cost of equity is low is because it is a very low-risk asset. In general, utility stocks are low-risk investments because movements in their prices are not volatile. If the Commission were to make a significant, sudden change in the awarded ROE, however, it could have the effect of increasing the Companies' risk. Therefore, while it is legally and technically appropriate to set the awarded return at or near the Companies' actual cost of equity, it would be arguably better not to move the awarded return over 200 basis points in one case for any utility, pursuant to the *Hope* Court's "end result" doctrine. For these reasons, I recommend an awarded return on equity that is

[11] *See Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944). Here, the Court stats that it is not mandating the various permissible ways in which the rate of return may be determined, but instead indicates that the end result should be just and reasonable. This is sometimes called the "end result" doctrine. For a more fulsome discussion of the legal standards, please see Appendix A.

higher than Eversource's actual cost of equity. Specifically, I recommend that the Commission award a return on equity of 8.75%, which is towards the upper end of a reasonable range of 7.5% – 9.0%. In addition, I am recommending an imputed debt ratio of 51% for both NSTAR and WMEC to reflect a more prudent capital structure for each company.[12] My recommendations regarding NSTAR's awarded rate of return are summarized in the following figure:[13]

Figure 1:
Awarded Return Recommendation - NSTAR

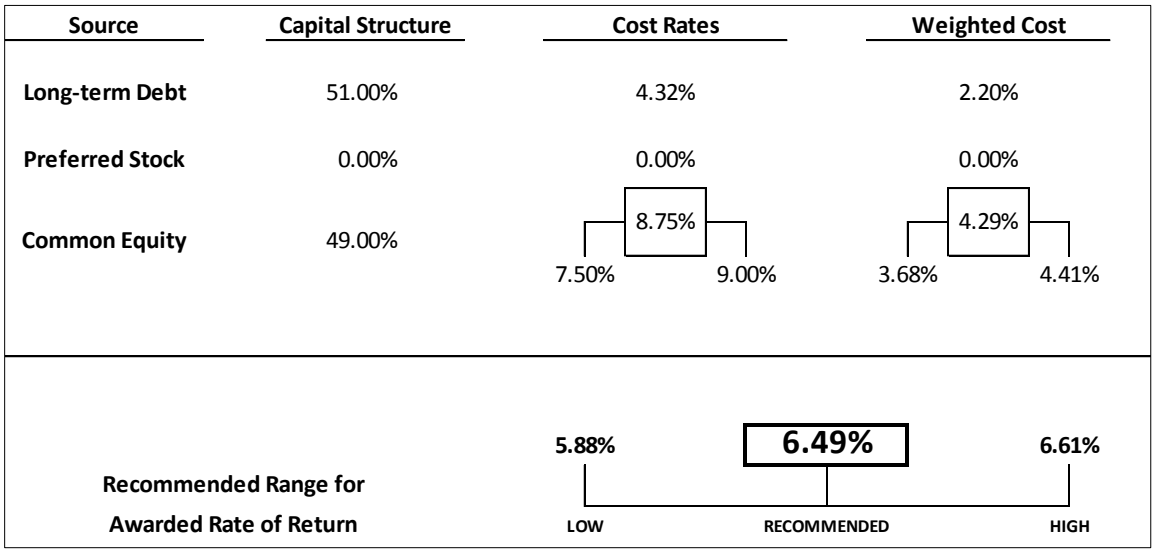


[12] I discuss my capital structure analysis in Appendix F.

[13] *See also* Exhibit SREF-DJG-3.

As shown in this figure, my overall weighted average awarded return recommendation for NSTAR is 6.45%. The next figure summarizes my recommendations regarding WMEC's awarded rate of return:[14]

Figure 2:
Awarded Return Recommendation - WMEC



As shown in this figure, my overall weighted average awarded return recommendation for WMEC is 6.49%. In this case, if the Commission were to award a return on equity of 8.75% as I have recommended, it will allow Eversource's shareholders to earn a return that is much higher than the one they require for investing in a low-risk utility company.

[14] *See also* Exhibit SREF-DJG-4.

Q. Describe the dollar impact to the Companies' proposed rate increase resulting from your proposals.

A. NSTAR has proposed a rate increase of $60 million. My ROE and capital structure proposals would reduce the Company's proposed rate increase by an estimated $58 million, as illustrated in the following figure.[15]

Figure 3:
Revenue Requirement Impact - NSTAR

Description	Rate Base	Pre-Tax ROR	Rate Increase
	[DPH-1]		[DPH-1]
Requested Amounts	$ 2,734,402,771	11.48%	$ 60,194,387
Adjust ROE to 8.75%	$ 2,734,402,771	-2.13%	$ (58,143,025)
Total			$ 2,051,362

WMEC has proposed a rate increase of $35.7 million. My ROE and capital structure proposals would reduce the Company's proposed rate increase by an estimated $9 million, as illustrated in the following figure.[16]

[15] *See also* Exhibit DJG-21.

[16] *Id.*

Figure 4:
Revenue Requirement Impact - WMEC

Description	Rate Base	Pre-Tax ROR	Rate Increase
	[DPH-1]		[DPH-1]
Requested Amounts	$ 440,871,529	11.50%	$ 35,663,046
Adjust ROE to 8.75%	$ 440,871,529	-2.04%	$ (8,976,821)
Total			$ 26,686,225

Thus, as discussed above, the cost of capital issue has a significant impact on the Companies' overall revenue requirement.

Q. Please provide an overview of the problems you have identified with the Companies' cost of capital estimate.

A. As set forth above, Mr. Hevert proposes a return on equity of 10.50% for the Companies, a debt ratio of only 46% for NSTAR, and a debt ratio of only 47% for WMEC. Mr. Hevert's cost of equity recommendations are based on the CAPM, DCF Model, and a risk premium model, however, several of his key assumptions and inputs to these models violate fundamental, widely-accepted tenants in finance and valuation. In the sections below, I will discuss my concerns regarding the Companies' requested cost of capital in further detail. However, the key areas of concern are summarized as follows:

1. In his DCF Model, Mr. Hevert's long-term growth rate applied to Eversource exceeds the long-term growth rate for the entire U.S. economy. It is a fundamental concept in finance that, in the long run, a company cannot grow at a faster rate than the aggregate economy in which it operates; this is especially true for a regulated utility with a defined service territory. Thus, the results of Mr. Hevert's DCF Model are based on unrealistic assumptions and are not reflective of market conditions.[17]

2. Mr. Hevert's estimate for the equity risk premium ("ERP"), the single most important factor in estimating the cost of equity, is more than twice as high as the estimate reported by thousands of experts across the country. This is because in estimating the equity risk premium, Mr. Hevert assumed long-term growth rates in excess of 70% for some U.S. companies, which is about 17 times greater than the estimated growth rate of the entire U.S. economy. Thus, the results of Mr. Hevert's CAPM are also based on unrealistic assumptions and are not reflective of market conditions.[18]

3. Mr. Hevert suggests that company-specific risk factors have an increasing effect on its cost of equity. However, this assumption overlooks the fundamental concept that the market does not reward diversifiable, firm-specific risk; therefore, rational investors do not expect a return for such risk.[19]

4. Mr. Hevert proposes debt ratio of 46% and 47% for NSTAR and WMEC, respectively. These debt ratio is not reflective of ones that we would see in a competitive environment for these companies. These low debt ratios further escalate the Companies' proposed cost of capital. By choosing high-cost equity over low-cost debt, the Companies have artificially inflated their capital costs at the unnecessary expense of customers and for the sole benefit of shareholders.

In short, the assumptions employed by Mr. Hevert skew the results of his financial models such that they do not reflect the economic realities of the market upon which cost of equity recommendation should be based. In the testimony below, I demonstrate how correcting the various erroneous assumptions in the DCF and CAPM financial models

[17] Exhibit RBH-1.

[18] Exhibit RBH-3.

[19] *See generally* Direct Testimony of Robert B. Hevert pp. 41-53.

results in appropriate ROE recommendations which better align with current market conditions and Eversource's risk profile.

Q. Please be more specific, starting with Mr. Hevert's DCF Model.

A. Mr. Hevert's DCF Model produced cost of equity results as high as 10.61%.[20] The results of Mr. Hevert's DCF Model are overstated because of a crucial mistake regarding his growth rate inputs. Specifically, Mr. Hevert used long-term growth rates as high as 9.0%. In fact, in developing his Constant DCF "High ROE," he used a long-term growth rate of 9.0% for every company in the proxy group. Mr. Hevert's growth rate input exceeds realistic estimates of long-term GDP, which means his assumption violates the basic principle that no company can grow at a greater rate than the economy in which it operates over the long-term, especially a regulated utility company with a defined service territory. Since Mr. Hevert and I used the same proxy group of utilities for our analyses, and our stock price and dividend inputs are substantially similar, if Mr. Hevert had used the highest realistic growth rate of 4.1% as I did, his DCF Model would have produced a cost of equity result of about 7.5%, which is much more realistic.

Q. Were the results of your DCF Model consistent with the results of your CAPM?

A. Yes, although the financial models are based on entirely, different inputs, the results in this case were exactly the same. Both models yielded a cost of equity estimate of 7.5%.[21]

These results provide further support for the accuracy of these models, especially when they are used to analyze the cost of equity for utility companies. The detailed results of my CAPM analysis are presented in the following section.

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

A. Using the inputs for the risk-free rate, beta coefficient, and equity risk premium discussed above, I calculated the CAPM cost of equity for each proxy company. Using the same CAPM equation presented above, the results of my CAPM analysis are expressed as follows:[22]

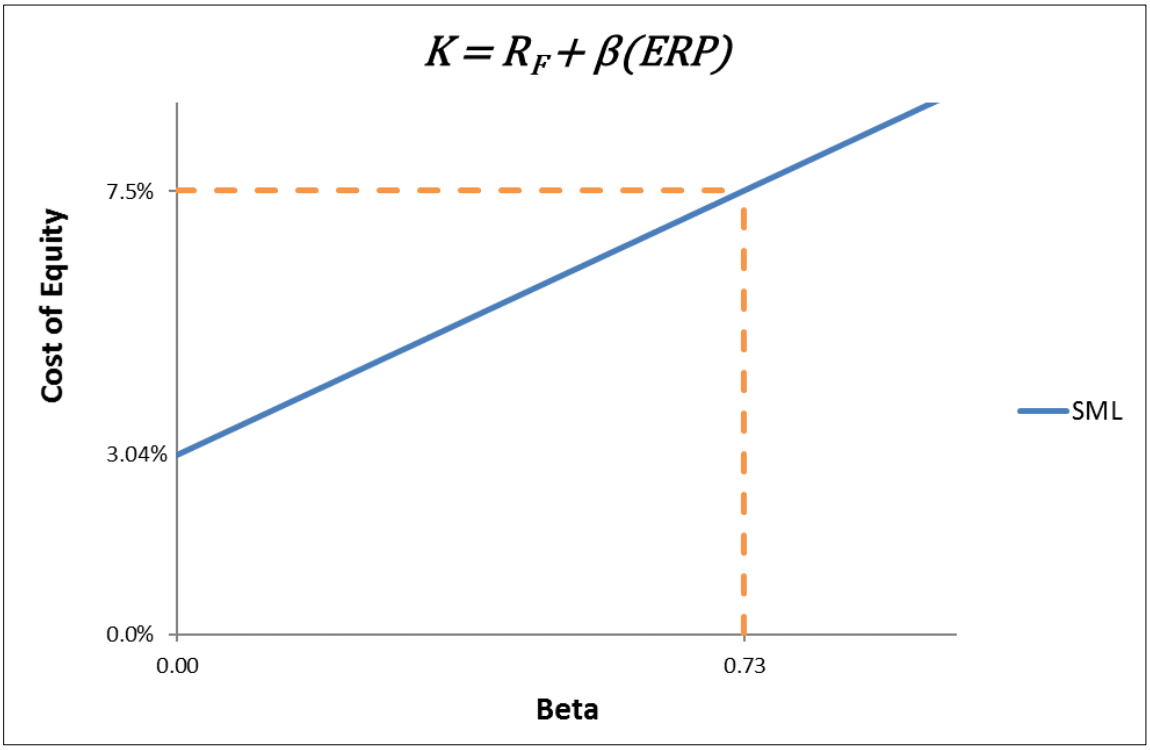
Equation 1:
CAPM Results

$$\mathbf{7.5}\% = 3.04\% + 0.73(6.2\%)$$

The CAPM suggests that Eversource's cost of equity capital is about 7.1%. The CAPM may be displayed graphically through what is known as the Security Market Line ("SML"). The following figure shows the expected return (cost of equity) on the y-axis, and the average beta for the proxy group on the x-axis. The SML intercepts the y-axis at the level of the risk-free rate. The slope of the SML is the equity risk premium.

[22] Exhibit SREF-DJG-14.

Figure 5:
CAPM Graph



The SML provides the required rate of return that will compensate investors for the beta risk of that investment. Thus, at an average beta of 0.73 for the proxy group, the estimated cost of equity for Eversource is 7.5%.

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

A. Yes. Mr. Hevert's CAPM cost of equity results are as high as 11.32%.[23] The main problem with Mr. Hevert's CAPM analysis is his input for the equity risk premium.

[23] Direct Testimony of Robert B. Hevert, p. 74 (Table 11).

Q. Did Mr. Hevert rely on a realistic measure for the equity risk premium?

A. No. Mr. Hevert's used an input as high as 11.21% for the equity risk premium ("ERP").[24] The ERP is one of three inputs in the CAPM equation, and it is one of the most single important factors for estimating the cost of equity in this case. As discussed above, I used two widely-accepted methods for estimating the ERP, including consulting expert surveys and calculating the implied ERP based on aggregate market data. In contrast, Mr. Hevert essentially conducted a DCF analysis on every single company in the S&P 500. This means that Mr. Hevert made 500 separate growth rate inputs for each company in his market portfolio. If his growth inputs were reasonable, then the model could theoretically produce reasonable results. Instead, however, many of Mr. Hevert's growth rate inputs were not realistic. For example, Mr. Hevert estimated a long-term growth rate for Cimarex Energy Co. of 71%.[25] Recall that, as a general rule, the long-term growth rate for any U.S. company cannot exceed long-term growth in GDP, which is projected at about 4%. This means that Mr. Hevert's long-term growth estimate for this company is over 17 times anything that could be considered realistic.

Q. What is the impact of Mr. Hevert's flawed ERP estimate?

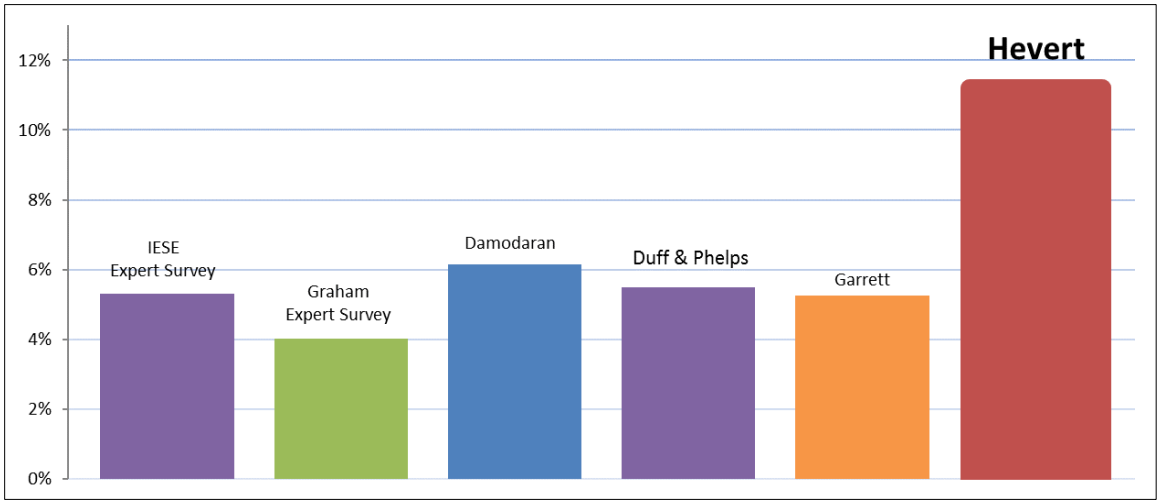
A. Mr. Hevert's overestimated ERP is considerably higher than the range of ERPs utilized by firms and analysts across the country. Because the ERP is not firm-specific, there are

[24] Exhibit ES-RBH-5.

[25] Exhibit RBH-3, p. 1.

fairly standardized ERP levels that are widely recognized by several prominent national expert surveys. For example, as discussed above, Graham and Harvey's 2016 expert survey reports an average ERP of 4.0%. The IESE Business School expert survey reports an average ERP of 5.3%. Similarly, Duff & Phelps estimates an ERP of 5.5% for 2016. The following chart illustrates that Mr. Hevert's ERP estimate is far out of line with industry norms:[26]

Figure 6:
Equity Risk Premium Comparison



When compared with these well-established ERP benchmarks, it is clear that Mr. Hevert's ERP estimate is not within the range of reasonableness. As a result, his CAPM cost of equity estimates similarly reach overstated and unrealistic results.

[26] The ERP estimated by Dr. Damodaran is the highest of his several ERP estimates under various assumptions.

Q. Did you also review Mr. Hevert's Bond Yield Plus Risk Premium Model?

A. Yes. Before I discuss Mr. Hevert's risk premium model, I will reiterate that the CAPM itself is a "risk premium" model. In short, it takes the bare minimum return any investor would require for buying a stock (the risk-free rate), then adds a *premium* to compensate the investor for the extra risk he or she assumes by buying a stock rather than a riskless U.S. Treasury security. The CAPM has been utilized by companies around the world for decades for the same purpose we are using it in this case – to estimate cost of equity. When reasonable inputs are used in the CAPM, this model tends to produce cost of equity results for utility companies that are much lower than the excessive awarded returns requested by utility executives. Thus, utility witnesses often downplay or completely distort the Nobel-Prize-winning CAPM and instead promote their own various risk premium models.

In stark contrast to the CAPM, the risk premium models relied upon by utility witnesses are not market-based, and therefore have no value in helping us estimate the market-based cost of equity. Unlike the CAPM, which is found in almost every comprehensive financial textbook, the risk premium models used by utility witnesses are typically only found in texts written by other utility witnesses. Specifically, these risk premium models attempt to create an inappropriate link between market-based factors, such as interest rates, with awarded returns on equity. Inevitably, this type of model is used to justify a cost of equity that is much higher than one that would be dictated by market forces.

In this case, Mr. Hevert's risk premium model is no different. Mr. Hevert's version of the risk premium model looked at the difference between awarded returns and Treasury bonds over a period of time.[27] This necessarily suggests that the awarded ROE should be somehow based on the current interest rate. In some aspects this is correct, though not for the reasons implied in Mr. Hevert's model. Indeed, the legal standards governing this issue direct that the awarded return on equity should be based on the cost of equity. In turn, the cost of equity, as estimated through the CAPM, is driven by interest rates. Thus, the idea that the awarded ROE should be based on interest rates is already built into the CAPM, but only if regulators base the awarded ROE on the true cost of equity, which is about 7.5% in this case. Unfortunately, it is clear that for many years, awarded returns for utilities have escalated far above market-based cost of equity computations. Giving undue consideration to Mr. Hevert's "risk premium" model would only serve to perpetuate this trend, which has resulted in a significant excess wealth transfer from ratepayers to shareholders for many years.

