DIRECT TESTIMONY OF BENTE VILLADSEN

On Behalf of Arizona Public Service Company

Docket No. E-01345A-16-0036

June 1, 2016

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I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND ADDRESS.

A. My name is Bente Villadsen and my business address is The Brattle Group, 44 Brattle Street, Cambridge, Massachusetts 02138, USA.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY IN THIS PROCEEDING?

A. I have been asked by Arizona Public Service Company (APS or Company) to determine and present APS's cost of equity and recommend the return on equity that should be included in its rates. I have also been asked to discuss how decoupling affect the cost of equity. Finally, my testimony offers an opinion on the fair value of APS's rate base and an appropriate fair value rate of return.

Q. PLEASE SUMMARIZE YOUR QUALIFICATIONS.

A. I am a principal of The Brattle Group and have more than 15 years of experience working with regulated utilities on cost of capital and related matters. My practice focuses on cost of capital, regulatory finance and accounting issues. I have testified or filed expert reports on cost of capital in Alaska, Alberta, Arizona, California, New Mexico, Oregon as well as before the Bonneville Power Administration and the Surface Transportation Board. I have provided white papers on cost of capital to the British Columbia Utilities Commission and the Canadian Transportation Agency as well as to European and Australian regulators on cost of capital. I have testified or filed testimony on regulatory accounting issues before the Federal Energy Regulatory Commission (FERC), the Michigan Public Service Commission as well as in international and U.S. arbitrations and regularly advice utilities on regulatory matters as well as risk

management. I have previously testified on cost of capital before the Arizona Corporation Commission (Commission or ACC). I hold a Ph.D. from Yale University and a BS/MS from University of Aarhus, Denmark. Appendix A contains more information on my professional qualifications as well as a list of my prior testimonies.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. To determine APS's cost of equity I selected a relevant sample of integrated electric utilities that are subject to regulation as well as a utility sample, whose assets are similar to those of APS. I calculated the cost of equity for the sample using standard Capital Asset Pricing Models (CAPM), Discounted Cash Flow (DCF) models and a risk premium model. Having estimated the cost of equity for the sample, I then considered specific risks of APS to derive a range of cost of equity estimates for the Company. I concluded that a range of reasonable return on equity (ROE) estimates are as indicated below:

Return on Equity

	Reasonable Range for Proxy Group
CAPM-based Methods	10.0% - 10.5%
DCF-based Methods	9.9% - 10.8%
Risk Premium Method	10.3%

I conclude that APS should be in the upper half of the range because, among other things, of its significant portfolio of nuclear generation. I also note that APS has been unable to earn its allowed ROE since 2002.

For these reasons and because APS's revised rates are expected to be in effect beginning in 2017, I believe that APS should be placed in the upper end of the range and recommend that a ROE of 10.5% is appropriate for setting rates in this case.

As I mentioned, in my testimony I also discuss the relationship between decoupling of rates and cost of capital. The majority of the utilities in my sample have a decoupling mechanism in place, consequently, the impact, if any, of decoupled rates would already be captured and reflected in the cost of equity ranges that I have provided. Further, additional research has shown that decoupling does not measurably impact the cost of capital. Therefore, I conclude that decoupling does not affect the cost of equity.

Finally, I discuss the fair value rate base for APS and the return hereon. I find that the fair value rate base claimed by APS, which is the average of original and reconstruction cost new is a reasonable if conservative estimation of fair value in the economic sense. Further, a FVROR on the incremental rate base (Fair Value Increment) of up 6.04% (calculated as the inflation adjusted ROR) would be reasonable, as would applying the weighted cost of capital of 8.13% to the entire FVRB. Thus, the Company's request of a return on the Fair Value Increment of 1%, as well as an overall FVROR of 5.84% is conservative.

II. APPROACH TO ESTIMATING THE COST OF CAPITAL

A. *Preliminary Comments*

Q. WHAT ARE THE GUIDING PRINCIPLES FOR DETERMINING A JUST AND REASONABLE RATE OF RETURN ON UTILITY INVESTMENTS?

A. Fortunately, there has been a lot of guidance provided on this topic over the years. Perhaps the seminal guidance was provided by the U.S. Supreme Court in the Hope and Bluefield cases, which found that:[1]

[1] *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923) (Bluefield), and *Federal Power Com'n v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) (Hope).

1. The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks;[2]
2. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility; and
3. The return should be adequate, under efficient and economical management for the utility to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[3]

Q. PLEASE DESCRIBE HOW YOU CONDUCTED YOUR COST OF EQUITY ANALYSIS.

A. I selected a sample of regulated electric utilities that are comparable to APS, estimated the return that investors required to provide capital for those utilities and reviewed the return on equity authorized in other jurisdictions. I also reviewed the specific risks for APS including business, financial, and regulatory risk.

In order to provide additional support for my recommendation, I undertake several analyses. Specifically, I use the CAPM, DCF and Risk Premium analyses; all of which are widely used in the utility and ratemaking setting. The wisdom of employing multiple methodologies has been acknowledged by the Commission in prior decisions.[4]

To arrive at my final ROE recommendation, I considered (i) the ranges of my cost of equity numbers, (ii) the current economic outlook, (iii) the financial risk differences, (iv) the business risks of APS relative to that of the benchmark samples, (v) the regulatory environment in which APS operates. Based upon my analyses of those

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[2] *Hope.*
[3] *Bluefield.*
[4] For example, Decision 71914, p. 34.

factors, I determined that a reasonable range of ROE was between 10.25% and 10.75% and concluded that a recommended ROE of 10.5% was appropriate.

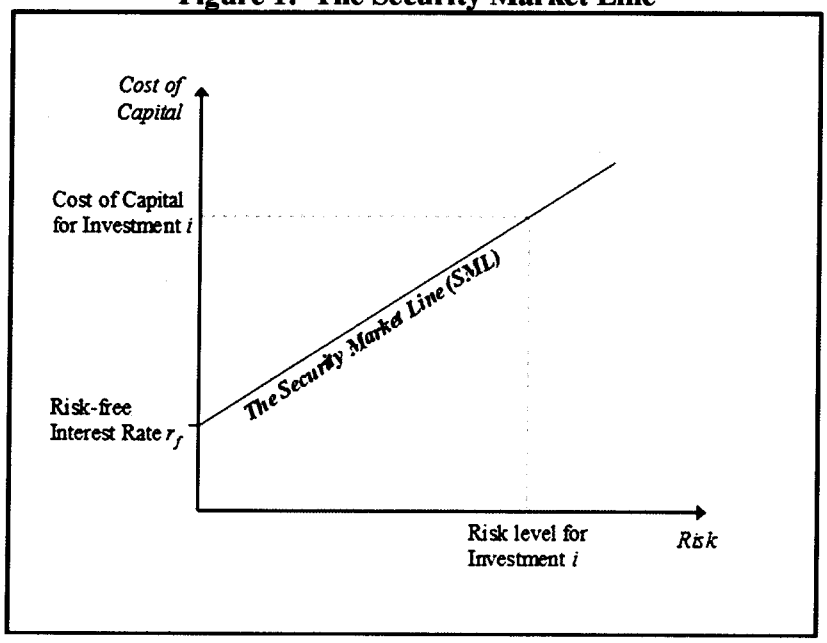
1. Cost of Capital and Risk

Q. HOW IS THE "COST OF CAPITAL" DEFINED?

A. The cost of capital is defined as the expected rate of return in capital markets on alternative investments of equivalent risk. The cost of capital is a type of opportunity cost: it represents the rate of return that investors could expect to earn elsewhere without bearing more risk. "Expected" is used in the statistical sense: the mean of the distribution of possible outcomes. The terms "expect" and "expected," as in the definition of the cost of capital itself, refer to the probability-weighted average over all possible outcomes.

The definition of the cost of capital recognizes a tradeoff between risk and return that can be represented by the "security market risk-return line" or "Security Market Line" for short. This line is depicted in Figure 1 below. The higher the risk, the higher the cost of capital required.

Figure 1: The Security Market Line



Q. WHY IS THE COST OF CAPITAL RELEVANT IN RATE REGULATION?

A. The "cost of capital" is the return that investors expect to earn on investments of comparable risk[5] and is one of the relevant factors set forth in the Hope and Bluefield cases.

Q. WHAT DOES THIS MEAN FROM AN ECONOMIC PERSPECTIVE?

A. From an economic perspective, rate levels that give investors a fair opportunity to earn the cost of capital are the lowest levels that compensate investors for the risks they bear. A utility's ability to attract capital and maintain its financial integrity requires that the combined equity return and equity ratio be such that not only is the expected return commensurate with that of other enterprises, but it also meets the expectations of credit market participants.

[5] *See also* Stewart C. Myers, "The Application of Finance Theory to Public Utility Rate Cases," *The Bell Journal of Economics & Management Science* 3:58-97 (1972).

More important for customers, however, are the broader economic consequences of providing an inadequate return to the company's investors. In the short run, deviations from the expected rate of return on the rate base from the cost of capital may seemingly create a "zero-sum game"—investors gain if customers are overcharged, and customers gain if investors are shortchanged. In the longer term, inadequate returns are likely to cost customers—and society generally—far more than may be saved in the short run. Inadequate returns lead to inadequate investment, whether for maintenance or for new plant and equipment. Without access to investor capital, the company may be forced to forgo opportunities to maintain, upgrade, and expand its systems and facilities in ways that decrease long run costs. Indeed, the cost to consumers of an undercapitalized industry can be far greater than any short-run gains from shortfalls in the cost of capital. This is especially true in capital-intensive industries (such as the electric and gas utility industry), which feature systems that take a time to decay. Such long-lived infrastructure assets cannot be repaired or replaced overnight, because of the time necessary to plan and construct the facilities. Thus, it is in customers' interest not only to make sure the expected return of the investors does not exceed the cost of capital, but also that the expected return does not fall short of the cost of capital.

2. The Impact of Risk on the Cost of Capital

Q. PLEASE SUMMARIZE HOW YOU FACTORED RISK WHEN DETERMINING THE COST OF CAPITAL.

A. I analyzed the difference in leverage among the sample utilities and the benchmark equity percentage of APS. To determine where in the estimated range APS's ROE reasonably falls, I compared the business risk of APS relative to the sample utilities and also the capital markets.

Q. WHY IS CAPITAL STRUCTURE IMPORTANT FOR THE DETERMINATION OF THE COST OF EQUITY?

A. Shareholders in a company with more debt face more equity risk and therefore the return on equity needs to be greater.[6] There are several manners in which the impact of financial risk can be taken into account in an analysis of cost of equity. One way is to determine the after-tax weighted-average cost of capital for the entities and let that figure be constant between the estimate obtained for the sample and the entity to which it is applied. This assumes that the after-tax weighted-average cost of capital is constant for a range that spans the capital structures used to estimate the cost of equity and the regulatory capital structure. A second approach was developed by Professor Hamada, who unlevered the beta estimates in the CAPM to obtain a so-called all-equity or assets beta and then re-levered the beta to determine the beta associated with the target regulatory capital structure. This requires an estimate of the systematic risk associated with debt (i.e., the debt beta), which is usually quite small. In Appendix B, I set forth additional technical details related to methods to account for financial risk when estimating the cost of capital.

Q. PLEASE IDENTIFY THE APS OR ARIZONA-SPECIFIC RISK FACTORS.

A. First, APS's generation capacity includes 27% nuclear, which is substantially higher than the average among my sample companies (about 13%).[7] The magnitude and composition of generating facilities matter because capital-intensive investments increase the fixed cost component and hence the operating leverage of a company.[8] Nuclear generation not only has very large fixed costs, but also large operating risks and

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[6] Robert S. Hamada, "Portfolio Analysis, Market Equilibrium and Corporate Finance," *The Journal of Finance* 24: 13-31 (March 1969).

[7] *See* Figure 4 below for details.

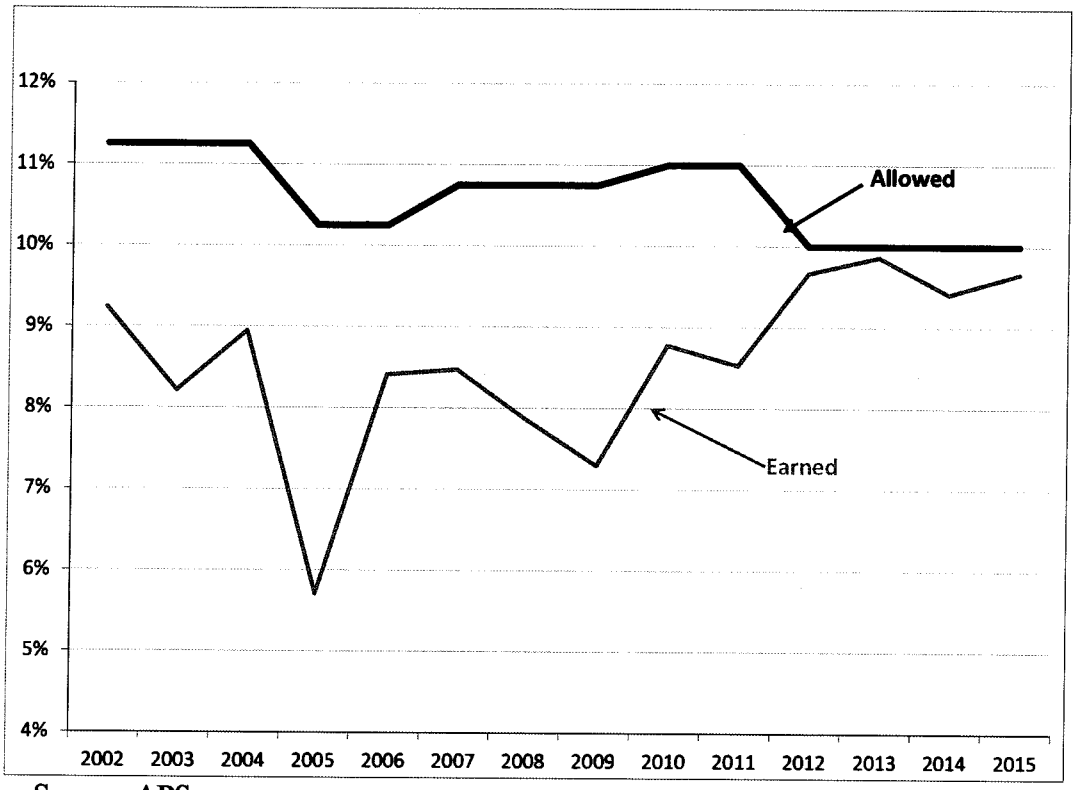
[8] For an exposition of this, *see* Richard A. Brealey, Stewart C. Myers, and Franklin Allen, "*Principles of Corporate Finance*," 11th Edition, 2014 (Brealey, Myers & Allen 2014), pp. 227-228.