Q. Describe the proper way to consider risk premiums when estimating the cost of equity.

A. The CAPM already has a built-in risk premium factor known as the equity risk premium ("ERP"). Not only is the ERP a crucial factor in the CAPM, but many would agree that

[27] Direct Testimony of Robert B. Hevert, p. 38:10-19.

the ERP is "the single most important variable for making investment decisions. . . ."[28] Specifically, the ERP is the expected return on the market less the risk-free rate. In other words, the ERP is a function of market-driven forces. Unlike the risk premium presented in Mr. Hevert's testimony, the ERP cannot be influenced by the decisions of a utility commission. For that matter, it cannot be materially influenced by the decisions of any single company. Thus, the ERP has no material connection with the returns awarded to public utility companies in rate cases. This point is demonstrated by the expert surveys. Recall that the expert surveys ask thousands of experts across the country about the current ERP. When these experts are asked about the sources they relied on in giving their ERP estimate, it is not surprising that they make no mention of commission-awarded returns.[29] Moreover, many awarded returns arise out of settlements, which means that in complete contrast to the ERP, they are not reflective of market-driven forces. For all of these reasons, it is inappropriate to consider commission-awarded returns in any risk premium analysis.

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

[29] In the IESE Business School's 2014 survey, some of the respondents indicated which books, papers, and other sources they used as a reference to justify the equity risk premium that they used. The most cited references were Dr. Damodaran, Ibbotson, Duff & Phelps, Graham-Harvey, Bloomberg, Grabowski, Siegel, and other sources. Of course, there was no mention of commission-awarded returns.

III. ADDITIONAL INFORMATION

Q. Describe Mr. Hevert's opinion on flotation costs.

A. Mr. Hevert suggests that flotation costs should have an increasing effect on the cost of equity, and modified his DCF calculation to include an additional 0.12% for flotation costs.[30]

Q. Do you agree with Mr. Hevert's theory?

A. No. When companies issue equity securities, they typically hire at least one investment bank as an underwriter for the securities. "Flotation costs" generally refer to the underwriter's compensation for the services it provides in connection with the securities offering. The Commission should not allow recovery of flotation costs in this case for the following three reasons:

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

Mr. Hevert stated that flotation costs "include out-of-pocket expenditures for preparation, filing, underwriting and other issuance costs of common stock."[31] This statement is misleading. Describing a cost as "out-of-pocket" suggests that the Companies actually expended funds to pay for it. Underwriters, however, are not compensated in this fashion. Instead, underwriters are compensated through an "underwriting spread." An underwriting spread is the difference between the price at

[30] *See* Direct Testimony of Robert B. Hevert p. 51:15-19.

[31] *Id*. at 50:6.

which the underwriter purchases the shares from the firm, and the price at which the underwriter sells the shares to investors.[32]

2. The market already accounts for flotation costs.

When an underwriter markets a firm's securities to investors, the investors are well aware of the underwriter's fees. In other words, the investors know that a portion of the price they are paying for the shares does not go directly to the company, but instead goes to compensate the underwriter for its services. In fact, federal law requires that the underwriter's compensation be disclosed on the front page of the prospectus.[33] Thus, investors have already considered and accounted for flotation costs when making their decision to purchase shares at the quoted price. There is no need for the Companies' shareholders to receive additional compensation to account for costs they have already considered and agreed to. We see similar compensation structures in other kinds of business transactions. For example, a homeowner may hire a realtor and sell a home for $100,000. After the realtor takes a six percent commission, the seller nets $94,000. The buyer and seller agreed to the transaction notwithstanding the realtor's commission. Obviously, it would be unreasonable for the buyer or seller to demand additional funds from anyone after the deal is done to reimburse them for the realtor's fees. Likewise,

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

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

investors of competitive firms do not expect additional compensation for flotation costs. Thus, it would not be appropriate for a commission standing in the place of competition to award a utility's investors with this additional compensation.

3. It is inappropriate to add any additional basis points to a cost of equity proposal that is already far above the true required return.

For the reasons discussed above, flotation costs should be disallowed from a technical standpoint; they should also be disallowed from a practical standpoint. Eversource is asking this Commission to award it a cost of equity that is well over 200 basis points above its true cost of equity. Under these circumstances, it is especially inappropriate to suggest that the effect of flotation costs should be considered in any way.

IV. CONCLUSION AND RECOMMENDATION

Q. Summarize the key points of your testimony.

A. The key points of my testimony and appendices are summarized as follows:

1. A high level of awarded ROE will unnecessarily overstate the Companies' MMRC, which if approved would further discourage future investments in DER and establish rates that are contrary to the Commonwealth's stated objective of encouraging DER.

2. Contrary to the Companies' claims, an increasing prevalence in DER customers does not have an increasing effect on the Companies' risk profile beyond that which is already accounted for in the cost of equity models discussed in this testimony and appendices.

3. The legal standards governing this issue are clear that the awarded rate of return should be based on the Companies' actual cost of capital.

4. When the awarded rate of return exceeds the actual cost of capital, it results in an inappropriate transfer of excess wealth from customers to shareholders.

5. The models I used in this case indicate the Companies' cost of equity is about 7.5%. However, under prudent ratemaking principles, the Commission should award Eversource's shareholders with a return on equity of 8.75%, which is towards the higher end of a range of reasonableness of 7.5% - 9.0%. Although we must move awarded returns toward true cost of equity, we should also ensure that we do not impose too much volatility and risk to the Companies in the process.

6. When assessing the proper capital structure, it is not appropriate to merely consider the capital structures of other regulated utilities or the Companies' test-year capital structure; Eversource's optimal capital structure consists of a debt ratio that is likely greater than 60%. In this case, however, I recommend an imputed debt ratio of only 51%, which conforms to the average debt ratio of the proxy group.

Q. Describe the harmful impact to the Commonwealth's economy if the Commission were to adopt Eversource's inflated ROE recommendation.

A. When the awarded return is set significantly above the true cost of equity, it results in an inappropriate and excess transfer of wealth from ratepayers to shareholders beyond that which is required by law. Specifically, if the Commission adopts Eversource's inflated ROE recommendation of 10.5%, and the Companies' low proposed debt ratios, it would result in more than $60 million per year of excess wealth being transferred from Massachusetts ratepayers to the Companies' shareholders and the Internal Revenue Service ("IRS"). This outflow of funds from Massachusetts's economy would not benefit its businesses or citizens. Instead, Massachusetts businesses would be less competitive with businesses in surrounding states, and individual ratepayers would receive inflated costs for basic goods and services, along with unnecessarily high utility bills.

Q. Does this conclude your testimony?

A. Yes, including any exhibits, appendices, and other items attached hereto. I reserve the right to supplement this testimony as needed with any additional information that has been requested from the Companies but not yet provided. To the extent I did not address an opinion expressed by the Companies, it does not constitute an agreement with such opinion.

Respectfully Submitted,

David J. Garrett
Resolve Utility Consulting, PLLC
1900 NW Expressway, Suite 410
Oklahoma City, OK 73118
dgarrett@resolveuc.com
405.249.1050

APPENDIX A

LEGAL STANDARDS AND THE AWARDED RETURN

Over the course of many years the courts have developed legal standards governing the awarded rate of return on capital investments for regulated utilities. In *Wilcox v. Consolidated Gas Co. of New York*, the U.S. Supreme Court first addressed the meaning of a fair rate of return for public utilities.[1] The Court found that "the amount of risk in the business is a most important factor" in determining the appropriate allowed rate of return.[2] Later in two landmark cases, the Court set forth the standards by which public utilities are allowed to earn a return on capital investments. In *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, the Court held:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public. . . but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[3]

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

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

[2] *Id*. at 48.

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

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses *but also for the capital costs of the business*. These include service on the debt and dividends on the stock. By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.[4]

The cost of capital models employed are in accord with all of the foregoing legal standards

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

> Since by definition the cost of capital of a regulated firm represents precisely the expected return that investors could anticipate from other investments while bearing no more or less risk, and since investors will not provide capital unless the investment is expected to yield its opportunity cost of capital, the correspondence of the definition of the cost of capital with the court's definition of legally required earnings appears clear.[5]

The models I have employed in this case closely estimate the Companies' true cost of equity. If the Commission sets the awarded return based on my lower, and more reasonable rate of return, it will comply with the Supreme Court's standards, allow the Companies to maintain

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

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

their financial integrity, and satisfy the claims of their investors. On the other hand, if the Commission sets the allowed rate of return much *higher* than the true cost of capital, it arguably results in an inappropriate transfer of wealth from ratepayers to shareholders.

> [I]f the allowed rate of return is greater than the cost of capital, capital investments are undertaken and investors' opportunity costs are more than achieved. Any excess earnings over and above those required to service debt capital accrue to the equity holders, and the stock price increases. In this case, the wealth transfer occurs from ratepayers to shareholders.[6]

Thus, it is important to understand that the *awarded* return and the *cost* of capital are different but related concepts. The two concepts are related in that the legal and technical standards encompassing this issue maintain the awarded return should reflect the true cost of capital. On the other hand, the two concepts are different in that the legal standards do not mandate that awarded returns exactly match the cost of capital.

Awarded returns are set through the regulatory process and may be influenced by a number of factors other than objective market drivers. The cost of capital, on the other hand, should be evaluated objectively and closely tie to economic market realities. In other words, the cost of capital is driven by stock prices, dividends, growth rates, and most importantly – it is driven by risk. The cost of capital can be estimated through the use of financial models used by firms, investors, and academics around the world for decades. The problem is, with respect to regulated utilities, there has been a trend in which awarded returns fail to closely track with actual market-based cost of capital. To the extent this occurs, the results are detrimental to ratepayers and the state's economy.

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

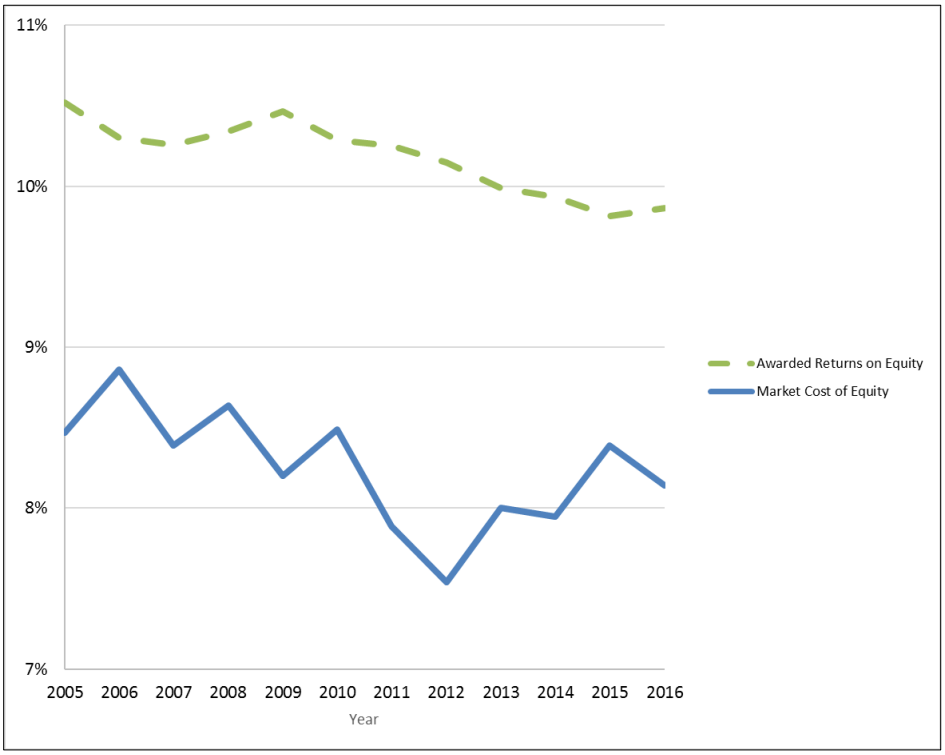
There is a detrimental impact when the awarded return strays from the Supreme Court's legal standard. When a company is awarded ROE much higher than true cost of capital based on objective market data, it runs the risk of violating the Supreme Court's standards directing that the awarded return should be *based on the cost of capital*. Specifically, if the Commission were to adopt the Companies' position in this case, it would be permitting an excess transfer of wealth from Massachusetts customers to the Companies' shareholders. The detrimental impact to ratepayers and the state's economy is clear. Moreover, establishing an awarded return that far exceeds true cost of capital effectively prevents the awarded returns from changing along with economic conditions.

As shown in the figure below, awarded returns for public utilities have been well above the average required market return for at least ten years. Due to the fact that utility stocks are consistently far less risky than the average stock in the marketplace, the cost of equity for utility companies are *less* than the required return on the market.

The graph below shows two lines. The top line is the average annual awarded returns over the past 10 years. The bottom line is the required market return over the same period. The required market return is essentially the return that investors would require if they invested in the entire market. In other words, the required market return is essentially the cost of equity of the entire market. Since it is undisputed (even by utility witnesses) that utility stocks are less risky than the average stock in the market, then the utility cost of equity must be less than the market cost of equity. Thus, awarded returns should be much closer to, if not below the market cost of equity, on average, since awarded returns are supposed to be based on actual cost of equity.[7]

[7] *See* Exhibit DJG-17.

Figure 1:
Awarded Returns on Equity vs. Market Cost of Equity (2005 – 2016)



The gap between awarded returns and utility cost of equity has resulted in an excess of ratepayer wealth being transferred to utility shareholders and the IRS for at least 10 years. This is likely due, in part, to the fact that many years ago (in the 1990s) interest rates were much higher, with average required market return around 12%. In that environment, the cost of equity for low-risk utility stocks may have been about 9%. Since that time, however, interest rates have dramatically declined among other economic changes, and it is clear that awarded returns have failed to keep pace with decreasing equity costs.

It is not hard to see why this trend of inflating awarded returns has occurred in the past. Because awarded returns have at times been based in part on a comparison with other awarded returns, the average awarded returns effectively fail to adapt to true market conditions. Once

utility companies and regulatory commissions become accustomed to awarding rates of return higher than market conditions actually require, this trend becomes difficult to reverse. The fact is, utility stocks are *less risky* than the average stock in the market. As such, the required returns (cost of equity) on utility stocks should be less than the average required returns on the market. However, that is often not the case. What we have seen instead is a disconnect from the market-based cost of equity. For these reasons, the Commission should strive to move the awarded return to a level more closely aligned with the Companies' actual, market-derived cost of capital while keeping in mind the following legal principles:

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

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

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

Because awarded returns in the regulatory environment have not closely tracked market-based trends and commensurate risk, utility companies have been able to remain more than

financially sound, perhaps in spite of management efficiencies. In fact, the transfer of wealth from ratepayers to shareholders has been so far removed from actual cost-based drivers that even under relatively inefficient management a utility could remain financially sound. Therefore, regulatory commissions should strive to set the awarded return to a regulated utility at a level based on accurate market conditions to promote prudent and efficient management and minimize economic waste.

Other analysts have recognized the discrepancy between utility cost of capital and awarded rates of return around the country. In his article published in Public Utilities Fortnightly in 2016, Steve Huntoon observed that even though utility stocks are less risky than the stocks of competitive industries (essentially every other industry), utility stocks have outperformed the broader market.[8] Specifically, Huntoon notes the following three points which lead to a problematic conclusion:

> 1. Jack Bogle, the founder of Vanguard Group and a Wall Street legend, provides rigorous analysis that the long-term total return for the broader market will be around 7 percent going forward. Another Wall Street legend, Professor Burton Malkiel, corroborates that 7 percent in the latest edition of his seminal work, A Random Walk Down Wall Street.
>
> 2. Institutions like pension funds are validating [the first point] by piling on risky investments to try and get to a 7.5 percent total return, as reported by the Wall Street Journal.7
>
> 3. Utilities are being granted returns on equity around 10 percent.[9]

As discussed above, since awarded returns should be based on (i.e., at least close to) actual cost of capital, and utility stocks are less risky than the average stock in the market, the

[8] *See* Steve Huntoon, "Nice Work If You Can Get It," Public Utilities Fortnightly (Aug. 2016).
[9] *Id*.

cost of equity for utilities in general should be *less than* the return on broader market. Instead, the awarded returns and actual earned returns of utilities have generally been *greater than* the expected and actual returns of the broader market. This is a problem.

In a follow-up article analyzing Mr. Huntoon's findings, Leonard Hyman and William Tilles found that utility equity investors expect about a 7.5% annual return. This finding is particularly remarkable given the results of my CAPM and DCF Model. Specifically, both of my models produced cost of equity results for Eversource of exactly 7.5%. To be clear, the CAPM and DCF Model consider completely different inputs. That is, the CAPM considers the risk-free rate, a beta coefficient (measuring the effect of market risk on a particular firm), and the equity risk premium. The DCF Model considers a firm's dividends, stock price, and a long-term growth rate. Furthermore, the authors of this article took a different approach to their estimate. Yet, all of these approaches point to a cost of equity of 7.5%.

Similarly, in a white paper published earlier this year, Charles Griffey also observed that "[m]ounting evidence indicates that awarded ROEs and actual utility earnings are too high, and that it is time to reevaluate the status quo and reduce utility ROEs to reflect actual risk and economic factors."[10] The question remains whether regulators will begin incorporating this evidence in their awarded returns on equity.

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

APPENDIX B

RISK AND RETURN CONCEPTS

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

1. Differences between firm-specific risk and market risk.

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

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

the risk of major socio-economic events. When there are changes in these risk factors, they affect all firms in the market to some extent.[2]

Analysis of the U.S. market in 2001 provides a good example for contrasting firm-specific risk and market risk. During that year, Enron Corp.'s stock fell from about $80 per share to about $0.60 per share, and the company filed bankruptcy at the end of the year. If an investor had invested his entire portfolio in Enron stock at the beginning of 2001, this irrational investor would have lost the entire investment by the end of the year due to assuming the full exposure of Enron's firm-specific risk – in that case, imprudent management. On the other hand, a rational, diversified investor who owned every stock in the S&P 500 would have had a much different result that year. The rational investor would have been relatively unaffected by the fall of Enron, because his portfolio included 499 other stocks. Each of those stocks, however, would have been affected by various market risk factors that occurred that year, including the terrorist attacks on September 11th. Thus, the rational investor would have incurred a relatively minor loss due to market risk factors, while the irrational investor would have lost everything due to firm-specific risk factors.

A fundamental concept in finance is that firm-specific risk can be eliminated through diversification.[3] If someone irrationally invested all of their funds in one firm, they would be exposed to all of the firm-specific risk and the market risk inherent in that single firm. Rational investors, however, are risk-averse and seek to eliminate risk they can control. Investors can eliminate firm-specific risk by simply adding more stocks to their portfolio through a process

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

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

called "diversification." There are two reasons why diversification eliminates firm-specific risk. First, each stock in a diversified portfolio represents a much smaller percentage of the overall portfolio than it would in a portfolio of just one or a few stocks. Thus, any firm-specific action that changes the stock price of one stock in the diversified portfolio will have only a small impact on the entire portfolio.[4]

The second reason why diversification eliminates firm-specific risk is that the effects of firm-specific actions on stock prices can be either positive or negative for each stock. Thus, in large portfolios, the net effect of these positive and negative firm-specific risk factors will be essentially zero and will not affect the value of the overall portfolio.[5] Firm-specific risk is also called "diversifiable risk" because it can be easily eliminated through diversification.