APS is the operator of the largest nuclear generating facility in the country, Palo Verde units 1, 2 and 3. Second, APS has not earned its allowed ROE since 2002 and the earned ROE has been substantially below the allowed ROE during several years. This is illustrated in Figure 2 below (*see* Attachment BV-2DR). Third, the majority of the publicly traded electric utilities in the U.S. are larger than APS. The average market capitalization and annual revenue of my sample companies are twice that of Pinnacle West Capital Corporation (Pinnacle West), the parent of APS.[9] Empirical studies have shown that investors require a higher premium to invest in smaller companies than in larger ones. The single-jurisdiction, comparatively smaller size of Pinnacle West means that the Company has less diversification and hence has a more concentrated risk exposure to, for example, adverse local conditions. Finally, I note that decoupling mechanisms are available to the majority of companies in my sample as well as in the majority of U.S. states. Also, decoupling has been shown to have no detectable impact on the return on equity.[10] Therefore, should the Commission in the future implement a decoupling mechanism, it should not affect the ROE.

[9] APS represents a very large proportion of the revenue, income, assets and equity comprising the Pinnacle West Corporation according to Pinnacle West's 2014 Annual Report's income statements and balance sheets for the corporation and the utility. Figure 8 summarizes the size and other facts about the sample companies and APS.

[10] Joe Wharton & Michael J. Vilbert, "Decoupling and the Cost of Capital," *The Electricity Journal*, vol. 28, 2015, pp. 19-28.

Figure 2: APS Earned and Allowed ROE: 2002-2015



Source: APS.

I note that APS obtained an A2 rating from Moody's in June 2015 following an upgrade to A3 in January 2014,[11] while Standard & Poor's upgraded APS to A- in December 2013.[12] The improved rating, which lowers debt costs, coincides with the closing of the gap between the allowed and earned ROE. I note that the financial improvements coincide with regulatory initiatives, so that (ignoring the height of the financial crisis in 2008-09), APS's financial performance has improved after the upgrade of the regulatory environment in Arizona to Average / 3 by Regulatory Research Associates[13] and further with the approval of several rate mechanisms from 2012 onwards that aim to recover

[11] Moody's, "Moody's upgrades Pinnacle West Capital and Arizona Public Service; outlooks are stable," June 2, 2015 and https://www.moodys.com/credit-ratings/Arizona-Public-Service-Company-credit-rating-62000.

[12] Standard & Poor's.

[13] SNL, "Commissions," Reviewed March 5, 2016.

costs more quickly.[14] It is important to continue these efforts to ensure the utility and customers have access to debt capital at relatively low cost.

Q. HOW DID YOU FACTOR THE ADDITIONAL CAPITAL MARKET INFORMATION INTO YOUR ANALYSIS?

A. The return that investors require to provide equity capital depends not only on the relative risk of the investment being considered but also on the return generally available in the market for investments with comparable risk. Therefore, I felt that it was essential to consider prevailing conditions and trends in financial markets when determining inputs to the models used to estimate the cost of equity and when evaluating the reasonableness of the estimates.

III. IMPACT OF THE ECONOMY AND MARKETS ON THE COST OF EQUITY

A. *Interest Rates*

Q. WHAT ARE THE RELEVANT DEVELOPMENTS REGARDING INTEREST RATES?

A. Recent interest rates and especially government bond yields have been low. However, the spread between utility bond yields and government bond yields of the same maturity is higher than they have been historically; both when measured over the long run and more recently.

Figure 3 below shows the development in BBB rated utility and Government bond yields from 1999 to today.[15] It is evident that the yield spread (the difference between

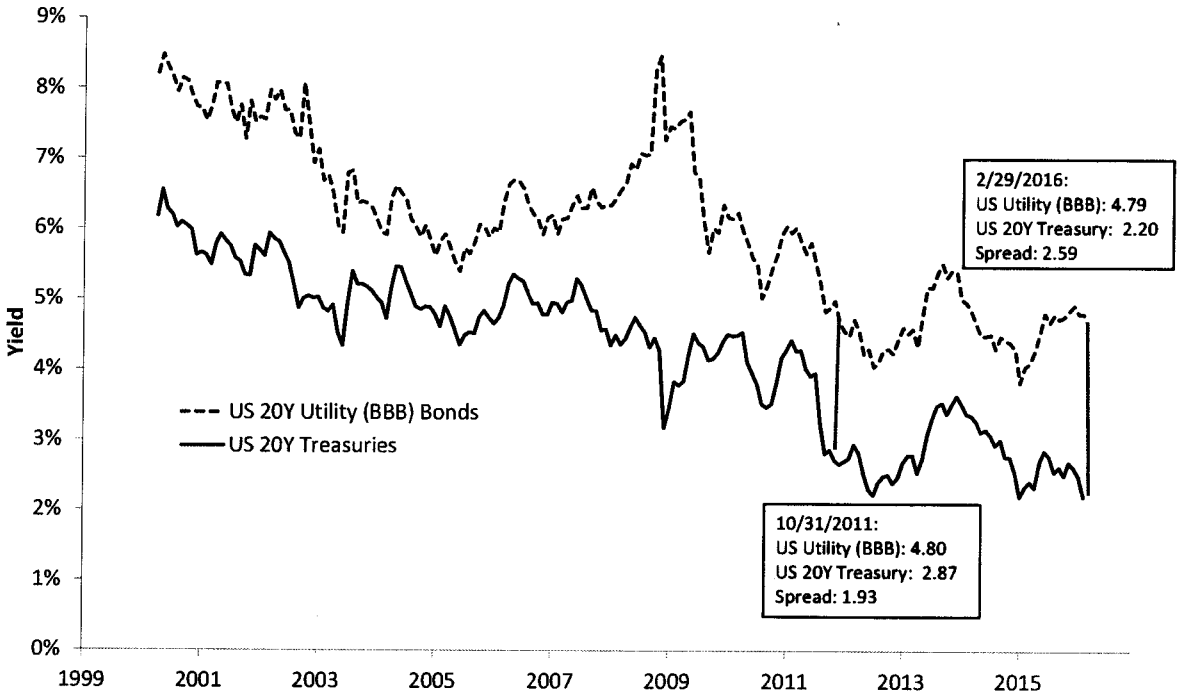
[14] *Ibid.* For example, a Lost Fixed Cost Recovery mechanism was initially approved in 2012 and effective beginning in 2015 a Four Corners Adjustment rider that will allow APS to recover costs associated with APS share in Four Corners.

[15] For clarity "BBB rated" refer to bonds in the range of BBB- through BBB+ and "A rated" reference bonds in the range of A- through A+. The majority of electric utilities are low A or high BBB rated.

the yield on BBB rated utility bonds and government bonds) has increased both relative to its historical average and relative to the Company's most recent rate case filing (Docket No. E-01345A-11-0224).