2. Firm specific risk is generally not rewarded through higher returns.

Is it well-known and accepted that because firm-specific risk can be easily eliminated through diversification, it is not rewarded by the market through higher returns. Because investors eliminate firm-specific risk through diversification, they know they cannot expect a higher return for assuming the firm-specific risk in any one company. Thus, the risks associated with an individual firm's operations are not rewarded by the market. In fact, firm-specific risk is also called "unrewarded" risk for this reason. Market risk, on the other hand, cannot be eliminated through diversification. Because market risk cannot be eliminated through diversification, investors expect a return for assuming this type of risk. Market risk is also called

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

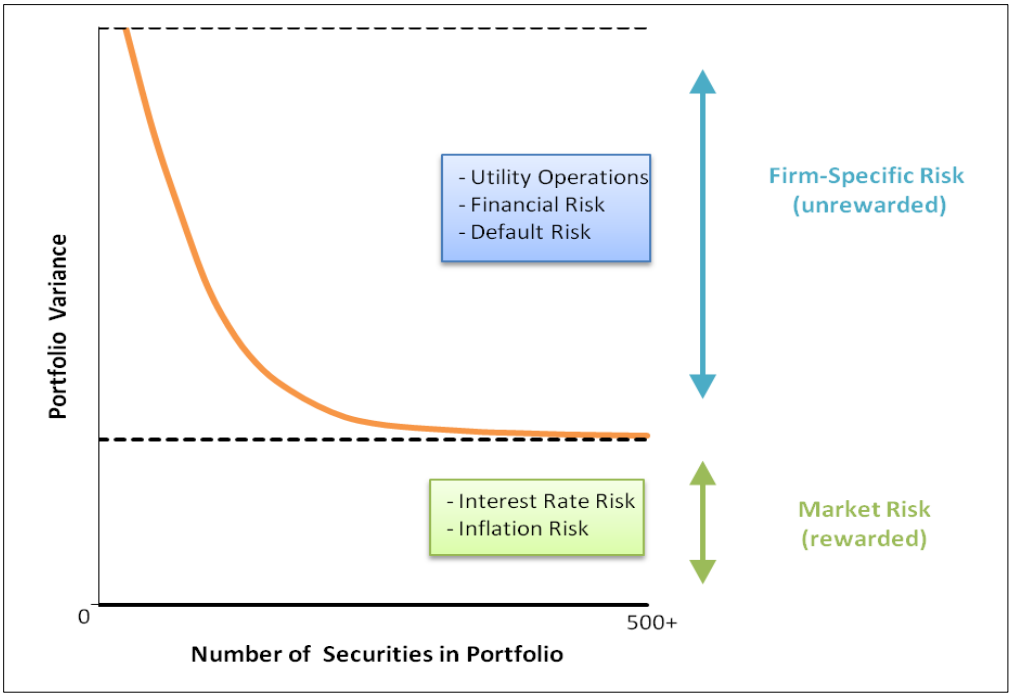
[5] *Id.*

"systematic risk." Scholars recognize the fact that market risk, which is also called "systematic risk," is the only type of risk for which investors expect a return for bearing:

> If investors can cheaply eliminate some risks through diversification, then we should not expect a security to earn higher returns for risks that can be eliminated through diversification. Investors can expect compensation only for bearing systematic risk (i.e., risk that cannot be diversified away).[6]

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

Figure 1:
Effects of Portfolio Diversification



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

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

3. Methods for measuring market risk.

Investors who want to eliminate firm-specific risk must hold a fully diversified portfolio. To determine the amount of risk that a single stock adds to the overall market portfolio, investors measure the covariance between a single stock and the market portfolio. The result of this calculation is called "beta."[7] Beta represents the sensitivity of a given security to the market as a whole. The market portfolio of all stocks has a beta equal to one. Stocks with betas greater than one are relatively more sensitive to market risk than the average stock. For example, if the market increases (decreases) by 1.0%, a stock with a beta of 1.5 will, on average, increase (decrease) by 1.5%. In contrast, stocks with betas of less than one are less sensitive to market risk, such that if the market increases (decreases) by 1.0%, a stock with a beta of 0.5 will, on average, only increase (decrease) by 0.5%. Thus, stocks with low betas are relatively insulated from market conditions. The beta term is used in the Capital Asset Pricing Model to estimate the cost of equity.

Public utilities are characterized as defensive firms that have low betas, low market risk, and are relatively insulated from overall market conditions. Although market risk affects all firms in the market, it affects different firms to varying degrees. Firms with high betas are

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

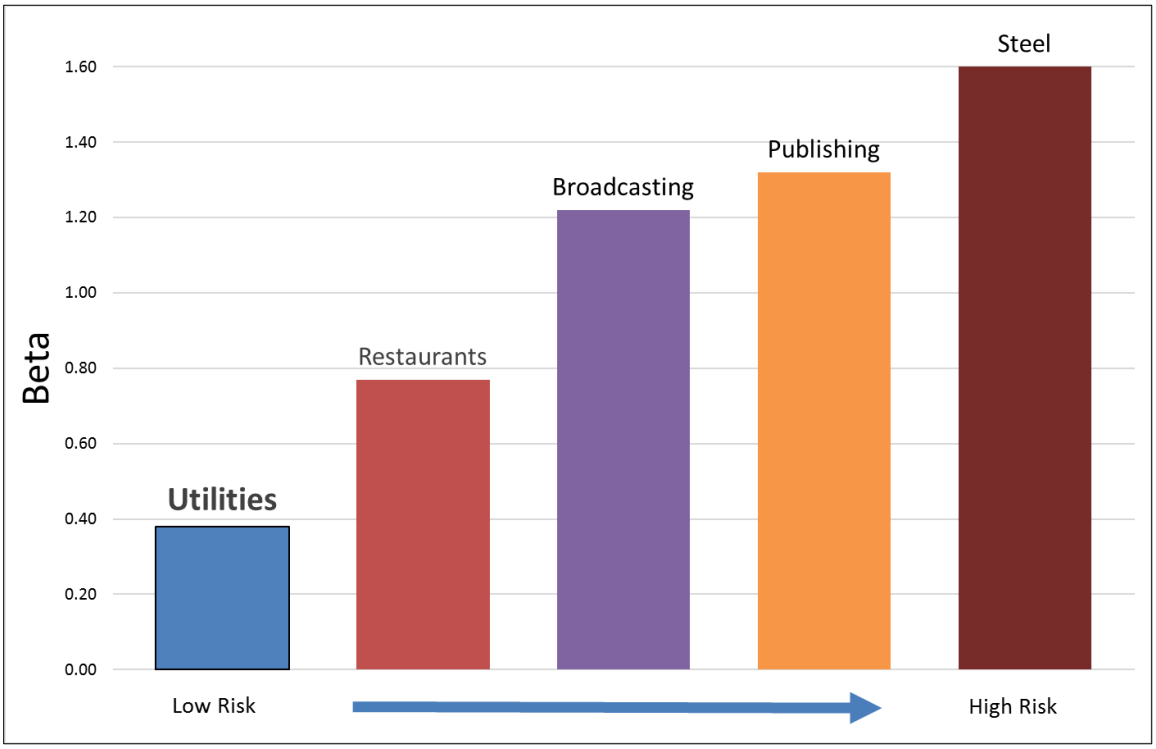
affected more than firms with low betas, which is why firms with high betas are riskier. Stocks with betas greater than one are generally known as "cyclical stocks." Firms in cyclical industries are sensitive to recurring patterns of recession and recovery known as the "business cycle."[8] Thus, cyclical firms are exposed to a greater level of market risk. Securities with betas less than one, other the other hand, are known as "defensive stocks." Companies in defensive industries, such as public utility companies, "will have low betas and performance that is comparatively unaffected by overall market conditions."[9] In fact, financial textbooks often use utility companies as prime examples of low-risk, defensive firms. The figure below compares the betas of several industries and illustrates that the utility industry is one of the least risky industries in the U.S. market.[10]

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

[9] *Id*. at 383.

[10] *See* Betas by Sector (US) at http://pages.stern.nyu.edu/~adamodar/. The exact beta calculations are not as important as illustrating the well-known fact that utilities are very low-risk companies. The fact that the utility industry is one of the lowest risk industries in the country should not change from year to year.

Figure 2:
Beta by Industry



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

APPENDIX C

DISCOUNTED CASH FLOW ANALYSIS

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

Equation 1:
General Discounted Cash Flow Model

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

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

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

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

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

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

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

1. The Constant Growth DCF Model.

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

Equation 2:
Constant Growth Discounted Cash Flow Model

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

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

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

Utilization of the Constant Growth DCF Model requires additional assumptions. In addition to the four assumptions listed above, the Constant Growth DCF Model relies on four additional assumptions as follows:

1. The discount rate must exceed the growth rate;
2. The growth rate is constant in every year to infinity;
3. Investors require the same return in every year; and

4. There is no external financing; that is, growth is provided only by the retention of earnings.

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

2. The Quarterly Approximation DCF Model.

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

Equation 3:
Quarterly Approximation Discounted Cash Flow Model

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

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

The Quarterly Approximation DCF Model assumes that dividends are paid quarterly and that each dividend is constant for four consecutive quarters. All else held constant, this model

actually results in the highest cost of equity estimate for the utility in comparison to other DCF Models because it accounts for the quarterly compounding of dividends. There are several other variations of the Constant Growth (or Annual) DCF Model, including a Semi-Annual DCF Model which is used by the Federal Energy Regulatory Commission ("FERC"). These models, along with the Quarterly Approximation DCF Model, have been accepted in regulatory proceedings as useful tools for estimating the cost of equity. For this case, I have chosen to use the Quarterly Approximation DCF Model described above.

3. Inputs to the DCF Model.

There are three primary inputs in the DCF Model: (1) stock price (P_0); (2) dividend (d_0); and (3) growth rate (g). The stock prices and dividends are known inputs based on recorded data, while the growth rate projection must be estimated. This section will discuss each of these inputs in turn.

A. Stock Price

$$\left[K = \frac{D_1}{\boldsymbol{P_0}} + g\right]$$

For the stock price (P_0), I used a 30-day average of stock prices for each company in the proxy group.[1] Analysts sometimes rely on average stock prices for longer periods (e.g., 60, 90, or 180 days). According to the efficient market hypothesis, however, markets reflect all relevant information available at a particular time, and prices adjust instantaneously to the arrival of new

[1] *See* Exhibit DJG-6.

information.[2] Past stock prices, in essence, reflect outdated information. The DCF Model used in utility rate cases is a derivation of the dividend discount model, which is used to determine the current value of an asset. Thus, according to the dividend discount model and the efficient market hypothesis, the value for the "P_0" term in the DCF Model should technically be the current stock price, rather than an average.

Using a short-term average of stock prices for the current stock price input adheres to market efficiency principles while avoiding any irregularities that may arise from using a single current stock price. In the context of a utility rate proceeding there is a significant length of time from when an application is filed and responsive testimony is due. Choosing a current stock price for one particular day during that time could raise a separate issue concerning which day was chosen to be used in the analysis. In addition, a single stock price on a particular day may be unusually high or low. It is arguably ill-advised to use a single stock price in a model that is ultimately used to set rates for several years, especially if a stock is experiencing some volatility. Thus, it is preferable to use a short-term average of stock prices, which represents a good balance between adhering to well-established principles of market efficiency while avoiding any unnecessary contentions that may arise from using a single stock price on a given day. The stock prices I used in my DCF analysis are based on 30-day averages of adjusted closing stock prices for each company in the proxy group.[3]

[2] *See* Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, Vol. 25, No. 2 The Journal of Finance 383 (1970); *see also* Graham, Smart & Megginson *supra* n. 20, at 357. The efficient market hypothesis was formally presented by Eugene Fama in 1970, and is a cornerstone of modern financial theory and practice.

[3] Exhibit DJG-6. Adjusted closing prices, rather than actual closing prices, are ideal for analyzing historical stock prices. The adjusted price provides an accurate representation of the firm's equity value beyond the mere market price because it accounts for stock splits and dividends.

B. Dividend

$$\left[K = \frac{\mathbf{D_1}}{P_0} + g\right]$$

The dividend term in the Quarterly Approximation DCF Model is the current quarterly dividend per share. I obtained the quarterly dividend paid in the first quarter of 2017 for each proxy company.[4] The Quarterly Approximation DCF Model assumes that the company increases its dividend payments each quarter. Thus, the model assumes that each quarterly dividend is greater than the previous one by $(1 + g)^{0.25}$. This expression could be describe as the dividend quarterly growth rate, where the term "g" is the growth rate and the exponential term "0.25" signifies one quarter of the year.

The Quarterly Approximation DCF Model results in the highest cost of equity relative to other DCF Models, with all else held constant. Thus, the DCF Model I employed in this case results in a higher DCF cost of equity estimate than the annual or semi-annual DCF Models due to the quarterly compounding of dividends inherent in the model.

C. Growth Rate

$$\left[K = \frac{\mathrm{D}_1}{P_0} + \boldsymbol{g}\right]$$

The most critical input in the DCF Model is the growth rate. Unlike the stock price and dividend inputs, the growth rate must be estimated. As a result, the growth rate is often the most contentious DCF input in utility rate cases. The DCF model used in this case is based on the constant growth valuation model. As stated above, one of the inherent assumptions of this model

[4] Nasdaq Dividend History, http://www.nasdaq.com/quotes/dividend-history.aspx.

is that dividends grow at a constant rate forever. Thus, the growth rate term in the constant growth DCF model is often called the "constant," "stable," or "terminal" growth rate. For young, high-growth firms, estimating the growth rate to be used in the model can be especially difficult. For mature, low-growth firms such as utilities, however, estimating the terminal growth rate is more transparent.

It is widely accepted that the terminal growth rate cannot exceed the growth rate of the economy, especially for a regulated utility company. This is consistent with a fundamental concept in finance that no firm can grow forever at a rate higher than the growth rate of the economy in which it operates.[5] Thus, the terminal growth rate used in the DCF Model should not exceed the aggregate economic growth rate. This is especially true when the DCF Model is conducted on public utilities because these firms have defined service territories. As stated by Dr. Damodaran:

> If a firm is a purely domestic company, either because of internal constraints . . . or external constraints (such as those imposed by a government), the growth rate in the domestic economy will be the limiting value.[6]

In fact, it is reasonable to assume that a regulated utility would grow at a rate that is <u>less</u> than the U.S. economic growth rate. Unlike competitive firms, which might increase their growth by launching a new product line, franchising, or expanding into new and developing markets, public utilities cannot do any of these things to grow. Gross domestic product ("GDP") is one of the most widely-used measures of economic production, and is used to measure aggregate economic growth. According to the Congressional Budget Office's Budget Outlook,

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

[6] *Id.*

the long-term forecast for nominal U.S. GDP growth is 4.1%, which includes an inflation rate of 2%.[7] For mature companies in mature industries, such as utility companies, the terminal growth rate will likely fall between the expected rate of inflation and the expected rate of nominal GDP growth. Thus, Eversource's terminal growth rate is between 2% and 4.1%

It is also reasonable to assume that the terminal growth rate will not exceed the risk-free rate. In the long term, the risk-free rate will converge on the growth rate of the economy. For this reason, financial analysts often use the risk-free rate for the terminal growth rate value in the DCF model.[8]

When analyzing growth rates for any firm, there are several quantitative methods and various growth determinants that can be used in the analysis. These can include both historical and projected analyses of revenue, operating income, net income, earnings, dividends, and other determinants. While it may be important to consider one or more of these quantitative growth determinants, it may be even more important to consider "qualitative" aspects of growth when analyzing a regulated utility. This is because a utility's growth in dividends or earnings is going to be primarily driven by the return on equity awarded by the regulator. This creates a circular reference problem. In other words, if a regulator awards a higher ROE than the market anticipated, this could lead to higher growth rate estimates from analysts; if those same estimates are used in the DCF Model in the next rate case, it could lead to a higher awarded ROE; and the cycle continues. Therefore, it is important to begin the analysis with this simple qualitative question: How is this utility going to grow in the future? If this question were asked of a

[7] Congressional Budget Office Long-Term Budget Outlook, https://www.cbo.gov/publication/51580.

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

competitive firm, there could be a number of answers depending on the line of business, such as launching a new product line, engaging in mergers and acquisitions, franchising, rebranding to target a new demographic, expanding into developing markets, etc. Regulated utilities, however, cannot engage in these potential growth opportunities. This is why it is not surprising to see very low load growth and related projections in utility integrated resource plans. In fact, utility load growth estimates provide an objective way to measure utility growth, because such estimates are not as affected by awarded ROEs.

a. Growth rate used for Eversource model.

For Eversource, there are several different growth forecasts that should be considered when determining the best growth rate estimate to use in the DCF Model. The figure below shows these various growth determinants.

Figure 1:
Terminal Growth Rate Determinants

Determinant	Rate
Nominal GDP	4.10%
Inflation	2.00%
Risk Free Rate	2.92%
Average	**3.01%**

For the long-term growth rate in my DCF model I selected the maximum revenue growth of 4.1%. This means I am making the following assumption: Over the long-term, the annual growth in Eversource's earnings will match the growth of the entire U.S. economy. Since it is

very likely that Eversource's growth will be less than U.S. GDP growth, this means that my DCF cost of equity estimate of 7.5% is at the highest end of a reasonable range.[9]

b. Final results for Eversource DCF Model.

I used the Quarterly Approximation DCF Model discussed above to estimate Eversource's cost of equity capital. I obtained an average of reported dividends and stock prices from the proxy group, and I used a reasonable terminal growth rate estimate for Eversource. My DCF cost of equity estimate for Eversource is 7.5%.[10]

[9] *See also* Exhibit DJG-8.

[10] *See also* Exhibit DJG-9.

APPENDIX D

CAPITAL ASSET PRICING MODEL ANALYSIS

The Capital Asset Pricing Model ("CAPM") is a market-based model founded on the principle that investors demand higher returns for incurring additional risk.[1] The CAPM estimates this required return. The following assumptions are inherent in the CAPM:

1. Investors are rational, risk-adverse, and strive to maximize profit and terminal wealth;

2. Investors make choices on the basis of risk and return. Return is measured by the mean returns expected from a portfolio of assets; risk is measured by the variance of these portfolio returns;

3. Investors have homogenous expectations of risk and return;

4. Investors have identical time horizons;

5. Information is freely and simultaneously available to investors;

6. There is a risk-free asset, and investors can borrow and lend unlimited amounts at the risk-free rate;

7. There are no taxes, transaction costs, restrictions on selling short, or other market imperfections; and

8. Total asset quality is fixed, and all assets are marketable and divisible.

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

[1] William F. Sharpe, *A Simplified Model for Portfolio Analysis* 277-93 (Management Science IX 1963); *see also* Graham, Smart & Megginson *supra* n. 20, at 208.

The CAPM approach is consistent with the legal standards set forth by the U.S. Supreme Court. Our courts have recognized that "the amount of risk in the business is a most important factor" in determining the allowed rate of return,[2] and that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks."[3]

The CAPM is a useful model because it directly considers the amount of risk inherent in a business. It is arguably the strongest of the models usually presented in rate cases because unlike the DCF Model, the CAPM directly measures the most important component of a fair rate of return analysis: Risk. The basic CAPM equation is expressed as follows:

Equation 1:
Capital Asset Pricing Model

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

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

There are essentially three terms within the CAPM equation that are required to calculate the required return (K): (1) the risk-free rate (R_F); (2) the beta coefficient (β); and (3) the equity risk premium ($R_M - R_F$), which is the required return on the overall market less the risk-free rate. Each term is discussed in more detail below, along with the inputs I used for each term.

R_F **A. The Risk-Free Rate**

$$\left[K = \quad + \beta_i(R_M - R_F)\right]$$

The first term in the CAPM is the risk-free rate (R_F). The risk-free rate is simply the level of return investors can achieve without assuming any risk. The risk-free rate represents the

[2] *Wilcox v. Consolidated Gas Co. of New York*, 212 U.S. 19, 48 (1909) (emphasis added).

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

bare minimum return that any investor would require on a risky asset. Even though no investment is technically void of risk, investors often use U.S. Treasury securities to represent the risk-free rate because they accept that those securities essentially contain no default risk. The Treasury issues securities with different maturities, including short-term Treasury Bills, intermediate-term Treasury Notes, and long-term Treasury Bonds.

In valuing an asset, investors estimate cash flows over long periods of time. Common stock is viewed as a long-term investment, and the cash flows from dividends are assumed to last indefinitely. Thus, short-term Treasury bill yields are rarely used in the CAPM to represent the risk-free rate. Short-term rates are subject to greater volatility and can thus lead to unreliable estimates. Instead, long-term Treasury bonds are usually used to represent the risk-free rate in the CAPM. I considered a 30-day average of daily Treasury yield curve rates on 30-year Treasury bonds in my risk-free rate estimate, which resulted in a risk-free rate of 2.79%.[4]

B. The Beta Coefficient

$$\left[K = R_F + \boldsymbol{\beta_i} (R_M - R_F)\right]$$

As discussed above, beta represents the sensitivity of a given security to movements in the overall market. The CAPM states that in efficient capital markets, the expected risk premium on each investment is proportional to its beta. Recall that a security with a beta greater (less) than one is more (less) risky than the market portfolio. A stock's beta equals the covariance of the asset's returns with the returns on a market portfolio, divided by the portfolio's variance, as expressed in the following formula:

[4] Exhibit DJG-10.

Equation 2:
Beta

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

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

Typically, an index such as the S&P 500 Index is used as proxy for the market portfolio. The historical betas for publicly traded firms are published by several commercial sources.[5] Beta may also be calculated through a linear regression analysis, which provides additional statistical information about the relationship between a single stock and the market portfolio. Also as discussed above, beta represents the sensitivity of a given security to the market as a whole. The market portfolio of all stocks has a beta equal to one. Stocks with betas greater than one are relatively more sensitive to market risk than the average stock. For example, if the market increases (decreases) by 1.0%, a stock with a beta of 1.5 will, on average, increase (decrease) by 1.5%. In contrast, stocks with betas of less than one are less sensitive to market risk. For example, if the market increases (decreases) by 1.0%, a stock with a beta of 0.5 will, on average, only increase (decrease) by 0.5%.

In my analysis, I used betas recently published by Value Line Investment Survey. The beta for each proxy company is less than 1.0. Thus, we have an objective measure to prove the well-known concept that utility stocks are less risky than the average stock in the market. The

[5] E.g., Value Line, Bloomberg, and Merrill Lynch.

betas for each company in the proxy group is are less than 1.0, which means that each company's stock is less risky than the market portfolio of stocks (which has a beta equal to 1.0).

C. The Equity Risk Premium

$$\left[K = R_F + \beta_i \quad (R_M - R_F) \quad \right]$$

The final term of the CAPM is the equity risk premium ("ERP"), which is the required return on the market portfolio less the risk-free rate ($R_M - R_F$). In other words, the ERP is the level of return investors expect above the risk-free rate in exchange for investing in risky securities. Many experts would agree that "the single most important variable for making investment decisions is the equity risk premium."[6] Likewise, the ERP is arguably the single most important factor in estimating the cost of capital in this matter. There are three basic methods that can be used to estimate the ERP: (1) calculating a historical average; (2) taking a survey of experts; and (3) calculating the implied ERP. I will discuss each method in turn, noting advantages and disadvantages of these methods.

1. HISTORICAL AVERAGE

The historical ERP may be calculated by simply taking the difference between returns on stocks and returns on government bonds over a certain period of time. Ibbotson, one of the most widely cited source for the historical ERP in the U.S.,[7] reports both the geometric mean and arithmetic mean for the returns of stocks and government bonds in its annual yearbooks.[8] Many practitioners rely on the historical ERP as an estimate for the forward-looking ERP because it is easy to obtain. However, there are disadvantages to relying on the historical ERP as an indication of the current ERP.

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

[7] *Id*. at 173.

[8] 2015 Ibbotson Stocks, Bonds, Bills, and Inflation Classic Yearbook 91 (Morningstar 2015).

Many investors use the historic ERP because it is convenient and easy to calculate. There are, however, limitations associated with relying solely on a historical average to estimate the current or forward-looking ERP. What matters in the CAPM model is not the actual risk premium from the past, but rather the current and forward-looking risk premium. Some investors may think that a historic ERP provides some indication of what the prospective risk premium is, but there is empirical evidence to suggest the prospective, forward-looking ERP is actually lower than the historical ERP.

In a landmark publication on risk premiums around the world, *Triumph of the Optimists*, the authors suggest through extensive empirical research that the prospective ERP is lower than the historical ERP.[9] This is due in large part to what is known as "survivorship bias" or "success bias" – a tendency for failed companies to be excluded from historical indices.[10] From their extensive analysis, the authors make the following conclusion regarding the prospective ERP:

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

[10] *Id*. at 34.

The result is a forward-looking, geometric mean risk premium for the United States . . . of around 2½ to 4 percent and an arithmetic mean risk premium . . . that falls within a range from a little below 4 to a little above 5 percent.[11] Indeed, these results are lower than many reported historical risk premiums. Other noted experts agree:

> The historical risk premium obtained by looking at U.S. data is biased upwards because of survivor bias. . . . The true premium, it is argued, is much lower. This view is backed up by a study of large equity markets over the twentieth century (*Triumph of the Optimists*), which concluded that the historical risk premium is closer to 4%.[12]

Regardless of the variations in historic ERP estimates, many scholars and practitioners agree that simply relying on a historic ERP to estimate the risk premium going forward is not ideal. Fortunately, "a naïve reliance on long-run historical averages is not the only approach for estimating the expected risk premium."[13] Due to the limitations of this approach, I did not rely on the historical ERP as part of my CAPM analysis in this case, but instead relied on the ERP reported in expert surveys and the implied ERP method discussed below.

2. EXPERT SURVEYS

As its name implies, the expert survey approach to estimating the ERP involves conducting a survey of experts including professors, analysts, chief financial officers and other executives around the country and asking them what they think the ERP is. Graham and Harvey have performed such a survey every year since 1996. In their 2016 survey, they found that

[11] *Id*. at 194.

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

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

experts around the country believe that the current risk premium is only 4.0%.[14] The IESE Business School conducts a similar expert survey. Their expert survey reported an average ERP of only 5.3%.[15]

3. IMPLIED EQUITY RISK PREMIUM.

The third method of estimating the ERP is arguably the best. The implied ERP relies on the stable growth model proposed by Gordon, often called the "Gordon Growth Model," which is a basic stock valuation model widely used in finance for many years:[16]

Equation 3:
Gordon Growth Model

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

where: P_0 = *current value of stock*
D_1 = *value of next year's dividend*
K = *cost of equity capital / discount rate*
g = *constant growth rate in perpetuity for dividends*

This model is similar to the Constant Growth DCF Model presented in Equation 3 above ($K=D_1/P_0+g$). In fact, the underlying concept in both models is the same: The current value of an asset is equal to the present value of its future cash flows. Instead of using this model to determine the discount rate of one company, we can use it to determine the discount rate for the

[14] John R. Graham and Campbell R. Harvey, *The Equity Risk Premium in 2016*, at 3 (Fuqua School of Business, Duke University 2014), copy available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2611793.

[15] Pablo Fernandez, Pablo Linares & Isabel F. Acin, *Market Risk Premium used in 171 Countries in 2016: A Survey with 6,932 Answers*, at 3 (IESE Business School 2015), copy available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2598104. IESE Business School is the graduate business school of the University of Navarra. IESE offers Master of Business Administration (MBA), Executive MBA and Executive Education programs. IESE is consistently ranked among the leading business schools in the world.

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

entire market by substituting the inputs of the model. Specifically, instead of using the current stock price (P_0), we will use the current value of the S&P 500 (V_{500}). Instead of using the dividends of a single firm, we will consider the dividends paid by the entire market. Additionally, we should consider potential dividends. In other words, stock buybacks should be considered in addition to paid dividends, as stock buybacks represent another way for the firm to transfer free cash flow to shareholders. Focusing on dividends alone without considering stock buybacks could understate the cash flow component of the model, and ultimately understate the implied ERP. The market dividend yield plus the market buyback yield gives us the gross cash yield to use as our cash flow in the numerator of the discount model. This gross cash yield is increased each year over the next five years by the growth rate. These cash flows must be discounted to determine their present value. The discount rate in each denominator is the risk-free rate (R_F) plus the discount rate (K). The following formula shows how the implied return is calculated. Since the current value of the S&P is known, we can solve for K: The implied market return.[17]

Equation 4:
Implied Market Return

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

V_{500} = current value of index (S&P 500)

where:

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

[17] *See* Exhibit DJG-12.

The discount rate is called the "implied" return here because it is based on the current value of the index as well as the value of free cash flow to investors projected over the next five years. Thus, based on these inputs, the market is "implying" the expected return. After solving for the implied market return (K), we simply subtract the risk-free rate from it to arrive at the implied ERP.

Equation 5:
Implied Equity Risk Premium

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

After collecting data for the index value, operating earnings, dividends, and buybacks for the S&P 500 over the past six years, I calculated the dividend yield, buyback yield, and gross cash yield for each year. I also calculated the compound annual growth rate (g) from operating earnings.

I used these inputs, along with the risk-free rate and current value of the index to calculate a current expected return on the entire market of 8.3%. I subtracted the risk-free rate to arrive at the implied equity risk premium of 5.26%. Dr. Damodaran, one of the world's leading experts on the ERP, promotes the implied ERP method discussed above. He calculates monthly and annual implied ERPs with this method and publishes his results. Dr. Damodaran's highest ERP estimate for April 2017 was only 6.16%.[18]

For the final ERP estimate I used in my CAPM analysis, I averaged the results of the ERP surveys along with the implied ERP calculations and the ERP reported by Duff & Phelps. The results are presented in the following figure:[19]

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

[19] *See also* Exhibit DJG-13.

Figure 1:
Equity Risk Premium Results

IESE Business School Survey	5.3%
Graham & Harvey Survey	4.0%
Duff & Phelps Report	5.5%
Damodaran	6.2%
Garrett	5.3%
Average	**5.2%**

While it would be reasonable to select any one of these ERP estimates, or the average of these estimates, I selected the highest ERP estimate of 6.2% to use in my CAPM in the interest of conservatism. However, this means that the final results of my CAPM are at the higher end of a reasonable range.

APPENDIX E

COST OF EQUITY SUMMARY

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

Figure 1:

Cost of Equity Summary

Model	Cost of Equity
Discounted Cash Flow Model	7.5%
Capital Asset Pricing Model	7.5%
Average	**7.5%**

The result produced by both the DCF Model and the CAPM is 7.5%. Furthermore, it is noteworthy that these two models produced identical results, especially considering the fact that the inputs for the two models are completely different. Again, the DCF Model considers stock price, dividends, and a long-term growth rate. The CAPM considers the risk-free rate, beta, and the equity risk premium. These inputs are unrelated to each other, and yet the models produced identical results. This fact further highlights the validity of these two models, which have been relied upon by executives, analysts, academics, and regulators for decades to value companies and estimate cost of equity.

In addition, there a market indicator we can use to test the reasonableness of the cost of equity estimates produced by these models. Recall that the risk-free rate plus the equity risk premium is called the required return on the market portfolio. This could also be called the market cost of equity. It is undisputed that the cost of equity of utility stocks must be less than the total market cost of equity. This is because utility stocks are less risky than the average stock in the market. (We proved this above by showing that utility betas were less than one). Therefore, once we determine the market cost of equity, it gives us a "ceiling" below which Eversource's actual cost of equity must lie. The methods used to estimate the market cost of equity are necessarily related to the methods used to estimate the ERP. In fact, the ERP is calculated by taking the market cost of equity less the risk-free rate. Therefore, in estimating the market cost of equity, I relied on the same methods to estimate the ERP: (1) consulting expert surveys; and (2) calculating the implied ERP. The results of my market cost of equity analysis are presented in the following table:[1]

Figure 2:

Market Cost of Equity Summary

Source	Estimate
IESE Survey	8.3%
Graham Harvey Survey	7.1%
Damodaran	9.2%
Garrett	8.3%
Average	8.2%

[1] *See* Exhibit DJG-16.

As shown in this table, the average market cost of equity from these sources is only 8.2%. Therefore, it is not surprising that CAPM and DCF Model indicate a cost of equity for Eversource of only 7.5%. In other words, any cost of equity estimate for Eversource (or any regulated utility) that is above the market cost of equity of 8.2% should be viewed as unreasonable (again, not that the cost of equity is different than the awarded rate of return).

The Commission should strive to award a return on equity that reflects, or is based upon the market-based cost of equity. However, the awarded return must also consider broader ratemaking principles and be reasonable under the circumstances. The results of the financial models presented in this case indicate a cost of equity estimate of about 7.5%. In the interest of avoiding a volatile move in the awarded return, I recommend the Commission adopt an awarded return on equity of 8.75%, which is toward the higher end of a range of reasonableness of 7.5% to 9.0%. This recommendation not only complies with the *Hope* Court's recognition that the awarded return be based on the actual cost of equity, but it also complies with the Court's acknowledgment that the "end result" be just and reasonable under the circumstances.

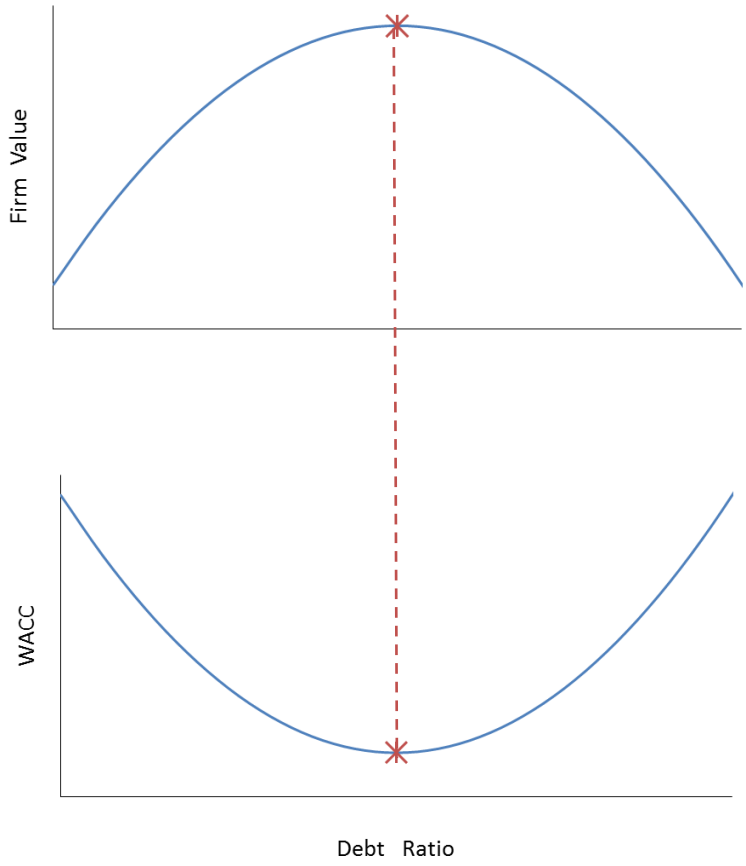
APPENDIX F

CAPITAL STRUCTURE

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

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

Figure 1:
Optimal Debt Ratio



As shown in this figure, a competitive firm's value is maximized when the WACC is minimized. In both of these graphs, the debt ratio [D/(D+E)] is shown on the x-axis. By increasing its debt ratio, a competitive firm can minimize its WACC and maximize its value. At a certain point, however, the benefits of increasing debt do not outweigh the costs of the additional risks to both bondholders and shareholders, as each type of investor will demand higher returns for the additional risk they have assumed.

While it is true that competitive firms maximize their value by minimizing their WACC, this is not the case for regulated utilities. Under the rate base rate of return model, a higher

WACC results in higher rates, all else held constant. The basic revenue requirement equation is as follows:

Equation 1:
Revenue Requirement for Regulated Utilities

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

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

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

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

> Since financial leverage multiplies the underlying business risk, it stands to reason that firms that have high business risk should be reluctant to take on financial leverage. It also stands to reason that firms that operate in stable businesses should be much more willing to take on financial leverage. Utilities, for instance, have historically had high debt ratios but have not had high betas, mostly because their underlying businesses have been stable and fairly predictable.[1]

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

It is not necessarily appropriate to consider the debt ratios of other regulated utilities to properly assess the proper debt ratio of the subject utility. Utility witnesses often argue that regulators should primarily consider the capital structures of other regulated utilities in assessing the proper capital structure. This type of analysis is oversimplified and insufficient for three important reasons:

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

Under the rate base rate of return model, utilities do not have a natural financial incentive to minimize their cost of capital; in fact, they have a financial incentive to do the opposite. Competitive firms, in contrast, can maximize their value by minimizing their cost of capital. Competitive firms minimize their cost of capital by including a sufficient amount of debt in their capital structures. Simply comparing the debt ratios of other regulated utilities will not indicate

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

an appropriate capital structure for the Companies. Rather, it is likely to justify debt ratios that are far too low. It is the Commission's role to act as a surrogate for competition and thereby ensure that the capital structure of a regulated monopoly is similar to what would be appropriate in a competitive environment, not a regulated environment. This cannot be accomplished by simply looking at the capital structures of other regulated utilities or the target utility's test-year capital structure.

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

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

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

The actual capital structure of any utility falls within the realm of managerial discretion. Regulatory commissions, however, have a duty to impute a proper capital structure if the company's actual capital structure is inappropriate. Thus, the actual capital structures of other utilities may have been deemed inappropriate by their own commission. For all of the foregoing reasons, simply comparing the capital structures of other regulated utilities is insufficient to determine a prudent capital structure.

The discussion below describes an objective approach to estimating a firm's optimal capital structure. My analysis of the optimal capital structure includes objective methods to

measure the effects of increasing debt on both the cost of debt and cost of equity. I will discuss the effects of increasing the debt ratio on each type of security separately.