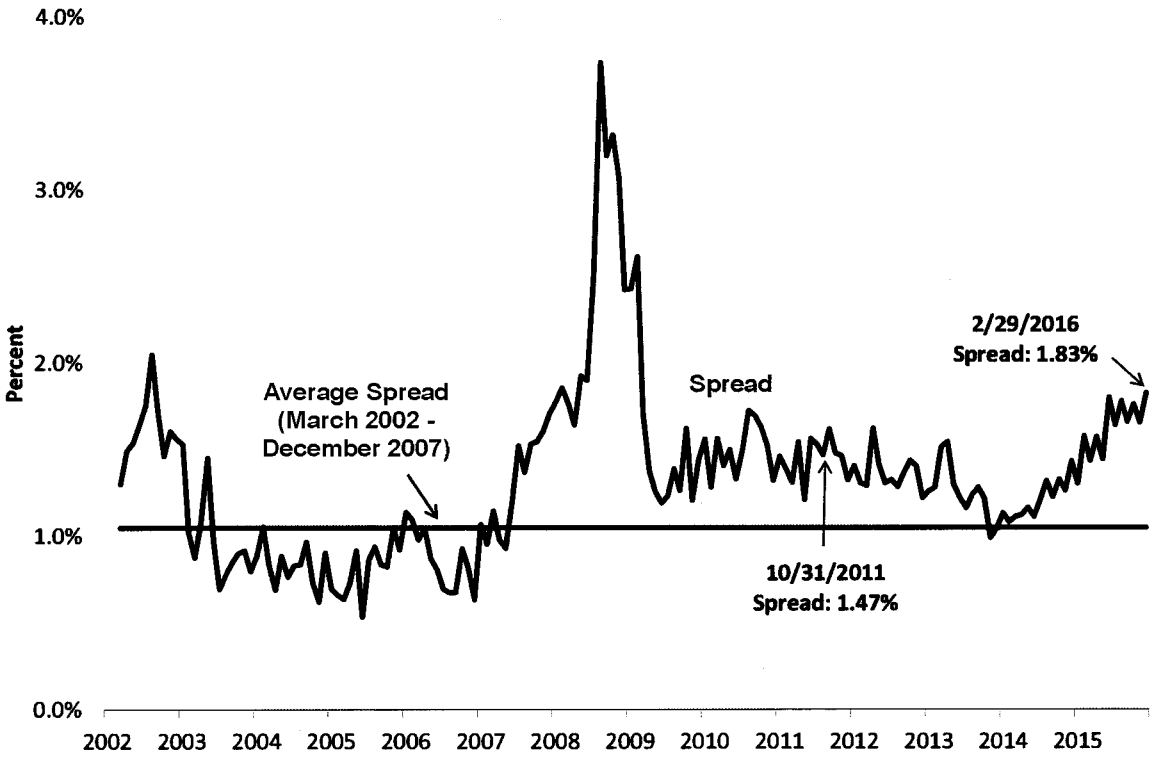
Figure 4 shows the spread between A rated utility bonds and government bond yields along with the average spread prior to the financial crisis. Again, it is evident that the spread is greater. Thus, a review of both BBB rated and A rated bonds clearly illustrates the increase in the spread between the utility bond yield and government bond yields.

Figure 3: BBB Utility and Government Bond Yields



Source: Bloomberg

Figure 4: Spread between A Rated Utility and 20-Year Government Bond Yield



Source: Bloomberg.

Q. HOW DOES THE CURRENT SPREAD BETWEEN UTILITY AND GOVERNMENT BOND YIELDS COMPARE TO THE HISTORICAL SPREAD?

A. As shown in Figure 3 and Figure 4 above, the spread between BBB rated utility bond yields or between A rated utility bond yields and government bond yields has grown. At the end of February, 2016 the BBB spread stood at 2.56%, which is approximately 136 basis points higher than prior to the 2008-09 financial crisis. At the same time the A rated utility bond yield was 1.83% for an increase of about 90 basis points over the pre-crisis level. Not only is the yield spread increased relative to its pre-crisis levels, but it is also greater relative to the level in the more recent past as illustrated in the figures above. (*see* Attachment BV-3DR)

Q. HOW ARE INTEREST RATES EXPECTED TO TREND GOING FORWARD?

A. Blue Chip Economic Indicators expects that the yield on 10-year Treasury Notes will increase by about 120 basis points by 2017 and the publication forecasts addition increases for 2018 and beyond.[16] Comparably, Consensus Forecast expect the 10-year yield to increase by 130 basis points by 2017 and by an additional 50 basis point by 2019, while the Congressional Budget Office predicts an increase of approximately 200 basis points over the coming years.[17] These expectations are consistent with the current downward pressure on Government bond yields, which has largely been caused by the Federal Reserve's quantitative easing program and general stimuli of the U.S. economy.[18]

Q. HOW DO THESE DEVELOPMENTS IMPACT THE COST OF EQUITY ANALYSIS?

A. There are several ways in which the current interest rate environment affects the cost of equity analysis. First and most directly, the CAPM utilizes as one of its inputs a measure of the risk-free rate (*see* Figure 1). I used the yield on a US government bond as a proxy for the risk-free rate. The estimated cost of equity using the CAPM increases (decreases) by 1% when the relied upon risk-free rate (e.g., the government bond rate) increases (decreases) by 1%. Therefore, to the extent that the government bond rate is driven by monetary policy rather than market factors, so is the CAPM estimate. Importantly, if the government bond rate is downward (upward) biased, then the CAPM estimate will be downward (upward) biased. When that is the case, it is necessary to normalize the relied upon government bond rate, so that the resulting CAPM estimate reflects a non-biased government bond rate.

[16] Blue Chip Economic Indicators, January 2016 and October, 2015.
[17] Consensus Forecasts, October 2015. Congressional Budget Office, "The Budget and Economic Outlook: 2015-2025," January 2015, p. 53.
[18] For a summary of the magnitude of the Federal Reserve's purchase program, see, for example, Bloomberg, "The Fed Eases Off," September 16, 2015.

Second and as a further indication of a potential bias, if the spread between the yield on utility (or corporate) bonds and government bonds (the "yield spread") widens, it indicates that the premium that investors require for holding securities other than government bonds has increased. Thus, there is evidence that the market equity risk premium has increased. A higher than normal yield spread is one indication of the higher risk premiums currently prevailing in capital markets. Investors consider a risk-return tradeoff (like the one displayed in Figure 1 above) and select investments based upon the desired level of risk. Higher yield spreads reflect the fact that the return on corporate debt is higher relative to government bond yields than is normally the case, even for regulated utilities. Because equity is more risky than debt, this means that the spread between the cost of equity and government bond yields must also be higher; i.e., the premium required to hold equity (the Market Risk Premium or MRP) rather than government bonds has increased. If this fact is not recognized, then the traditional cost of capital estimation models will underestimate the cost of capital prevailing in the capital markets.

Third, in times of economic uncertainty (such as the present) investors seek to reduce their exposure to market risk. This precipitates a so-called "flight to safety," wherein demand for low-risk government bonds rises at the expense of demand for stocks. If yields on bonds are extraordinarily low, however, any investor seeking a higher expected return must choose alternative investments such as stocks, real estate, gold or collectibles. Of course, all of these investments are riskier than government bonds, and investors demand a risk premium (perhaps an especially high one in times of economic uncertainty) for investing in them. But short of accepting meager returns, investors simply have few alternatives to returning to the stock market. Utility stocks may have experienced the "flight to safety" phenomenon to a larger degree than other stock because they traditionally have paid a substantial portion of their earnings as dividends.