Cost of Debt

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

Figure 2:
Bond Rating Spreads

Ratings Table			
Coverage Ratio	Bond Rating	Spread	Interest Rate
> 12.5	Aaa/AAA	0.60%	3.64%
9.5 - 12.49	Aa2/AA	0.80%	3.84%
7.5 - 9.49	A1/A+	1.00%	4.04%
6.0 - 7.49	A2/A	1.10%	4.14%
4.5 - 5.99	A3/A-	1.25%	4.29%
4.0 - 4.49	Baa2/BBB	1.60%	4.64%
3.5 - 3.99	Ba1/BB+	2.50%	5.54%
3.0 - 3.49	Ba2/BB	3.00%	6.04%
2.5 - 2.99	B1/B+	3.75%	6.79%
2.0 - 2.49	B2/B	4.50%	7.54%
1.5 - 1.99	B3/B-	5.50%	8.54%
1.25 - 1.49	Caa/CCC	6.50%	9.54%

As shown in this table, the spreads over the risk-free rate gradually increase as bond ratings fall.[2] The spread is added to the risk-free rate to obtain the interest rates shown in the far-right column. This concept is somewhat comparable to the interest rate a mortgage lender would

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

charge a borrower. The mortgage lender's advertised rate is usually the lowest rate, or the "prime" rate, which is available to borrowers with stellar credit scores. As credit scores decrease, however, the offered interest rate will increase. The bond ratings in this figure are based on various levels of interest coverage ratios shown in the far left column. The interest coverage ratio, as its name implies, is a metric used by financial analysts to gauge a firm's ability to pay its interest expense from its available earnings before interest and taxes ("EBIT"). (Likewise, the mortgage lender would consider the borrower's personal income-debt ratio). The formula for the interest coverage ratio is as follows:

Equation 2:
Interest Coverage Ratio

$$\frac{Earnings\ before\ Interest\ and\ Taxes}{Interest\ Expense}$$

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

Cost of Equity

As with the cost of debt, increasing the debt ratio also increases the cost of equity. To objectively measure how much the cost of equity increases, I first calculated the Companies' unlevered beta. The unlevered beta is determined by the assets owned by the firm, and removes the effects of financial leverage. As leverage increases, equity investors bear increasing amounts of risk, leading to higher betas. Before the effects of financial leverage can be accounted for,

however, the effects of leverage must first be removed, which is accomplished through the unlevered beta equation:

Equation 3:
Unlevered Beta

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

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

Using this equation, the beta for the firm can be unlevered, and then "re-levered" based on various debt ratios (by rearranging this equation to solve for β_L). So, by using the Bond Rating Spreads table and the unlevered beta equation, the costs of both debt and equity can be increased in correspondence with increasing the debt ratio, until the ideal capital structure is found: where the weighted average cost of capital is minimized.

Eversource's Optimal Debt Ratio

Since the optimal capital structure is unique to each firm based on its own financial metrics, I conducted separate capital structure analyses for NSTAR and WMEC. The following table presents different levels of NSTAR's weighted average cost of capital ("WACC") based on increasing debt ratios.[3]

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

Figure 3:
NSTAR's WACC at Various Debt Ratios

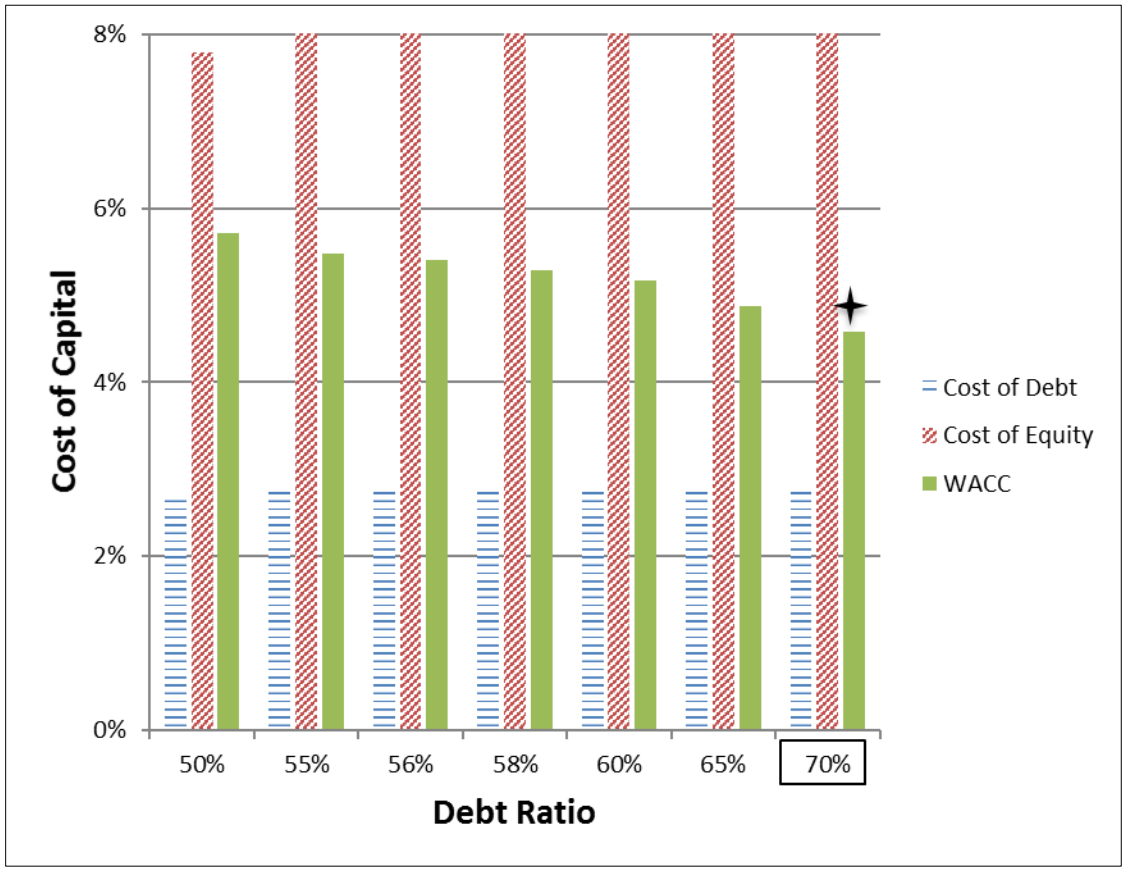
Optimal Capital Structure Calculation							
Debt Ratio	Levered Beta	True Cost of Equity	Awarded ROE	Coverage Ratio	After-tax Debt Cost	Optimal WACC	WACC at 8.75% ROE
0%	0.467	5.92%	8.75%	∞	2.37%	5.92%	8.75%
40%	0.670	7.17%	8.75%	8.19	2.63%	5.35%	6.30%
45%	0.716	7.45%	8.75%	7.28	2.69%	5.31%	6.02%
50%	0.771	7.79%	8.75%	6.55	2.69%	5.24%	5.72%
55%	0.839	8.21%	8.75%	5.96	2.79%	5.23%	5.47%
56%	0.854	8.30%	8.75%	5.85	2.79%	5.21%	5.41%
58%	0.887	8.50%	8.75%	5.65	2.79%	5.19%	5.29%
60%	0.923	8.73%	8.75%	5.46	2.79%	5.16%	5.17%
65%	1.032	9.40%	8.75%	5.04	2.79%	5.10%	4.88%
70%	1.176	10.29%	8.75%	4.68	2.79%	5.04%	4.58%

Utilities routinely offer some form of the following narrative: "If we issue more debt, our risk will increase which will raise our cost of debt and also raise our cost of equity." While this statement is technically true, it is very misleading for one important reason: It fails to acknowledge that the only cost that matters here is the weighted average cost of capital, not the cost of individual components of capital. In the figure above, the column on the far left shows increasing levels of debt ratios. At a debt ratio of 0%, the utility's beta is completely unlevered, its true cost of equity is only 5.92%, its cost of debt is only 2.37%, and its optimal WACC is only 5.92%. As the debt ratio is increased to 40% in the far left column, notice that both the cost of equity and the cost of debt increase (7.17% and 2.63% respectively). However, notice that the weighted average cost (the Optimal WACC column) actually decreases from 5.92% to 5.35%. This occurs as result of the basic weighted average cost of capital formula:

Weighted Average Cost of Capital = (Debt Ratio x Cost of Debt) + (Equity Ratio x Cost of Equity)

As the debt ratio increases, both the cost of debt and the cost of equity rise, however, the equity ratio also falls. This means the firm is replacing the higher-cost equity with the lower-cost debt as it increases the debt ratio. As shown in the figure above, at a debt ratio as high as 70%, the utility's WACC is actually lower than it was at a debt ratio of 0%, even though the costs of debt and equity both increased. According to this model, NSTAR's optimal debt ratio is significantly higher than what it has proposed in this case (only 46%). The following chart illustrates the results of this model.

Figure 4:
NSTAR's Optimal Debt Ratio



Stakeholders in the regulatory process have likely become familiar with idea of utility debt ratios being around 50%. To that extent, proposed debt ratios near 60% - 70% may appear to be high. In fact, however, debt ratios this high are very common among many industries across the country.

There are currently more than 1,000 firms across the country with debt ratios of 60% or greater, with an average debt ratio of 71%, as shown in the following figure:[4]

Figure 5:
Industries with Debt Ratios of 60% or Greater

Industry	Number of Fimrs	Debt Ratio
Advertising	41	87%
Hospitals/Healthcare Facilities	38	84%
Broadcasting	30	83%
Restaurant/Dining	86	82%
Tobacco	22	80%
Coal & Related Energy	38	**79%**
Brokerage & Investment Banking	45	76%
Retail (Building Supply)	6	75%
Retail (Automotive)	25	73%
Auto & Truck	15	73%
Trucking	30	73%
Packaging & Container	26	66%
Bank (Money Center)	10	66%
Beverage (Soft)	36	66%
Office Equipment & Services	24	65%
Telecom. Services	67	**64%**
Retail (Distributors)	88	62%
Power	68	**62%**
Hotel/Gaming	69	61%
Telecom (Wireless)	17	**61%**
R.E.I.T.	238	60%
Food Wholesalers	16	60%
Total / Average	**1035**	**71%**

[4] *See* Exhibit DJG-20.

Many of the industries shown here, like public utilities, are generally well-established industries with large amounts of capital assets. These shareholders of these industries demand higher debt ratios in order to maximize their profits. There are several notable industries that are relatively comparable to public utilities in some ways. For example, the Coal industry has an average debt ratio of 79%. Likewise, the telecommunication services industry has a debt ratio of 64%. Yet, utility witnesses often lead regulators to believe that operating at debt ratios above 50% would be detrimental. This is simply not accurate based on the market data or the technical analysis provided above.

Using WMEC's specific financial metrics, I conducted a similar capital structure analysis to the one presented above for NSTAR. The following table presents different levels of WMEC's weighted average cost of capital ("WACC") based on increasing debt ratios.[5]

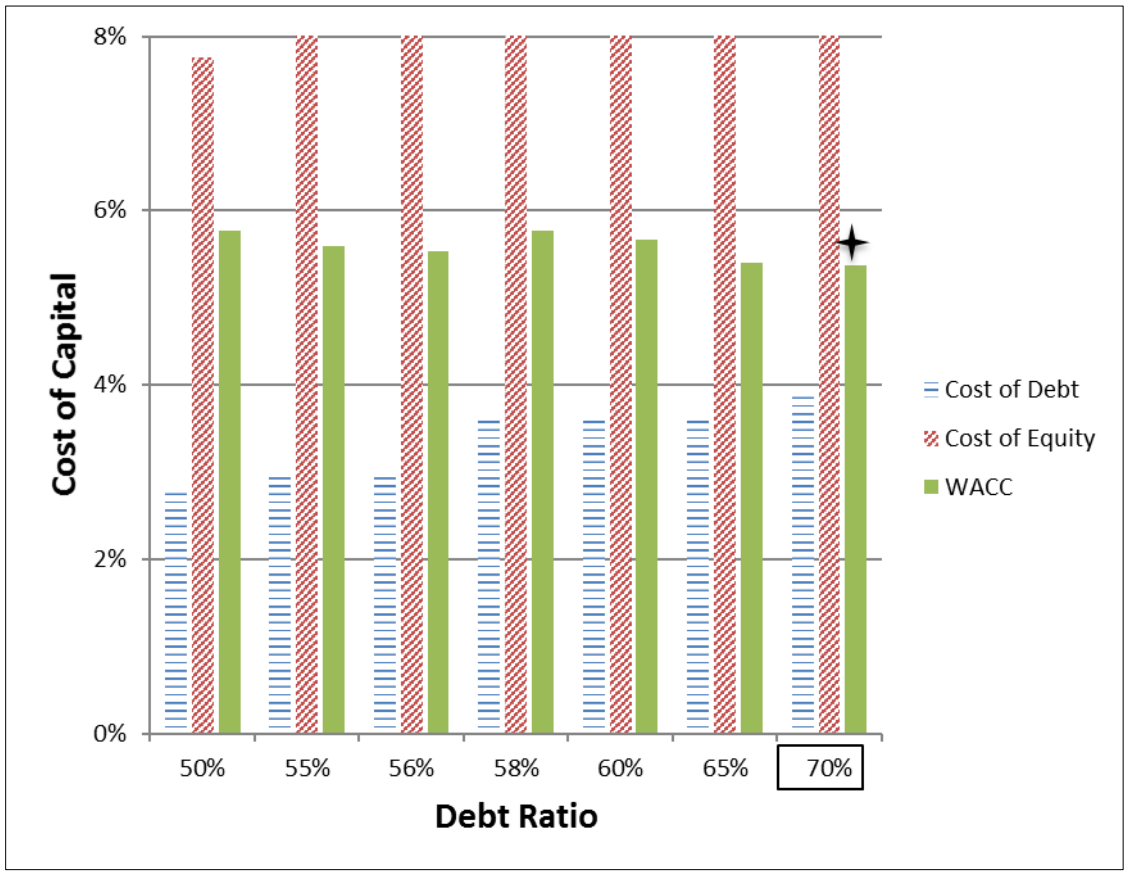
Figure 6:
WMEC's WACC at Various Debt Ratios

Optimal Capital Structure Calculation							
Debt Ratio	Levered Beta	True Cost of Equity	Awarded ROE	Coverage Ratio	After-tax Debt Cost	Optimal WACC	WACC at 8.75% ROE
0%	0.464	5.90%	8.75%	∞	2.37%	5.90%	8.75%
40%	0.665	7.14%	8.75%	5.69	2.79%	5.40%	6.37%
45%	0.710	7.42%	8.75%	5.06	2.79%	5.33%	6.07%
50%	0.765	7.75%	8.75%	4.55	2.79%	5.27%	5.77%
55%	0.832	8.17%	8.75%	4.14	3.02%	5.33%	5.60%
56%	0.847	8.26%	8.75%	4.07	3.02%	5.32%	5.54%
58%	0.880	8.46%	8.75%	3.93	3.60%	5.64%	5.76%
60%	0.916	8.68%	8.75%	3.80	3.60%	5.63%	5.66%
65%	1.024	9.35%	8.75%	3.50	3.60%	5.61%	5.40%
70%	1.167	10.23%	8.75%	3.25	3.93%	5.82%	5.37%

[5] *See also* Exhibit DJG-19.

As with the model above, as the debt ratio increases, both the cost of debt and the cost of equity rise, however, the equity ratio also falls. This means the firm is replacing the higher-cost equity with the lower-cost debt as it increases the debt ratio. As shown in the figure above, at a debt ratio as high as 50%, WMEC's WACC is minimized. However, also notice the cost of equity at a 50% debt ratio; it is 7.75%. At a cost of equity of 8.75% (my recommendation), the weighted average cost of capital is actually minimized at a debt ratio of 70%, similar to the analysis for NSTAR above. According to this model as well as the market data presented above, WMEC's optimal capital structure is much higher than what Eversource has proposed in this case (only 47%). The following chart illustrates the results of this model.

Figure 7:
WMEC's Optimal Debt Ratio



Again, as discussed above, we should not be surprised that this model would indicate that both NSTAR and WMEC would have optimal capital structures above 60%. The capital structures of over 1,000 competitive firms across the country have debt ratios above 60%, and moreover, the utility industry may be in a better position than every one of those industries to have capital structures with high debt ratios. This is because the utility industry is well-established, has large amounts of fixed capital assets, and has steady and relatively predictable revenue streams.

Although, as discussed above, it is not necessarily appropriate to solely consider the capital structures of other regulated utilities when assessing the proper capital structure of the

target utility, I have conducted an analysis of the proxy companies' debt ratios. The average debt ratio of the proxy companies is 51%, which is markedly higher than debt ratios proposed by NSTAR (46%) and WMEC (47%).[6]

All of the evidence presented here with regard to capital structure clearly indicates that Eversource's debt ratio is far below one that could be considered reasonable. When a utility's debt ratio is far below a reasonable level, a Commission standing in the place of competition should impute a debt ratio that would exist in a competitive environment, and at least partially limit the inappropriate transfer of excess wealth from Massachusetts ratepayers to the Companies' shareholders and the IRS. Even though the evidence indicates that Eversource's optimal debt ratio could be greater than 60%, I recommend that the Commission impute a debt ratio of only 51%. This debt ratio conforms to the debt ratios of the proxy group; moreover, it is supported by the objective analysis presented above. Finally, imputing a debt ratio of only 51% would represent a gradual, rather than abrupt move in the right direction.

[6] Exhibit DJG-21.

APPENDIX G

COMPONENTS OF WEIGHTED AVERAGE COST OF CAPITAL

The term "cost of capital" refers to the weighted average cost of all types of securities within a company's capital structure, including debt and equity. Determining the cost of debt is relatively straight-forward. Interest payments on bonds are contractual, "embedded costs" that are generally calculated by dividing total interest payments by the book value of outstanding debt. Determining the cost of equity, on the other hand, is more complex. Unlike the known, contractual cost of debt, there is no explicit "cost" of equity; the cost of equity must be estimated through various financial models. Thus, the overall weighted average cost of capital ("WACC") includes the cost of debt and the estimated cost of equity. It is a "weighted average," because it is based upon the Companies' relative levels of debt and equity, or "capital structure." Companies in the competitive market often use their WACC as the discount rate to determine the value of capital projects, so it is important that this figure be closely estimated. The basic WACC equation used in regulatory proceedings is presented as follows:

Equation 1:
Weighted Average Cost of Capital

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

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

Thus, the three components of the weighted average cost of capital are as follows:

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

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

While "cost of equity," "earned return on equity," and "awarded return on equity" are interrelated factors and concepts, they are all technically different. The financial models presented in this case were created as tools for estimating the "cost" of equity, which is synonymous to the "required return" that investors expect in exchange for giving up their opportunity to invest in other securities, or postponing their own consumption, given the level of risk inherent in the equity investment. In other words, the *cost* of equity from the company's perspective equals the "required return" from the investor's perspective.

The "earned" ROE is a historical return that is measured from a company's accounting statements, and it is used to measure how much shareholders earned for investing in a company. A company's earned ROE is not the same as the company's cost of equity or an investor's required return. For example, an investor who invests in a risky firm may *require* a return on investment of 10%. If the company has used the same estimates as the investor, then the company will estimate that its *cost* of equity is also 10%. If the company performs poorly and the investor *earns* a return only 3%, this does not mean that the investor required only 3%, or that the investor will not still require a 10% return the following period. Thus, the cost of equity

is not the same as the earned ROE. If by chance the company in this example achieves a 10% return on equity, then it will have exactly satisfied the return required by its shareholders.

Finally, the "awarded" return on equity is unique to the regulatory environment; it is the return authorized by a regulatory commission pursuant to legal guidelines. The awarded ROE should be based on the utility's cost of equity. The relationship between the terms and concepts discussed thus far may be summarized as follows: If the awarded ROE reflects a utility's cost of equity it should allow the utility to achieve an earned ROE that is sufficient to satisfy the required ROE of its equity investors; in addition, the regulator must consider the cost of debt and determine a prudent capital structure in order to ensure the utility's weighted average cost of capital is fair and reasonable.

APPENDIX H

ANALYTIC APPROACH

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

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

The cost of equity models in this case can be used to estimate the cost of capital of any individual, publicly-traded company. There are advantages, however, to conducting cost of

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

In this case, I chose to conduct my analyses on the same proxy group of utilities selected by the Companies. In my opinion, the exact composition of the proxy group is essentially insignificant in most cases, as long as there are enough utilities in the group to have a sufficient sample size. There could be reasonable arguments made for the inclusion or exclusion of a particular company in a proxy group, however, the cost of equity results are influenced far more by the assumptions and inputs to the various financial models we use than the composition of the proxy group.[1]

[1] *See* Exhibit DJG-5.