Therefore, investors who have sought income from their investments and found government bonds too unattractive may have accepted a higher risk and invested in utility stock with the goal of receiving periodic dividend payments.

One possible explanation of the current elevated level of the yield spread is that current and near-term expected levels of government bond yields are artificially depressed due to monetary policy.[19] I emphasize that the U.S. government bond yields (as well as that of many other western countries) is expected to increase substantially over the next several years.[20]

Q. WHAT ARE THE IMPLICATIONS OF ELEVATED YIELD SPREADS TO THE COST OF EQUITY?

A. The increase in the yield spread indicates that (i) the current long-term government bond yields are depressed relative to their normal levels; and/or (ii) investors are demanding a premium higher than the historical premium to hold securities that are not risk free. The latter is an indication that the market equity risk premium may be elevated relative to its historical level. Regardless of the interpretation, the consequence is that if cost of equity is estimated using the current risk-free rate and a market equity risk premium based on historical data, then it will be downward biased. Hence, it is necessary to "normalize" the risk-free rate, take into account the current (rather than historical) market equity risk premium, or a combination of these two interpretations.[21]

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[19] As of year-end 2014, the Federal Reserve held approximately $1.8 trillion of mortgage-backed securities, whereas the magnitude was less than $0.5 trillion in mid-2009. Source: Bloomberg, "The Fed Eases Off," September 16, 2015.

[20] If investors' believe the yield on government bonds will soon elevate, they may demand higher yields on corporate debt relative to the prevailing government bond yields, thus widening the yield spread.

[21] I note that if a combination interpretation is used, it becomes important to make sure that the overall (total) "normalization" takes into account the elevated yield spread once and only once.

B. *Market Volatility*

Q. HOW DID YOU FACTOR THE STOCK MARKET'S VOLATILITY INTO YOUR ANALYSIS?

A. Academic research has found that investors expect a higher risk premium during more volatile periods. The higher the risk premium, the higher the required return on equity. For example, French, Schwert & Stambaugh (1987) found a positive relationship between the expected market risk premium (MRP) and volatility:

> We find evidence that the expected market risk premium (the expected return on a stock portfolio minus the Treasury bill yield) is positively related to the predictable volatility of stock returns. There is also evidence that unexpected stock returns are negatively related to the unexpected change in the volatility of stock returns. This negative relation provides indirect evidence of a positive relation between expected risk premiums and volatility.[22]

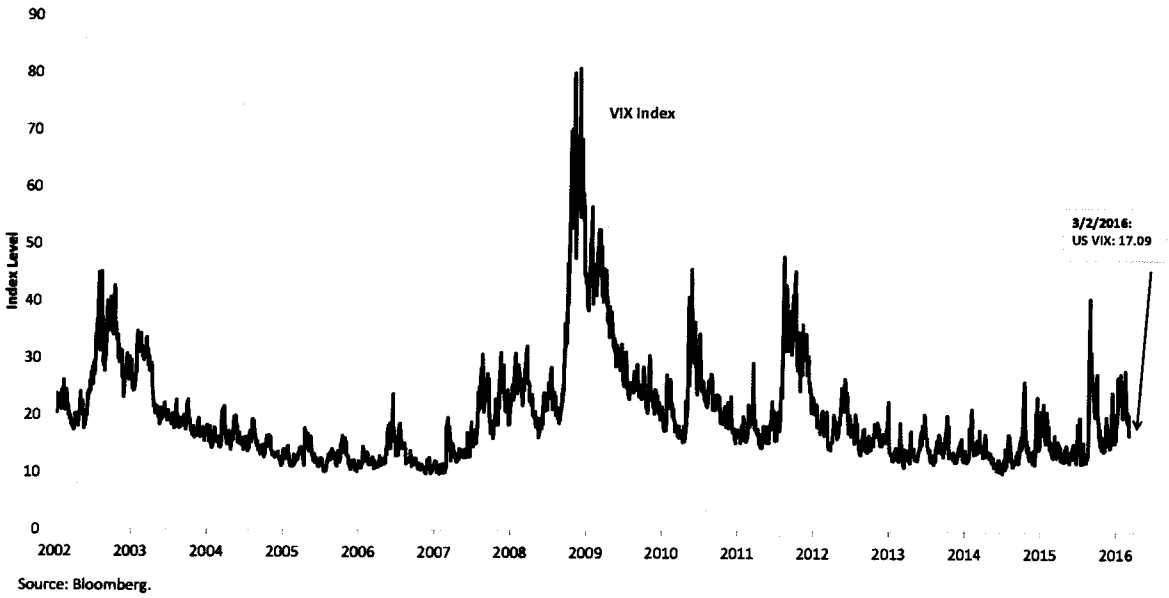
One implication of this finding is that the MRP tends to increase when market volatility is high, even when investors' level of risk aversion remains unchanged.

A measure of the market's expectations for volatility is the VIX index, which measures the 30-day implied volatility of the S&P 500 index. These indices are also referenced as the "investor fear gauge." While the long-term average for the VIX is about 20, the current level is elevated and was above 28 on February 11, 2016.[23] During the more recent period, the VIX spiked in August at about 40. Thus, the market volatility has higher in the early part of 2016 than it has been in recent periods. (*See* Attachment BV-4DR.)

[22] K. French, W. Schwert and R. Stambaugh (1987), "Expected Stock Returns and Volatility," *Journal of Financial Economics*, Vol. 19, p. 3.

[23] Yahoo Finance. It has since declined.

Figure 5: Volatility Index



Source: Bloomberg.

Q. WHAT DO YOU MEAN BY THE TERM "RISK AVERSION?"

A. Risk aversion is the recognition that investors dislike risk, which means that for any given level of risk, investors must expect to earn an appropriate return to be induced to invest. An increase in risk aversion means that investors now require a higher return for that same level of risk.

Q. DO YOU HAVE ANY EVIDENCE THAT THE RETURN PREMIUM DEMANDED BY INVESTORS FOR TAKING RISK IS HIGHER THAN IT WAS PRIOR TO THE 2008-09 FINANCIAL CRISIS?

A. Yes. Looking to forecasted MRPs, both academic research and financial data services such as Bloomberg have found an increase in the expected MRP compared to prior to the financial crisis. Not only did the expected MRP increase but it remains above the historical level. For example, Bloomberg's expected MRP exceeds the historical

average MRP and currently stands at about 8%, while the historical arithmetic average MRP from 1926 to 2014 is 7%.[24]

Q. HAS THE MRP INCREASED SINCE THE 2008-09 FINANCIAL CRISIS?

A. Yes. A recently updated analysis by Duarte and Rosa of the Federal Reserve of New York aggregates the results of many models of the required MRP in the U.S. and tracks them over time. This analysis finds a very high MRP in recent years.