1900 NW Expy., Ste. 410
Oklahoma City, OK 73118

DAVID J. GARRETT

405.249.1050
dgarrett@resolveuc.com

EDUCATION

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

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

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

PROFESSIONAL DESIGNATIONS

Society of Depreciation Professionals
Certified Depreciation Professional (CDP)

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

The Mediation Institute
Certified Civil / Commercial & Employment Mediator

WORK EXPERIENCE

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

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

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

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

TEACHING EXPERIENCE

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

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

PUBLICATIONS

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

VOLUNTEER EXPERIENCE

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

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

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

PROFESSIONAL ASSOCIATIONS

Oklahoma Bar Association 2007 – Present

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

Society of Utility Regulatory Financial Analysts 2014 – Present

SELECTED CONTINUING PROFESSIONAL EDUCATION

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

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

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

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

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

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

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

Utility Regulatory Proceedings

State	Regulatory Agency / Company-Applicant	Docket Number	Testimony / Analysis		
			Issues	Type	Date
TX	Railroad Commission of Texas Atmos Pipeline - Texas	GUD 10580	Depreciation rates, depreciation grouping procedure	Prefiled	3/22/2017
TX	Public Utility Commission of Texas Sharyland Utility Co.	PUC 45414	Depreciation rates, simulated and actuarial analysis	Prefiled	2/28/2017
OK	Oklahoma Corporation Commission Empire District Electric Co.	PUD 201600468	Cost of capital, depreciation rates, terminal salvage, lifespans	Prefiled	3/13/2017
TX	Railroad Commission of Texas CenterPoint Energy Texas Gas	GUD 10567	Depreciation rates, simulated and actuarial analysis	Prefiled	2/21/2017
AR	Arkansas Public Service Commission Oklahoma Gas & Electric Co.	160-159-GU	Cost of capital, depreciation rates, terminal salvage, lifespans	Prefiled	1/31/2017
FL	Florida Public Service Commission Peoples Gas	160-159-GU	Depreciation rates	Report	11/4/2016
AZ	Arizona Corporation Commission Arizona Public Service Co.	E-01345A-16-0036	Cost of capital, depreciation rates, terminal salvage, lifespans	Pre-filed	12/28/2016
NV	Nevada Public Utilities Commission Sierra Pacific Power Co.	16-06008	Depreciation rates, terminal salvage, lifespans, theoretical reserve	Pre-filed	9/23/2016
OK	Oklahoma Corporation Commission Oklahoma Gas & Electric Co.	PUD 201500273	Cost of capital, depreciation rates, terminal salvage, lifespans	Pre-filed Live	3/21/2016 5/3/2016
OK	Oklahoma Corporation Commission Public Service Co. of Oklahoma	PUD 201500208	Cost of capital, depreciation rates, terminal salvage, lifespans	Pre-filed Live	10/14/2015 12/8/2015
OK	Oklahoma Corporation Commission Oklahoma Natural Gas Co.	PUD 201500213	Cost of capital and depreciation rates	Pre-filed	10/19/2015

Utility Regulatory Proceedings

State	Regulatory Agency / Company-Applicant	Docket Number	Testimony / Analysis		
			Issues	Type	Date
OK	Oklahoma Corporation Commission Oak Hills Water System	PUD 201500123	Cost of capital and depreciation rates	Pre-filed Live	7/8/2015 8/14/2015
OK	Oklahoma Corporation Commission CenterPoint Energy Oklahoma Gas	PUD 201400227	Fuel prudence review and fuel adjustment clause	Pre-filed Live	11/3/2014 2/10/2015
OK	Oklahoma Corporation Commission Public Service Co. of Oklahoma	PUD 201400233	Certificate of authority to issue new debt securities	Pre-filed Live	9/12/2014 9/25/2014
OK	Oklahoma Corporation Commission Empire District Electric Co.	PUD 201400226	Fuel prudence review and fuel adjustment clause	Pre-filed Live	12/9/2014 1/22/2015
OK	Oklahoma Corporation Commission Fort Cobb Fuel Authority	PUD 201400219	Fuel prudence review and fuel adjustment clause	Pre-filed Live	 1/29/2015
OK	Oklahoma Corporation Commission Fort Cobb Fuel Authority	PUD 201400140	Outside services, legislative advocacy, payroll expense, and insurance expense	Pre-filed	12/16/2014
OK	Oklahoma Corporation Commission Public Service Co. of Oklahoma	PUD 201300201	Authorization of standby and supplemental tariff	Pre-filed Live	12/9/2013 12/19/2013
OK	Oklahoma Corporation Commission Fort Cobb Fuel Authority	PUD 201300134	Fuel prudence review and fuel adjustment clause	Pre-filed Live	10/23/2013 1/30/2014
OK	Oklahoma Corporation Commission Empire District Electric Co.	PUD 201300131	Fuel prudence review and fuel adjustment clause	Pre-filed Live	11/21/2013 12/19/2013
OK	Oklahoma Corporation Commission CenterPoint Energy Oklahoma Gas	PUD 201300127	Fuel prudence review and fuel adjustment clause	Pre-filed Live	10/21/2013 1/23/2014
OK	Oklahoma Corporation Commission	PUD 201200185	Gas transportation contract extension	Pre-filed	9/20/2012

Utility Regulatory Proceedings

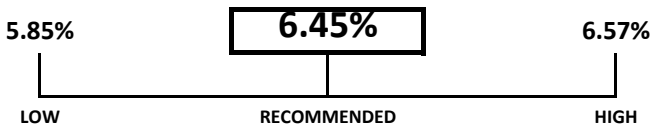
State	Regulatory Agency / Company-Applicant	Docket Number	Testimony / Analysis Issues	Type	Date
	Oklahoma Gas & Electric Co.			Live	10/9/2012
OK	Oklahoma Corporation Commission Empire District Electric Co.	PUD 201200170	Fuel prudence review and fuel adjustment clause	Pre-filed Live	10/31/2012 12/13/2012
OK	Oklahoma Corporation Commission Oklahoma Gas & Electric Co.	PUD 201200169	Fuel prudence review and fuel adjustment clause	Pre-filed Live	12/19/2012 4/4/2013

D.P.U. 17-05 Exhibit SREF-DJG-3
April 28, 2017 Hearing Officer Tassone

Weighted Average Awarded Return Recommendation
(NSTAR)

Source	Capital Structure	Cost Rates	Weighted Cost
Long-term Debt	51.00%	4.31%	2.20%
Preferred Stock	0.94%	4.56%	0.04%
Common Equity	48.06%	8.75% (7.50% – 9.00%)	4.21% (3.60% – 4.33%)

Recommended Range for Awarded Rate of Return

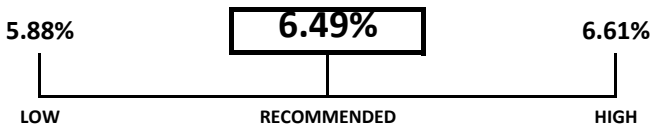


D.P.U. 17-05 Exhibit SREF-DJG-4
April 28, 2017 Hearing Officer Tassone

Weighted Average Awarded Return Recommendation (WMEC)

Source	Capital Structure	Cost Rates	Weighted Cost
Long-term Debt	51.00%	4.32%	2.20%
Preferred Stock	0.00%	0.00%	0.00%
Common Equity	49.00%	8.75% (7.50% – 9.00%)	4.29% (3.68% – 4.41%)

Recommended Range for Awarded Rate of Return



Proxy Group Summary

Company	Ticker	[1] Market Cap. ($ millions)	[2] Market Category	[3] Moody's Ratings	[4] Value Line Safety Rank	[5] Financial Strength	[6] Value Line Region
ALLETE	ALE	3,300	Mid Cap	A3	2	A	Central
Alliant Energy	LNT	8,900	Mid Cap	Baa1	2	A	Central
Ameren Corp.	AEE	13,000	Large Cap	Baa1	2	A	Central
Avista Corp.	AVA	2,500	Mid Cap	Baa1	2	A	West
American Electric Power	AEP	33,000	Large Cap	Baa1	1	A+	Central
Black Hills	BKH	3,300	Mid Cap	Baa2	2	A	West
CenterPoint Energy	CNP	12,000	Large Cap	Baa1	3	B+	Central
CMS Energy Corp.	CMS	12,000	Large Cap	Baa1	2	B++	Central
DTE Energy Co.	DTE	18,000	Large Cap	Baa1	2	B++	Central
El Paso Electric	EE	1,900	Small Cap	Baa1	2	B++	West
IDACORP	IDA	4,000	Mid Cap	Baa1	2	A	West
NorthWestern Corp.	NWE	2,800	Mid Cap	Baa1	3	B+	West
OGE Energy	OGE	7,300	Mid Cap	A3	2	A	Central
Otter Tail Corp.	OTTR	1,500	Small Cap	A3	2	A	Central
Pinnacle West Capital	PNW	8,700	Mid Cap	A3	1	A+	West
PNM Resources	PNM	2,700	Mid Cap	Baa3	3	B	West
Portland General	POR	3,900	Mid Cap	A3	2	B++	West
SCANA Corp.	SCG	9,900	Mid Cap	Baa3	2	B++	East
WEC Energy Group	WEC	19,000	Large Cap	A3	1	A+	Central
Xcel Energy	XEL	21,000	Large Cap	A3	1	A+	West

[1], [4], [5], [6] Value Line Investment Survey

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

[3] Bond ratings

Stock and Index Prices

D.P.U. 17-05 Exhibit SREF-DJG-6
April 28, 2017 Hearing Officer Tassone

Ticker	^GSPC	ALE	LNT	AEE	AVA	AEP	BKH	CNP	CMS	DTE	EE	IDA	NWE	OGE	OTTR	PNW	PNM	POR	SCG	WEC	XEL
30-day Average	2360	67.41	39.51	54.85	39.30	66.90	66.15	27.76	44.80	101.63	49.52	82.52	58.34	35.39	37.34	83.46	37.06	44.62	66.90	60.23	44.15
Standard Deviation	13.1	1.31	0.50	0.68	0.48	0.87	1.15	0.22	0.50	1.43	1.28	1.40	1.12	0.66	0.87	1.23	0.64	0.53	1.19	0.87	0.69
04/17/17	2349	69.37	39.88	55.43	40.48	67.74	68.01	28.24	45.55	104.44	51.35	85.36	60.41	34.65	38.40	85.74	38.00	45.77	66.30	60.94	45.08
04/13/17	2329	68.82	39.62	54.99	40.01	67.54	67.25	27.94	45.21	103.51	51.10	84.71	59.78	34.53	37.85	85.23	37.40	45.43	65.80	60.68	44.82
04/12/17	2345	69.32	39.89	55.39	39.99	67.79	67.83	28.04	45.55	103.96	51.40	84.84	59.66	34.76	38.25	85.37	38.10	45.56	66.22	61.10	44.90
04/11/17	2354	69.37	39.70	54.79	39.88	67.39	67.66	27.91	45.30	103.13	51.40	83.96	59.62	34.89	38.35	84.79	37.75	45.19	65.30	60.64	44.58
04/10/17	2357	68.95	39.71	54.71	39.47	67.50	67.35	28.00	45.24	103.20	50.95	83.10	59.13	34.66	37.95	84.78	37.65	44.91	65.52	60.55	44.58
04/07/17	2356	68.70	39.70	54.52	39.41	67.32	67.39	27.90	44.95	102.97	50.90	82.82	58.98	34.81	37.90	84.26	37.55	44.93	65.40	60.36	44.40
04/06/17	2357	68.44	39.87	54.71	39.41	67.62	67.58	27.90	45.10	102.97	51.00	83.39	59.41	35.01	37.90	84.48	37.75	45.08	66.30	60.82	44.59
04/05/17	2353	68.01	39.98	55.05	39.20	67.83	67.55	27.84	45.26	103.13	50.90	83.48	59.15	34.98	37.80	84.02	37.55	45.05	66.75	61.27	44.82
04/04/17	2360	67.78	39.87	54.72	38.79	67.29	66.74	27.77	44.91	102.24	50.40	83.21	58.85	34.88	37.95	83.74	37.30	44.72	66.12	60.61	44.51
04/03/17	2359	67.14	39.59	54.57	38.62	67.15	66.10	27.55	44.83	101.66	50.20	82.58	58.56	34.60	38.25	83.51	37.10	44.40	65.84	60.60	44.40
03/31/17	2363	67.71	39.61	54.59	39.05	67.13	66.47	27.57	44.74	102.11	50.50	82.96	58.70	34.68	37.90	83.38	37.00	44.42	65.35	60.63	44.45
03/30/17	2368	67.48	39.57	54.69	38.91	67.16	65.55	27.51	44.63	101.27	49.80	82.95	58.84	34.87	38.15	83.28	37.00	44.48	65.55	60.43	44.31
03/29/17	2361	67.75	39.98	55.13	39.11	67.39	65.70	27.85	44.82	101.78	49.60	83.26	58.84	35.10	38.10	83.52	37.15	44.69	65.66	60.93	44.47
03/28/17	2359	68.36	40.12	55.31	39.44	67.84	66.52	27.69	45.16	101.70	49.80	83.51	59.01	35.30	38.20	84.20	37.55	44.85	66.14	61.16	44.93
03/27/17	2342	68.15	40.06	56.05	39.33	67.69	66.34	27.69	45.10	101.89	49.70	83.29	58.82	35.11	38.25	84.14	37.55	44.73	66.46	60.98	44.77
03/24/17	2344	67.92	40.10	56.19	39.65	67.79	66.21	27.87	45.28	102.17	49.55	83.04	58.79	35.38	37.65	84.12	37.60	44.91	66.91	61.08	44.77
03/23/17	2346	67.50	39.84	56.05	39.52	67.45	66.19	27.75	45.10	101.60	49.20	82.82	58.51	35.24	36.35	83.59	37.30	44.75	66.71	60.68	44.58
03/22/17	2348	67.42	39.78	56.04	39.63	67.44	65.91	27.88	45.19	101.88	49.00	82.53	58.49	35.32	36.00	83.66	37.30	44.55	67.74	60.86	44.51
03/21/17	2344	67.10	39.70	55.49	39.47	66.98	65.65	27.58	45.01	101.47	48.90	81.93	58.14	35.40	36.00	83.69	37.25	44.37	68.27	60.74	44.36
03/20/17	2373	66.48	39.10	54.69	38.89	66.13	65.11	27.45	44.25	100.23	48.35	81.26	57.46	36.18	36.15	82.53	36.75	44.05	67.43	59.71	43.59
03/17/17	2378	67.38	39.56	55.05	39.49	66.47	66.65	27.68	44.71	100.90	49.10	82.31	57.75	36.47	36.55	83.23	37.30	44.68	67.88	60.01	43.85
03/16/17	2381	66.66	39.13	54.35	39.05	66.01	66.33	27.59	44.39	100.21	48.40	81.12	57.58	36.31	36.40	82.55	36.30	44.33	67.68	59.71	43.58
03/15/17	2385	66.90	39.58	54.79	39.62	66.68	66.40	28.09	45.00	101.73	48.85	81.76	58.14	36.59	36.85	83.60	36.70	44.71	68.75	60.32	44.05
03/14/17	2365	65.38	38.87	54.02	38.86	65.79	65.15	27.50	44.23	99.68	47.74	80.09	56.99	35.94	36.00	81.88	36.20	43.77	67.45	59.17	43.25
03/13/17	2373	65.32	38.75	54.19	38.91	65.81	65.20	27.61	44.19	99.80	47.89	80.43	56.97	36.08	36.40	81.68	36.25	43.91	67.60	59.24	43.23
03/10/17	2373	65.08	38.61	53.89	38.75	65.40	64.74	27.71	44.14	99.45	47.69	80.26	56.07	35.91	36.60	81.61	36.10	43.71	67.42	58.72	43.14
03/09/17	2365	64.59	38.30	53.68	38.43	64.84	63.85	27.37	43.72	98.92	47.34	80.20	55.99	35.74	36.20	80.87	35.75	43.65	67.34	58.11	42.71
03/08/17	2363	65.20	38.39	53.68	38.45	65.15	63.95	27.44	43.67	99.30	47.39	80.25	56.16	35.57	36.58	80.94	35.85	43.78	67.98	58.38	42.69
03/07/17	2368	66.83	39.28	54.37	39.40	66.24	64.70	28.00	44.44	100.73	48.53	82.03	57.59	36.48	37.70	82.54	36.40	44.57	69.20	59.29	43.46
03/06/17	2375	67.15	39.18	54.44	39.75	66.35	64.53	27.96	44.35	100.84	48.53	82.18	57.94	36.38	37.70	82.96	36.50	44.58	69.80	59.14	43.26

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

DCF Final Results

Company	Ticker	[1] Dividend	[2] Stock Price	[3] Dividend Yield
ALLETE	ALE	0.535	67.41	0.79%
Alliant Energy	LNT	0.315	39.51	0.80%
Ameren Corp.	AEE	0.440	54.85	0.80%
Avista Corp.	AVA	0.357	39.30	0.91%
American Electric Power	AEP	0.590	66.90	0.88%
Black Hills	BKH	0.445	66.15	0.67%
CenterPoint Energy	CNP	0.268	27.76	0.97%
CMS Energy Corp.	CMS	0.333	44.80	0.74%
DTE Energy Co.	DTE	0.825	101.63	0.81%
El Paso Electric	EE	0.310	49.52	0.63%
IDACORP	IDA	0.550	82.52	0.67%
NorthWestern Corp.	NWE	0.525	58.34	0.90%
OGE Energy	OGE	0.303	35.39	0.86%
Otter Tail Corp.	OTTR	0.320	37.34	0.86%
Pinnacle West Capital	PNW	0.655	83.46	0.78%
PNM Resources	PNM	0.243	37.06	0.66%
Portland General	POR	0.320	44.62	0.72%
SCANA Corp.	SCG	0.613	66.90	0.92%
WEC Energy Group	WEC	0.520	60.23	0.86%
Xcel Energy	XEL	0.360	44.15	0.82%
Average		**$0.44**	**$55.39**	**0.80%**

[1] First quarter 2017 dividends per share. Nasdaq.com

[2] Average stock price from DJG stock price exhibit.