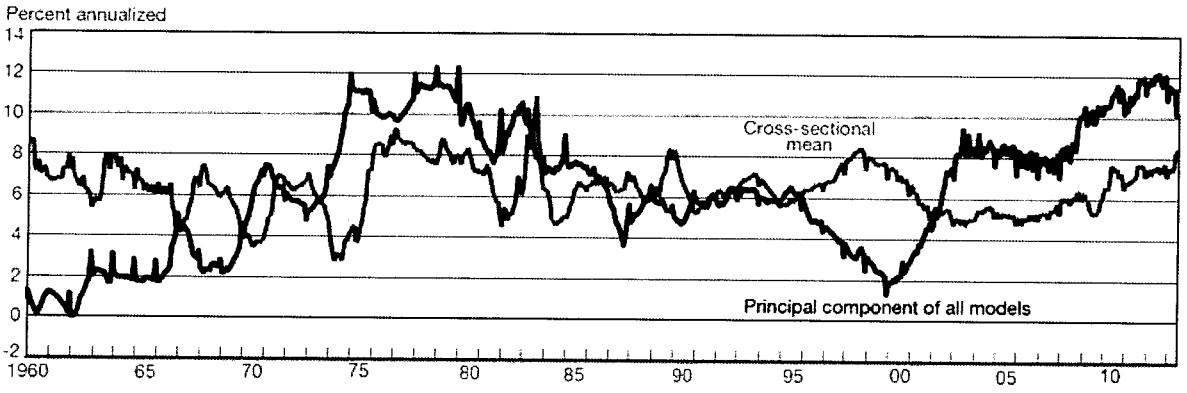
The analysis estimates the MRP that results from a range of models each year from 1960 through the present.[25] The analysis then reports the average as well as the first principal component of results.[26] The analysis then finds that the models used to determine the risk premium are converging to provide more comparable estimates and that the average annual estimate of the MRP was at an all-time high in 2013. These estimates are reasonably consistent with those obtained from Bloomberg and the consistent elevation of the MRP over the historical figure indicates that the elevated level is persistent. Figure 6 below shows Duarte and Rosa's summary results.

[24] Bloomberg and Duff & Phelps, "*2015 Valuation Handbook: Guide to Cost of Capital*," 2015, pp. 3-24.

[25] Fernando Duarte and Carlo Rosa, "The Equity Risk Premium: A Review of Models," *Federal Reserve Bank of New York*, December 2015 (Duarte & Rosa 2015).

[26] Duarte & Rosa emphasize the "first principal component" of the 20 models. This means that the authors used statistics to compute the weighted average combination of the models that captures the most variability among the 20 models over time.

Figure 6
Duarte and Rosa's Chart 3
One-Year Ahead MERP and Cross-Sectional Mean of Models



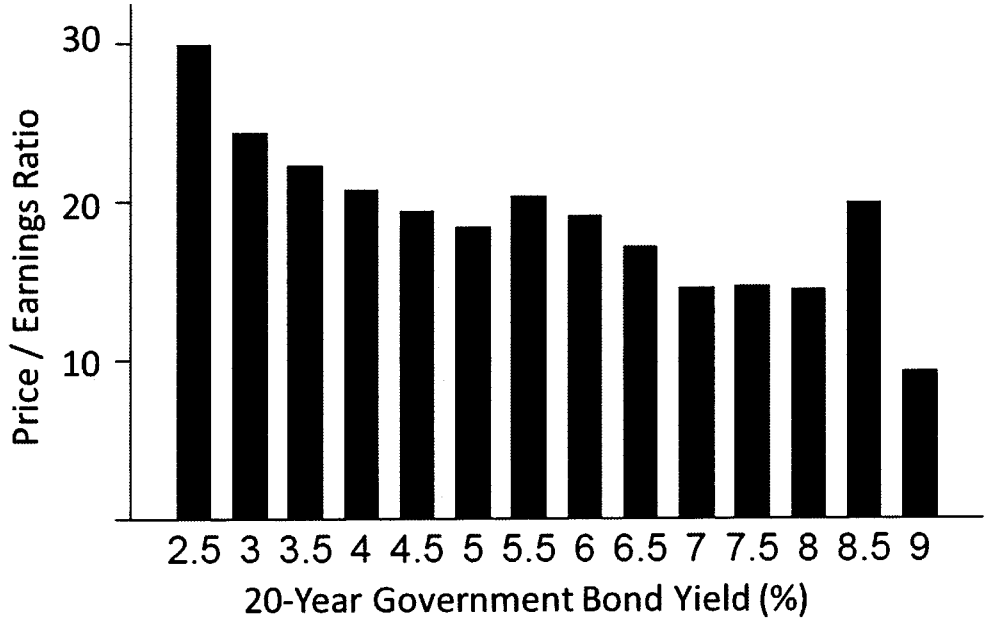
Q. ARE THERE OTHER REASONS WHY CAPITAL MARKETS MAY CONTINUE TO EXHIBIT HIGH VOLATILITY?

A. Yes, the early part of 2016 saw very large market declines across the globe and trading on the Chinese market was halted. For example, the New York Stock Index is down by about 8.5% during the first 6 weeks of 2016 with significant increases and decreases. At the same time, expected market volatility is high as illustrated in Figure 5. Further, oil prices are currently very low by historic standards – with a substantial impact on oil producing countries and regions. Finally, unrest in the Middle East (e.g., Syria and Saudi Arabia/Iran) has contributed to continued uncertainty and thereby an increase in the market equity risk premium that investors require. Lastly, it appears that the Euro zone once again may need to deal with the Greek debt situation.

Q. ARE THERE OTHER FEATURES OF FINANCIAL MARKETS THAT ARE CURRENTLY UNUSUAL?

A. Yes. The current level of many companies, including utilities, Price-to-Earnings (P/E) ratio is higher than what has been experienced historically. Empirically, the P/E ratio increases when interest rates decline. This is shown in Figure 7 below.

Figure 7: Average Price / Earnings Ratio of Comparable Electric Utilities vs. 20-Year Treasury Bond Yield



Source: Bloomberg (using quarterly data from 1990 through 2015)

Q. PLEASE EXPLAIN THE RELATIONSHIP BETWEEN THE P/E RATIO AND THE 20-YEAR GOVERNMENT BOND YIELD OF INTEREST IN YOUR ANALYSIS.

A. The dividend yield, which is calculated as Dividends divided by Price (D/P), is closely related to the P/E ratio as dividends are paid out of earnings. If the P/E ratio is very high (low), then the Earnings-to-Price ratio is low (high) and so is the dividend yield (D/P). The average electric utility pays approximately 60% of its earnings as dividends,[27] so if the P/E ratio increases from, for example, 15 to 17 (13.3%), then the Earnings / Price ratios declines by 0.79% (from 6.67% to 5.88%) and the dividend yield decline by 0.47%. Therefore, if the 20-year government bond yield is artificially depressed and expected to increase, then the dividend yield is also artificially depressed and expected

[27] Value Line Investment Survey as of December 2015 for 2016. Summarized in Attachment BV-11DR.

to increase. As a result, the results from the standard dividend discount models are likely to underestimate the cost of equity that will prevail going forward.

Q. WHAT DO YOU CONCLUDE FROM THIS INFORMATION?

A. The increase in the spread between the yield on utility and government bonds indicates that the premium investors require to hold assets that are not risk-free has increased. Likewise, the recent trends in preferred equity yields confirm that the premium on assets other than government bonds has increased. Similarly, the forecasted MRP is high relative to its recent past and the volatility index is higher than any time since 2012. All of these factors point to a relatively high degree of market volatility and that investors' required premia to hold assets that are not risk-free is elevated. Similarly, the very low risk-free rate are likely to have led to higher P/E ratios due to the flight to quality discussed above and consequently an lower than "normal" dividend yields.

C. *Impact On Roe Estimation*

Q. PLEASE SUMMARIZE HOW THE ECONOMIC DEVELOPMENTS DISCUSSED ABOVE HAVE AFFECTED THE RETURN ON EQUITY AND DEBT THAT INVESTORS REQUIRE.

A. Utilities rely on investors in capital markets to provide funding to support their capital expenditure program and efficient business operations, and investors consider the risk return tradeoff in choosing how to allocate their capital among different investment opportunities. It is therefore important to consider how investors view the current economic conditions; including the plausible development in the risk-free rate and the current MRP.

These investors have been dramatically affected by the credit crisis and ongoing market volatility, so there are reasons to believe that their risk aversion remains elevated relative to pre-crisis periods.

Likewise, the effects of the Federal Reserve's monetary policy have artificially lowered the risk-free rate. As a result, yield spreads on utility debt, including top-rated instruments, have remained elevated. The evidence presented above demonstrates that the equity risk premium is higher today than it was prior to the crisis for all risky investments. This is true even for investments of lower-than-average risk, such as the equity of regulated utilities.

Q. DOES YOUR ANALYSIS CONSIDER THE CURRENT ECONOMIC CONDITIONS?

A. Yes. In implementing the CAPM and risk premium models, I considered the downward biased risk-free rate as well as the elevated MRP. Specifically, I relied on two sets of inputs for the CAPM: I consider the elevated spread between utility and government bond yields and either (i) normalize the risk-free rate to reflect the currently downward bias of the yields and combine that with the historical MRP; or (ii) rely on Blue Chip's 2017 government bond yield forecast for the risk-free rate and combine that with a MRP that reflects the strong evidence that risk premiums are elevated relative to their long-term historical average. Similarly, I consider the impact on the dividend yield from the discussion above, which indicate that dividend yields will increase with increasing interest rates and hence be higher going forward than they are today.

IV. ANALYZING THE COST OF EQUITY

A. *Approach*

Q. PLEASE OUTLINE YOUR APPROACH FOR DETERMINING THE COST OF EQUITY FOR APS.

A. As described above in Section II.A, the standard for establishing a fair rate of return on equity requires that a regulated utility be allowed to earn a return equivalent to what an investor could expect to earn on an alternative investment of equivalent risk. Therefore,

my approach to estimating the cost of equity for APS focuses on measuring the expected returns required by investors to invest in companies that face business and financial risks comparable to those faced by APS. Because the models I rely upon most heavily require market data, my consideration of comparable companies is restricted to those that have publicly traded stock.

To this end, I have selected a sample of publicly-traded companies that primarily provide regulated electric utility services.

For this sample and a subsample, I derive estimates of the representative cost of equity according to standard financial models including two versions of the CAPM and two versions of DCF model. I further review results based on one version of the so-called risk premium model, as well as summary analysis of allowed ROEs for integrated electric utilities. The latter analysis is conducted using allowed returns on equity and associated allowed equity ratios rather than market data; the results of these analyses are used as a test on the reasonableness of my market-based results.

As the cost of equity for the CAPM and DCF based models are derived from market data that reflect the capital that investors hold in the sample companies, I consider the impact of any difference between the financial risk inherent in the cost of equity estimates and the capital structure to which it is assigned using several methods to avoid any one method biasing the results.

B. *Sample Selection*

Q. WHY DO YOU APPLY YOUR COST OF CAPITAL MODELS TO A SAMPLE OF COMPARABLE COMPANIES INSTEAD OF ESTIMATING THE COST OF CAPITAL FOR APS DIRECTLY?

A. It is a well-established point of finance theory (and practice) that the cost of capital depends on the use—not the source—of the invested capital. This means that if a diversified company has subsidiary parts engaged in distinct lines of business, the cost of capital for each part is specifically dependent on the risks inherent in its own line of business, not on the risks of the consolidated company as a whole.

APS is not publicly traded (although its parent Pinnacle West is), so it is not possible to directly estimate the cost of equity using the CAPM or DCF models. This is because these models rely on market information (such as stock prices, betas based on historical stock returns, and growth rate estimates) to estimate the expected returns required by equity investors.

Nor would it be appropriate to infer the appropriate cost of equity for APS based solely on the measured cost of equity of Pinnacle West as (1) a sample of one is simply too small; and (2) Pinnacle West have other lines of business albeit relatively small.

That is why I develop samples of publicly traded companies that are as analogous as possible to APS in terms of business risk, and apply the models to those samples as proxies for the APS. Subsequently, I discuss APS and Arizona-specific risks and place APS relative to the estimated cost of equity.

Q. HOW DO YOU IDENTIFY SAMPLE COMPANIES?

A. APS is an integrated electric utility, so I start with the universe of publicly traded utilities classified as electric utilities in Value Line. I then eliminated companies

engaged in substantial merger and acquisition (M&A) activities over the past 5-years and companies with less than 50% of its assets subject to regulation. Further, I require that the companies have an investment grade credit rating, no recent dividend cuts, more than $300 million in revenues to ensure liquidity, and generally have data available for estimation (*see* Attachment BV-6DR).

Q. WHAT ARE THE CHARACTERISTICS OF THE ELECTRIC SAMPLE?

A. The Electric sample comprises electric companies whose primary source of revenues and majority of assets are in the regulated portion of the electric industry. The final sample consists of the 27 electric utilities listed in Figure 8 below. These companies own regulated electric utility subsidiaries in many states, and some also provide electric transmission service regulated by the U.S. FERC.[28] Therefore, the Electric sample is broadly representative of the regulated electric utility industry from a business risk perspective. Further, the majority of the utilities own or lease generation albeit their generation mix may differ from that of APS.

Figure 8 reports the sample companies' annual revenues for the trailing twelve months ended September 2015 and the percentage of their assets devoted to regulated electric operations according to Edison Electric Institute's (EEI) classifications of electric utilities as being either regulated (R), having greater than 80% regulated electric assets or mostly regulated (MR), having 50-80% regulated electric assets. It also displays each company's Market Capitalization and the S&P Credit Rating in 2015, as well as its Value Line beta and the consensus long-term (3- to 5-year) earnings growth rate estimate for the company from Thomson Reuters IBES and Value Line. (*See* Attachment BV-6DR.)

[28] None of the included entities are primarily electric transmission entities.