[3] = [1] / [2]

Terminal Growth Rate

Growth Determinant	Rate	
Nominal GDP	4.10%	[1]
Inflation	2.00%	[2]
Risk Free Rate	2.92%	[3]
Average	**3.01%**	

[1], [2] CBO Long-Term Budget Outlook 2016 - 2046

[3] From DJG risk-free rate exhibit

Final DCF Result

[1]	[2]	[3]	[4]
Dividend (d_0)	Stock Price (P_0)	Growth Rate (g)	**DCF Result**
$0.44	$55.39	4.10%	**7.5%**

[1] Average proxy dividend from DJG dividend exhibit

[2] Average proxy stock price from DJG dividend exhibit

[3] Highest growth rate from DJG growth determinant exhibit

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

Risk-Free Rate

Date	Rate
03/06/17	3.10%
03/07/17	3.11%
03/08/17	3.15%
03/09/17	3.19%
03/10/17	3.16%
03/13/17	3.20%
03/14/17	3.17%
03/15/17	3.11%
03/16/17	3.14%
03/17/17	3.11%
03/20/17	3.08%
03/21/17	3.04%
03/22/17	3.02%
03/23/17	3.02%
03/24/17	3.00%
03/27/17	2.98%
03/28/17	3.02%
03/29/17	2.99%
03/30/17	3.03%
03/31/17	3.02%
04/03/17	2.98%
04/04/17	2.99%
04/05/17	2.98%
04/06/17	2.99%
04/07/17	3.00%
04/10/17	2.99%
04/11/17	2.93%
04/12/17	2.92%
04/13/17	2.89%
04/17/17	2.92%
Average	**3.04%**

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

Beta Results

Company	Ticker	Beta
ALLETE	ALE	0.80
Alliant Energy	LNT	0.70
Ameren Corp.	AEE	0.70
Avista Corp.	AVA	0.70
American Electric Power	AEP	0.65
Black Hills	BKH	0.90
CenterPoint Energy	CNP	0.85
CMS Energy Corp.	CMS	0.65
DTE Energy Co.	DTE	0.65
El Paso Electric	EE	0.70
IDACORP	IDA	0.75
NorthWestern Corp.	NWE	0.70
OGE Energy	OGE	0.95
Otter Tail Corp.	OTTR	0.85
Pinnacle West Capital	PNW	0.70
PNM Resources	PNM	0.75
Portland General	POR	0.70
SCANA Corp.	SCG	0.65
WEC Energy Group	WEC	0.60
Xcel Energy	XEL	0.60
Average		0.73

*Betas from Value Line Investment Survey

Implied Equity Risk Premium

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Year	Index Value	Operating Earnings	Dividends	Buybacks	Earnings Yield	Dividend Yield	Buyback Yield	Gross Cash Yield
2010	11,430	759	206	299	6.64%	1.80%	2.61%	4.42%
2011	11,385	877	240	405	7.70%	2.11%	3.56%	5.67%
2012	12,742	870	281	399	6.83%	2.20%	3.13%	5.33%
2013	16,495	956	312	476	5.80%	1.89%	2.88%	4.77%
2014	18,245	1,004	350	553	5.50%	1.92%	3.03%	4.95%
2015	17,900	885	382	572	4.95%	2.14%	3.20%	5.33%

Cash Yield	5.08%	[9]
Growth Rate	3.14%	[10]
Risk-free Rate	3.04%	[11]
Current Index Value	2,360	[12]

	[13]	[14]	[15]	[16]	[17]
Year	1	2	3	4	5
Expected Dividends	124	127	131	136	140
Expected Terminal Value					2743
Present Value	114	109	104	99	1935

Intrinsic Index Value	2360	[18]
Required Return on Market	8.30%	[19]
Implied Equity Risk Premium	**5.26%**	[20]

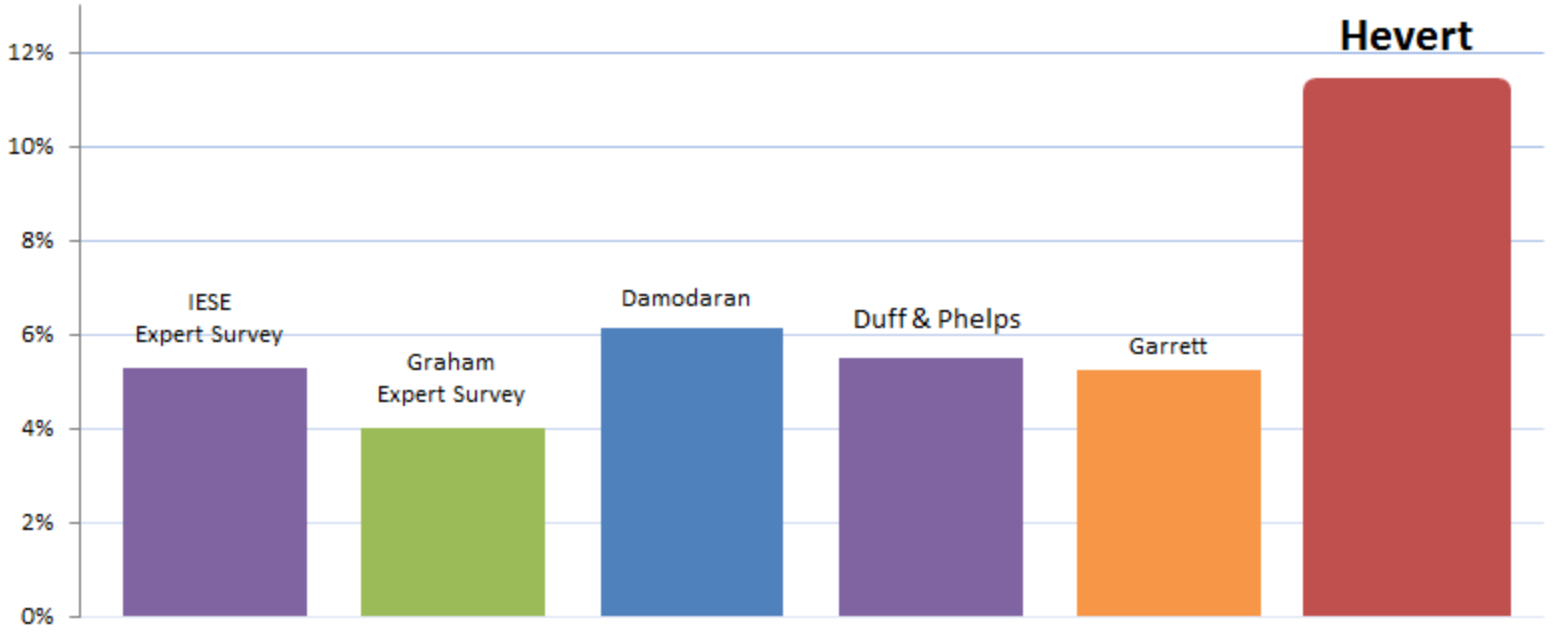
[1-4] S&P Quarterly Press Releases, data found at www.spdji.com/indices/equity/sp-500 (additional info tab) (all dollar figures are in $ billions)
[1] Market value of S&P 500
[5] = [2] / [1]
[6] = [3] / [1]
[7] = [4] / [1]
[8] = [6] + [7]
[9] = Average of [8]
[10] = Compund annual growth rate of [2] = (end value / beginning value)^ $^{1/4}$ -1
[11] Risk-free rate from DJG risk-free rate exhibit
[12] 30-day average of closing index prices from DJG stock price exhibit
[13-16] Expected dividends = [9]*[12]*(1+[10])^{n} ; Present value = expected dividend / (1+[11]+[19])^{n}
[17] Expected terminal value = expected dividend * (1+[11]) / [19] ; Present value = (expected dividend + expected terminal value) / (1+[11]+[19])^{n}
[18] = Sum([13-17]) present values.
[19] = [20] + [11]
[20] Internal rate of return calculation setting [18] equal to [12] and solving for the discount rate

Equity Risk Premium Results

IESE Business School Survey	5.3%	[1]
Graham & Harvey Survey	4.0%	[2]
Duff & Phelps Report	5.5%	[3]
Damodaran	6.2%	[4]
Garrett	5.3%	[5]
Average	**5.2%**	

Company ERP	11.21%
Survey Average	4.7%

[1] IESE Business School Survey
[2] Graham and Harvey Survey
[3] Duff & Phelps Client Alert 2016
[4] Highest ERP est., http://pages.stern.nyu.edu/~adamodar/
[5] From DJG implied ERP exhibit



CAPM Final Results

Company	Ticker	[1] Risk-Free Rate	[2] Value Line Beta	[3] Risk Premium	[4] CAPM Results
ALLETE	ALE	3.04%	0.800	6.16%	8.0%
Alliant Energy	LNT	3.04%	0.700	6.16%	7.4%
Ameren Corp.	AEE	3.04%	0.700	6.16%	7.4%
Avista Corp.	AVA	3.04%	0.700	6.16%	7.4%
American Electric Power	AEP	3.04%	0.650	6.16%	7.0%
Black Hills	BKH	3.04%	0.900	6.16%	8.6%
CenterPoint Energy	CNP	3.04%	0.850	6.16%	8.3%
CMS Energy Corp.	CMS	3.04%	0.650	6.16%	7.0%
DTE Energy Co.	DTE	3.04%	0.650	6.16%	7.0%
El Paso Electric	EE	3.04%	0.700	6.16%	7.4%
IDACORP	IDA	3.04%	0.750	6.16%	7.7%
NorthWestern Corp.	NWE	3.04%	0.700	6.16%	7.4%
OGE Energy	OGE	3.04%	0.950	6.16%	8.9%
Otter Tail Corp.	OTTR	3.04%	0.850	6.16%	8.3%
Pinnacle West Capital	PNW	3.04%	0.700	6.16%	7.4%
PNM Resources	PNM	3.04%	0.750	6.16%	7.7%
Portland General	POR	3.04%	0.700	6.16%	7.4%
SCANA Corp.	SCG	3.04%	0.650	6.16%	7.0%
WEC Energy Group	WEC	3.04%	0.600	6.16%	6.7%
Xcel Energy	XEL	3.04%	0.600	6.16%	6.7%
Average			0.728		**7.5%**

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

Cost of Equity Summary

Model	Cost of Equity
Discounted Cash Flow Model	7.5%
Capital Asset Pricing Model	7.5%
Average	**7.5%**

Market Cost of Equity

Source	Estimate	
IESE Survey	8.3%	[1]
Graham Harvey Survey	7.1%	[2]
Damodaran	9.2%	[3]
Garrett	8.3%	[4]
Average	8.2%	

[1] Average reported ERP + riskfree rate

[2] Average reported ERP + risk-free rate

[3] Recent highest reported ERP + risk-free rate

[4] From implied ERP exhibit herein

Awarded Returns vs. Market Cost of Equity
(2005 - 2016)

Quarter	[1] Cases Filed	[2] Average Awarded ROE
2005.1	4	10.55%
2005.2	12	10.13%
2005.3	8	10.84%
2005.4	10	10.57%
2006.1	11	10.38%
2006.2	18	10.39%
2006.3	7	10.06%
2006.4	12	10.38%
2007.1	11	10.30%
2007.2	16	10.27%
2007.3	8	10.02%
2007.4	11	10.44%
2008.1	7	10.15%
2008.2	8	10.41%
2008.3	21	10.42%
2008.4	6	10.38%
2009.1	13	10.31%
2009.2	22	10.55%
2009.3	17	10.46%
2009.4	14	10.54%
2010.1	16	10.45%
2010.2	19	10.12%
2010.3	12	10.27%
2010.4	8	10.30%
2011.1	8	10.35%
2011.2	15	10.24%
2011.3	17	10.13%
2011.4	10	10.29%
2012.1	17	10.84%
2012.2	16	9.92%
2012.3	8	9.78%
2012.4	12	10.05%
2013.1	19	10.23%
2013.2	16	9.77%
2013.3	4	10.06%
2013.4	7	9.90%
2014.1	9	10.23%
2014.2	25	9.83%
2014.3	8	9.89%
2014.4	16	9.78%
2015.1	10	10.37%
2015.2	21	9.73%
2015.3	6	9.40%
2015.4	11	9.62%
2016.1	14	10.26%
2016.2	27	9.57%
2016.3	12	9.76%
2016.4	17	9.57%

Year	[3] Annual Market Return	
2005	4.83%	
2006	15.61%	
2007	5.48%	
2008	-36.55%	
2009	25.94%	
2010	14.82%	
2011	2.10%	
2012	15.89%	
2013	32.15%	
2014	13.25%	
2015	1.38%	
2016	11.74%	
Average		
Arithmetic	8.89%	[4]
Geometric	7.39%	[5]
Average Return on All Stocks	**8.1%**	[6]
Average Utility Awarded ROE	**10.2%**	[7]

Year	[8] Market Cost of Equity
2005	8.47%
2006	8.86%
2007	8.39%
2008	8.64%
2009	8.20%
2010	8.49%
2011	7.89%
2012	7.54%
2013	8.00%
2014	7.95%
2015	8.39%
2016	8.14%
Average	**8.25%**

[1] Edison Electric Institute Financial Update. Number of cases filed in each quarter.

[2] Edison Electric Institute Financial Update. Average awarded utility ROE each quarter.

[3] Historical stock returns. NYU Stern School of Business. http://pages.stern.nyu.edu/~adamodar/.

[4] = Average of [3]

[5] = Geometric mean of [3]

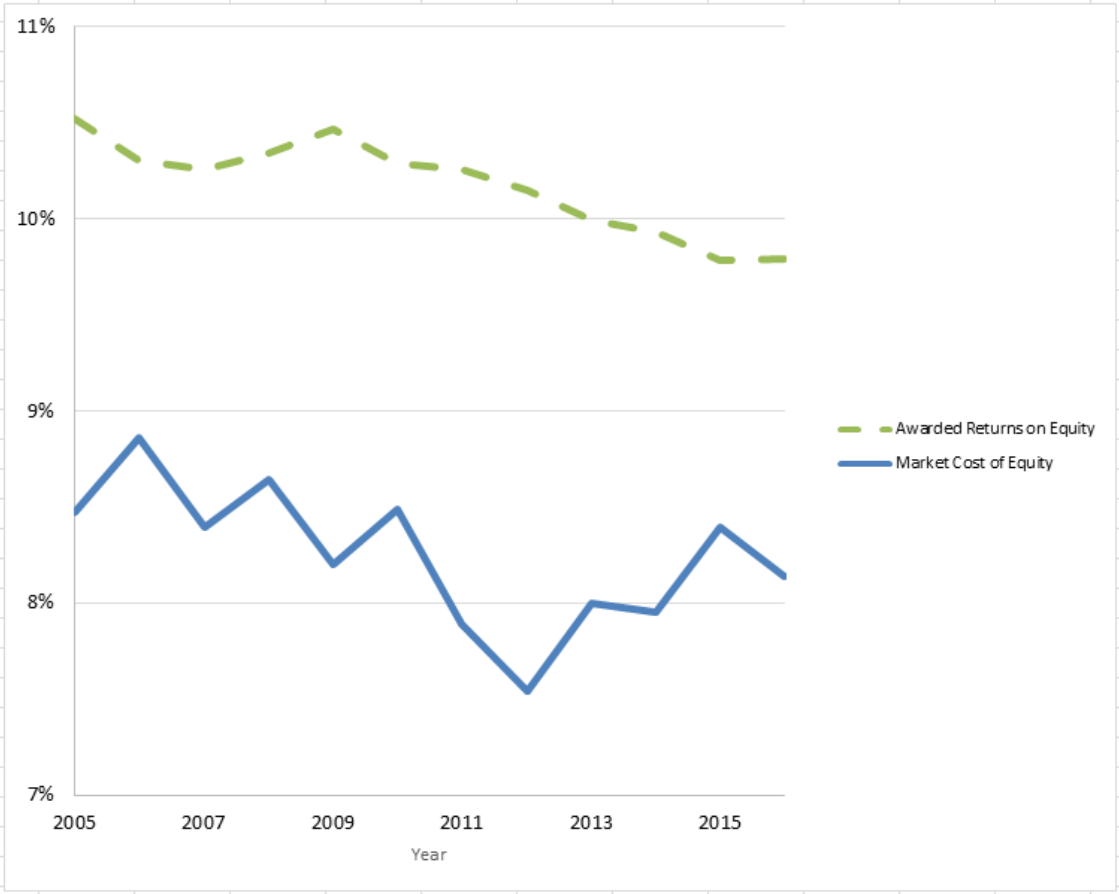
[6] = Average ([4],[5])

[7] = Average of [2]

[8] Annual required market returns. NYU Stern School of Business. http://pages.stern.nyu.edu/~adamodar/ (adding risk-free rate to implied ERP)

Average annual awards

2005	10.52%
2006	10.30%
2007	10.26%
2008	10.34%
2009	10.47%
2010	10.29%
2011	10.25%
2012	10.15%
2013	9.99%
2014	9.93%
2015	9.78%
2016	9.79%



Optimal Capital Structure (NSTAR)

Inputs		
EBIT	642,827	[1]
Interest Expense	75,298	[2]
Book Debt	2,100,000	[3]
Book Equity	2,452,821	[4]
Debt / Capital	46.13%	[5]
Debt / Equity	86%	[6]
Debt Cost	4.31%	[7]
Tax Rate	35%	[8]
Unlevered Beta	0.47	[9]
Risk-free Rate	3.04%	[10]
Equity Risk Premium	6.16%	[11]
Coverage Ratio	8.54	[12]
Bond Rating	A2	[13]

[14]	[15]	[16]	[17]
Ratings Table			
Coverage Ratio	Bond Rating	Spread	Interest Rate
> 12.5	Aaa/AAA	0.60%	3.64%
9.5 - 12.49	Aa2/AA	0.80%	3.84%
7.5 - 9.49	A1/A+	1.00%	4.04%
6.0 - 7.49	A2/A	1.10%	4.14%
4.5 - 5.99	A3/A-	1.25%	4.29%
4.0 - 4.49	Baa2/BBB	1.60%	4.64%
3.5 - 3.99	Ba1/BB+	2.50%	5.54%
3.0 - 3.49	Ba2/BB	3.00%	6.04%
2.5 - 2.99	B1/B+	3.75%	6.79%
2.0 - 2.49	B2/B	4.50%	7.54%
1.5 - 1.99	B3/B-	5.50%	8.54%
1.25 - 1.49	Caa/CCC	6.50%	9.54%

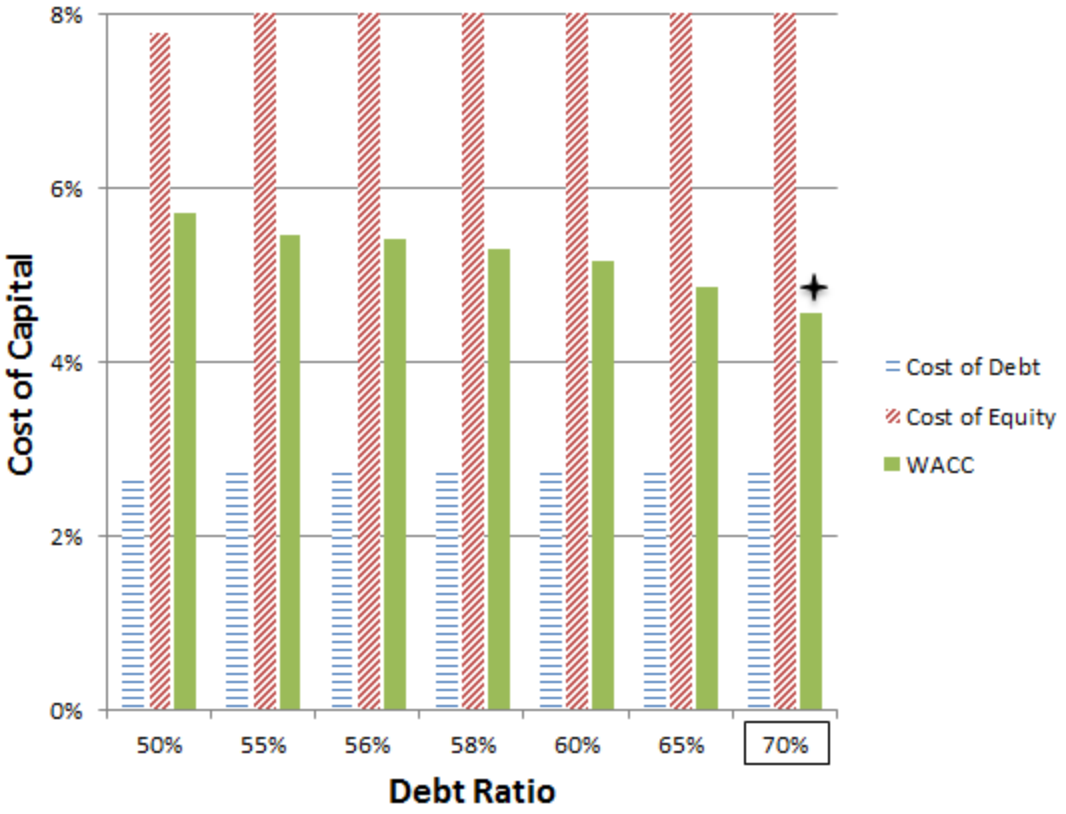
Optimal Capital Structure Calculation

[18] Debt Ratio	[19] D/E Ratio	[20] Levered Beta	[21] True Cost of Equity	[22] Awarded ROE	[23] Debt Level	[24] Interest Expense	[25] Coverage Ratio	[26] Pre-tax Debt Cost	[27] After-tax Debt Cost	[28] Optimal WACC	[29] WACC at 8.75% ROE
0%	0%	0.467	5.92%	8.75%	0	0	∞	3.64%	2.37%	5.92%	8.75%
40%	67%	0.670	7.17%	8.75%	1,821,128	78,491	8.19	4.04%	2.63%	5.35%	6.30%
45%	82%	0.716	7.45%	8.75%	2,048,769	88,302	7.28	4.14%	2.69%	5.31%	6.02%
50%	100%	0.771	7.79%	8.75%	2,276,410	98,113	6.55	4.14%	2.69%	5.24%	5.72%
55%	122%	0.839	8.21%	8.75%	2,504,052	107,925	5.96	4.29%	2.79%	5.23%	5.47%
56%	127%	0.854	8.30%	8.75%	2,549,580	109,887	5.85	4.29%	2.79%	5.21%	5.41%
58%	138%	0.887	8.50%	8.75%	2,640,636	113,811	5.65	4.29%	2.79%	5.19%	5.29%
60%	150%	0.923	8.73%	8.75%	2,731,693	117,736	5.46	4.29%	2.79%	5.16%	5.17%
65%	186%	1.032	9.40%	8.75%	2,959,334	127,547	5.04	4.29%	2.79%	5.10%	4.88%
70%	233%	1.176	10.29%	8.75%	3,186,975	137,359	4.68	4.29%	2.79%	5.04%	4.58%

[1], [2] Q-AG-01-002 AG-1-2 Attachment (11) (000's)
[3], [4] Company Schedule DPH-31 (000's)
[5] = [3] / ([3] + [4])
[6] = [3] / [4]
[7] Company Schedule DPH-31
[8] Estimated corporate tax rate
[9] Average beta / (1+(1 - [8])*[6])
[10] From DJG risk-free rate exhibit
[11] From DJG equity risk premium exhibit

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

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



Optimal Capital Structure Calculation

Debt Ratio	Levered Beta	True Cost of Equity	Awarded ROE	Coverage Ratio	After-tax Debt Cost	Optimal WACC	WACC at 8.75% ROE
0%	0.467	5.92%	8.75%	∞	2.37%	5.92%	8.75%
40%	0.670	7.17%	8.75%	8.19	2.63%	5.35%	6.30%
45%	0.716	7.45%	8.75%	7.28	2.69%	5.31%	6.02%
50%	0.771	7.79%	8.75%	6.55	2.69%	5.24%	5.72%
55%	0.839	8.21%	8.75%	5.96	2.79%	5.23%	5.47%
56%	0.854	8.30%	8.75%	5.85	2.79%	5.21%	5.41%
58%	0.887	8.50%	8.75%	5.65	2.79%	5.19%	5.29%
60%	0.923	8.73%	8.75%	5.46	2.79%	5.16%	5.17%
65%	1.032	9.40%	8.75%	5.04	2.79%	5.10%	4.88%
70%	1.176	10.29%	8.75%	4.68	2.79%	5.04%	4.58%

Optimal Capital Structure (WMEC)

Inputs		
EBIT	115,520	[1]
Interest Expense	23,025	[2]
Book Debt	547,976	[3]
Book Equity	626,410	[4]
Debt / Capital	46.66%	[5]
Debt / Equity	87%	[6]
Debt Cost	4.32%	[7]
Tax Rate	35%	[8]
Unlevered Beta	0.46	[9]
Risk-free Rate	3.04%	[10]
Equity Risk Premium	6.16%	[11]
Coverage Ratio	5.02	[12]
Bond Rating	A2	[13]

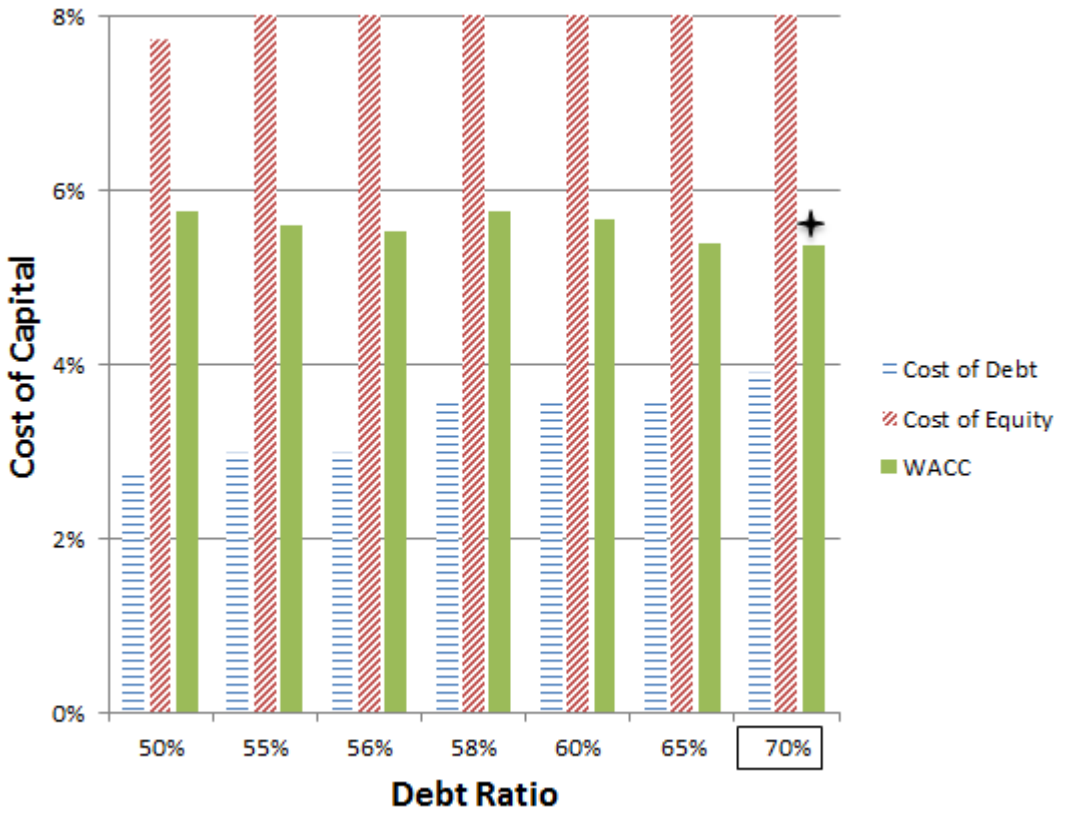
Ratings Table

[14] Coverage Ratio	[15] Bond Rating	[16] Spread	[17] Interest Rate
> 12.5	Aaa/AAA	0.60%	3.64%
9.5 - 12.49	Aa2/AA	0.80%	3.84%
7.5 - 9.49	A1/A+	1.00%	4.04%
6.0 - 7.49	A2/A	1.10%	4.14%
4.5 - 5.99	A3/A-	1.25%	4.29%
4.0 - 4.49	Baa2/BBB	1.60%	4.64%
3.5 - 3.99	Ba1/BB+	2.50%	5.54%
3.0 - 3.49	Ba2/BB	3.00%	6.04%
2.5 - 2.99	B1/B+	3.75%	6.79%
2.0 - 2.49	B2/B	4.50%	7.54%
1.5 - 1.99	B3/B-	5.50%	8.54%
1.25 - 1.49	Caa/CCC	6.50%	9.54%

Optimal Capital Structure Calculation

[18] Debt Ratio	[19] D/E Ratio	[20] Levered Beta	[21] True Cost of Equity	[22] Awarded ROE	[23] Debt Level	[24] Interest Expense	[25] Coverage Ratio	[26] Pre-tax Debt Cost	[27] After-tax Debt Cost	[28] Optimal WACC	[29] WACC at 8.75% ROE
0%	0%	0.464	5.90%	8.75%	0	0	∞	3.64%	2.37%	5.90%	8.75%
40%	67%	0.665	7.14%	8.75%	469,754	20,293	5.69	4.29%	2.79%	5.40%	6.37%
45%	82%	0.710	7.42%	8.75%	528,474	22,830	5.06	4.29%	2.79%	5.33%	6.07%
50%	100%	0.765	7.75%	8.75%	587,193	25,367	4.55	4.29%	2.79%	5.27%	5.77%
55%	122%	0.832	8.17%	8.75%	645,912	27,903	4.14	4.64%	3.02%	5.33%	5.60%
56%	127%	0.847	8.26%	8.75%	657,656	28,411	4.07	4.64%	3.02%	5.32%	5.54%
58%	138%	0.880	8.46%	8.75%	681,144	29,425	3.93	5.54%	3.60%	5.64%	5.76%
60%	150%	0.916	8.68%	8.75%	704,632	30,440	3.80	5.54%	3.60%	5.63%	5.66%
65%	186%	1.024	9.35%	8.75%	763,351	32,977	3.50	5.54%	3.60%	5.61%	5.40%
70%	233%	1.167	10.23%	8.75%	822,070	35,513	3.25	6.04%	3.93%	5.82%	5.37%

[1], [2] Q-AG-01-002 AG-1-2 Attachment (11) (000's)
[3], [4] Company Schedule DPH-31 (000's)
[5] = [3] / ([3] + [4])
[6] = [3] / [4]
[7] Company Schedule DPH-31
[8] Estimated corporate tax rate
[9] Average beta / (1+(1 - [8])*[6])
[10] From DJG risk-free rate exhibit
[11] From DJG ERP exhibit
[12] = [1] / [2]
[13] Company bond rating
[14] Ranges of coverage ratios
[15] Moody's / S&P bond ratings
[16] NYU spread over risk-free rate
[17] = [16] + [10] = est. debt cost
[18] = debt / total capital
[19] = [18] / (1 - [18])
[20] = [9] * (1 + (1 - [8]) * [6]
[21] = [10] + [20] * [11]
[22] Recommended awarded ROE
[23] = [18] * ([3] + [4]); (000's)
[24] = [22] * [7]; (000's)
[25] = [1] / [23]
[26] Debt cost given coverage ratio per Ratings Table
[27] = [25] * (1 - [8])
[28] = ([18] * [26]) + ((1 - [18]) * [21])
[29] = ([18] * [26]) + ((1 - [18]) * [22])



Optimal Capital Structure Calculation

Debt Ratio	Levered Beta	True Cost of Equity	Awarded ROE	Coverage Ratio	After-tax Debt Cost	Optimal WACC	WACC at 8.75% ROE
0%	0.464	5.90%	8.75%	--	2.37%	5.90%	8.75%
40%	0.665	7.14%	8.75%	5.69	2.79%	5.40%	6.37%
45%	0.710	7.42%	8.75%	5.06	2.79%	5.33%	6.07%
50%	0.765	7.75%	8.75%	4.55	2.79%	5.27%	5.77%
55%	0.832	8.17%	8.75%	4.14	3.02%	5.33%	5.60%
56%	0.847	8.26%	8.75%	4.07	3.02%	5.32%	5.54%
58%	0.880	8.46%	8.75%	3.93	3.60%	5.64%	5.76%
60%	0.916	8.68%	8.75%	3.80	3.60%	5.63%	5.66%
65%	1.024	9.35%	8.75%	3.50	3.60%	5.61%	5.40%
70%	1.167	10.23%	8.75%	3.25	3.93%	5.82%	5.37%

Competitive Industry Debt Ratios

Industry	Number of Fimrs	Debt Ratio
Advertising	41	87%
Hospitals/Healthcare Facilities	38	84%
Broadcasting	30	83%
Restaurant/Dining	86	82%
Tobacco	22	80%
Coal & Related Energy	38	79%
Brokerage & Investment Banking	45	76%
Retail (Building Supply)	6	75%
Retail (Automotive)	25	73%
Auto & Truck	15	73%
Trucking	30	73%
Packaging & Container	26	66%
Bank (Money Center)	10	66%
Beverage (Soft)	36	66%
Office Equipment & Services	24	65%
Telecom. Services	67	64%
Retail (Distributors)	88	62%
Power	68	62%
Hotel/Gaming	69	61%
Telecom (Wireless)	17	61%
R.E.I.T.	238	60%
Food Wholesalers	16	60%
Retail (Grocery and Food)	14	59%
Real Estate (Operations & Services)	54	59%
Transportation	17	59%
Chemical (Basic)	45	58%
Construction Supplies	51	58%
Environmental & Waste Services	89	57%
Farming/Agriculture	37	56%
Business & Consumer Services	165	56%
Air Transport	18	56%
Green & Renewable Energy	25	55%
Computer Services	117	54%
Oil/Gas Distribution	78	54%
Utility (Water)	22	54%
Cable TV	14	53%
Steel	38	53%
Rubber& Tires	4	52%
Drugs (Biotechnology)	426	52%
Chemical (Specialty)	100	52%
Recreation	66	51%
Software (System & Application)	236	51%
Metals & Mining	97	51%
Beverage (Alcoholic)	25	51%
Information Services	64	51%
Household Products	129	51%
Chemical (Diversified)	8	50%
Aerospace/Defense	96	50%
Building Materials	41	50%
Oil/Gas (Production and Exploration)	330	50%
Investments & Asset Management	156	49%
Auto Parts	63	48%
Total / Average	**3660**	**61%**

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

Industry	Number of Fimrs	Debt Ratio
Advertising	41	87%
Hospitals/Healthcare Facilities	38	84%
Broadcasting	30	83%
Restaurant/Dining	86	82%
Tobacco	22	80%
Coal & Related Energy	38	**79%**
Brokerage & Investment Banking	45	76%
Retail (Building Supply)	6	75%
Retail (Automotive)	25	73%
Auto & Truck	15	73%
Trucking	30	73%
Packaging & Container	26	66%
Bank (Money Center)	10	66%
Beverage (Soft)	36	66%
Office Equipment & Services	24	65%
Telecom. Services	67	**64%**
Retail (Distributors)	88	62%
Power	68	**62%**
Hotel/Gaming	69	61%
Telecom (Wireless)	17	**61%**
R.E.I.T.	238	60%
Food Wholesalers	16	60%
Total / Average	**1035**	**71%**

Proxy Company Debt Ratios

Company	Ticker	Debt Ratio
ALLETE	ALE	42%
Alliant Energy	LNT	49%
Ameren Corp.	AEE	48%
Avista Corp.	AVA	50%
American Electric Power	AEP	50%
Black Hills	BKH	56%
CenterPoint Energy	CNP	69%
CMS Energy Corp.	CMS	67%
DTE Energy Co.	DTE	56%
El Paso Electric	EE	53%
IDACORP	IDA	46%
NorthWestern Corp.	NWE	53%
OGE Energy	OGE	41%
Otter Tail Corp.	OTTR	43%
Pinnacle West Capital	PNW	43%
PNM Resources	PNM	54%
Portland General	POR	48%
SCANA Corp.	SCG	52%
WEC Energy Group	WEC	51%
Xcel Energy	XEL	54%
Average		51%

Debt ratios from Value Line Investment Survey

NSTAR ELECTRIC COMPANY
SUMMARY OF RECOMMENDATIONS
D.P.U. 17-05, TEST YEAR END 6/30/2016

Line No.	Description	Rate Base	Pre-Tax ROR	Rate Increase
		[DPH-1]		[DPH-1]
1	Requested Amounts	$ 2,734,402,771	11.48%	$ 60,194,387
2	Adjust ROE to 8.75%	$ 2,734,402,771	-2.13%	$ (58,143,025)
3	Total			$ 2,051,362

WESTERN MASSACHUSETTS ELECTRIC COMPANY
SUMMARY OF RECOMMENDATIONS
D.P.U. 17-05, TEST YEAR END 6/30/2016

Line No.	Description	Rate Base	Pre-Tax ROR	Rate Increase
		[DPH-1]		[DPH-1]
4	Requested Amounts	$ 440,871,529	11.50%	$ 35,663,046
5	Adjust ROE to 8.75%	$ 440,871,529	-2.04%	$ (8,976,821)
6	Total			$ 26,686,225

TOTAL EVERSOURCE
SUMMARY OF RECOMMENDATIONS
D.P.U. 17-05, TEST YEAR END 6/30/2016

Line No.	Description	Rate Base	Pre-Tax ROR	Rate Increase
7	Requested Amounts			$ 95,857,433
8	Adjust ROE to 8.75%			$ (67,119,846)
9	Total			$ 28,737,586

NSTAR ELECTRIC COMPANY
PRE-TAX COST OF CAPITAL
D.P.U. 17-05, TEST YEAR END 6/30/2016

Line No.	Description	Updated Pro Forma 2016	Pro Forma Cost	Updated Rate of Return	Revenue Conversion Factor	Pre-Tax ROR
		[DPH-31]	[DPH-31]	[DPH-31]	[DPH-4]	
	Requested Cost of Capital					
1	Long-term Debt	45.69%	4.31%	1.97%	1	1.97%
2	Preferred Stock	0.94%	4.56%	0.04%	1.6842	0.07%
3	Common Equity	53.37%	10.50%	5.60%	1.6842	9.44%
4	Total Capital	100.00%		7.61%		11.48%
	Recommended Cost of Capital					
5	Long-term Debt	51.00%	4.31%	2.20%	1	2.20%
6	Preferred Stock	0.94%	4.56%	0.04%	1.6842	0.07%
7	Common Equity	48.06%	8.75%	4.21%	1.6842	7.08%
8	Total Capital	100.00%		6.44%		9.35%
9	Difference			-1.17%		-2.13%

NSTAR ELECTRIC COMPANY
PRE-TAX COST OF CAPITAL
D.P.U. 17-05, TEST YEAR END 6/30/2016

Line No.	Description	Updated Pro Forma 2016	Pro Forma Cost	Updated Rate of Return	Revenue Conversion Factor	Pre-Tax ROR
		[DPH-31]	[DPH-31]	[DPH-31]	[DPH-4]	
	Requested Cost of Capital					
1	Long-term Debt	46.66%	4.32%	2.02%	1	2.02%
2	Preferred Stock	0.00%	0.00%	0.00%	1.6933	0.00%
3	Common Equity	53.34%	10.50%	5.60%	1.6933	9.48%
4	Total Capital	100.00%		7.62%		11.50%
	Recommended Cost of Capital					
5	Long-term Debt	51.00%	4.32%	2.20%	1	2.20%
6	Preferred Stock	0.00%	0.00%	0.00%	1.6933	0.00%
7	Common Equity	49.00%	8.75%	4.29%	1.6933	7.26%
8	Total Capital	100.00%		6.49%		9.46%
9	Difference			-1.13%		-2.04%