Figure 8
Electric Sample Companies

Company	Annual Revenues (USD million)	Regulated Assets	Market Cap. 2015 Q3 (USD million)	Betas	S&P Credit Rating (2015)	Long Term Growth Est.	Nuclear Generation (%)
	[3]	[4]	[5]	[6]	[7]	[8]	[9]
ALLETE	$1,500	R	$2,393	0.80	BBB+	4.2%	0.0%
Alliant Energy	$3,254	R	$6,434	0.80	A-	5.6%	17.0%
Amer. Elec. Power	$16,034	R	$27,037	0.70	BBB	4.4%	0.0%
Ameren Corp.	$6,098	R	$9,802	0.75	BBB+	7.1%	21.0%
CenterPoint Energy	$7,386	M	$7,692	0.85	A-	1.6%	-
CMS Energy Corp.	$6,146	R	$9,338	0.75	BBB+	6.3%	0.0%
Consol. Edison	$12,554	R	$18,927	0.60	A-	3.0%	-
Dominion Resources	$11,195	M	$41,040	0.70	A-	5.8%	33.0%
DTE Energy	$9,919	R	$13,951	0.75	BBB+	5.1%	17.0%
Edison Int'l	$11,452	R	$19,740	0.70	BBB+	0.3%	6.0%
El Paso Electric	$686	R	$1,432	0.75	BBB	8.0%	47.0%
Entergy Corp.	$11,203	R	$11,376	0.70	BBB	-2.6%	33.0%
G't Plains Energy	$2,502	R	$3,964	0.85	BBB+	6.2%	13.0%
IDACORP Inc.	$991	R	$3,087	0.80	BBB	3.1%	0.0%
MGE Energy	$564	M	$1,396	0.75	AA-	6.4%	0.0%
NextEra Energy	$17,216	M	$44,783	0.75	A-	7.0%	23.0%
OGE Energy	$2,197	R	$5,399	0.95	A-	3.2%	0.0%
Otter Tail Corp.	$783	R	$972	0.85	BBB	7.4%	0.0%
PG&E Corp.	$16,908	R	$24,840	0.70	BBB	8.2%	21.0%
Pinnacle West Capital	$3,501	R	$6,850	0.75	A-	4.8%	27.0%
Portland General	$1,912	R	$3,155	0.80	BBB	4.6%	0.0%
Public Serv. Enterprise	$9,896	M	$20,317	0.75	BBB+	1.7%	28.0%
SCANA Corp.	$4,163	M	$7,565	0.75	BBB+	4.3%	19.0%
Sempra Energy	$10,171	M	$22,956	0.80	BBB+	9.9%	0.0%
Vectren Corp.	$2,435	M	$3,324	0.75	A-	6.1%	0.0%
Westar Energy	$2,438	R	$5,239	0.75	BBB+	4.7%	8.0%
Xcel Energy Inc.	$11,024	R	$17,219	0.65	A-	4.8%	12.0%
Average	$6,820		$12,601	0.76		4.9%	13.0%
APS	3,501	R	n/a	n/a	A-	n/a	27.0%

Q. HOW DOES THE ELECTRIC SAMPLE COMPARE TO APS?

A. The Electric sample consists of 27 electric utilities from which I also create a subsample of companies that report between 17% and 37% of their generation capacity is nuclear. This sample consists of Alliant, Ameren, Dominion, DTE Energy, Entergy, NextEra, PG&E, Pinnacle West (albeit I consider the results without the parent of APS), PSE&G, and SCANA. The subsample intends to capture any nuclear related risks and therefore includes companies, whose nuclear generation percentage is within +/- 10% of APS's proportion of nuclear generation (*see* Attachment BV-7DR).

I note further that the average sample company (subsample) company has twice (three times) as much revenue as does APS and the average market capitalization is twice that of Pinnacle West. Thus, APS is smaller than the average sample company.

APS currently has a slightly higher credit rating than the average sample company, but (1) the difference is on average one notch (A- versus BBB+) and therefore small, (2) APS only achieved an A- rating in 2014 and was thus BBB+ rated during part of the estimation period, and (3) credit rating measure default risk rather than the cost of equity. Therefore, the impact of a slightly higher credit rating is simply that the Company has slightly lower default risk than the average sample company, which may be reflected in lower interest rates, which benefits customers. It does not, however, affect the cost of equity.

Finally, I note that the majority of the sample companies listed in Figure 8 have operating companies that have some form of decoupling mechanism. I discuss decoupling in more detail in Section VI.

Q. ARE THERE ANY DIFFERENCES IN THE REGULATORY ENVIRONMENT IN WHICH THE COMPARABLE COMPANIES AND APS OPERATES?

A. While all jurisdictions to a degree are unique, I did note several factors that impact more specifically APS's business risk. For example, APS has experienced larger than average penetration of distributed generation for a loss in load. I also note that Arizona operates with a historic test year.[29] This contrast to other states, where 32 states allow a future or

[29] I understand that the ACC has authorized APS to implement a rider to reflect in rates the costs associated with the Company's acquisition of a share of the coal-fired Four Corners Unit 4 and 5.

hybrid test year.[30] One issue associated with the use of historic test years is that it can become difficult to earn the allowed ROE during times of construction. As shown in Figure 2, APS has not earned its allowed ROE in the most recent 13 years.

It is essential that the Commission take APS-specific risks into account when determining the appropriate risk-adjusted cost of equity that APS should be allowed.

C. *The CAPM Based Cost Of Equity Estimates*

Q. PLEASE BRIEFLY EXPLAIN THE CAPM.

A. In the CAPM the collective investment decisions of investors in capital markets will result in equilibrium prices for all risky assets such that the returns investors expect to receive on their investments are commensurate with the risk of those assets relative to the market as a whole. The CAPM posits a risk-return relationship known as the Security Market Line (*see* Figure 1 in Section II), in which the required expected return on an asset is proportional to that asset's relative risk as measured by that asset's so-called "beta."

More precisely, the CAPM states that the cost of capital for an investment, S (e.g., a particular common stock), is given by the following equation:

$$r_s = r_f + \beta_s \times MRP \qquad (1)$$

where r_S is the cost of capital for investment S;

r_f is the risk-free interest rate;

β_S is the beta risk measure for the investment S; and

MRP is the market equity risk premium.

[30] Joe Wharton, Bente Villadsen, and Heidi Bishop, "Alternative Regulation and Ratemaking: Approaches for Water Companies," prepared for the *National Association of Water Companies*, September 2013, p. 43.

The CAPM is a "risk-positioning model" that relies on the empirical fact that investors price risky securities to offer a higher expected rate of return than safe securities. It says that an investment whose returns do not vary relative to market returns should receive the risk-free interest rate (that is the return on a zero-risk security, the y-axis intercept in Figure 1). Further, it says that the risk premium of a security over the risk-free rate equals the product of the beta of that security and the Market Risk Premium: the risk premium on a value-weighted portfolio of all investments, which by definition has average risk.

1. Inputs to the CAPM

Q. WHAT INPUTS DOES YOUR IMPLEMENTATION OF THE CAPM REQUIRE?

A. As demonstrated by equation (1), estimating the cost of equity for a given company requires a measure of the risk-free rate of interest and the market equity risk premium (MRP), as well as a measurement of the stock's beta. There are many methodological choices and sources of data that inform the selection of these inputs. I discuss these issues, along with the finance theory underlying the CAPM, in Appendix B to my written evidence. I performed multiple CAPM calculations corresponding to distinct "scenarios" reflecting different values of the inputs. This allowed me to derive a range of reasonable estimates for the cost of equity capital implied by each of my samples.

Q. WHAT VALUES DID YOU USE FOR THE RISK-FREE RATE OF INTEREST?

A. I used the yield on a 20-year Government Bond as the risk-free asset for purposes of my analysis. Recognizing the fact that the cost of capital set in this proceeding will be in place over the next several years, I rely on a forecast of what Government bond yields will be one year out. Specifically, Blue Chip predicts that the yield on a 10-year

Government Bond will be 3.4% by Q4, 2017.[31] I use year-end 2017 as the benchmark as rates are expected to be in effect well beyond that date. I adjust this value upward by 53 basis points, which is my estimate of the representative maturity premium for the 20-year over the 10-year Government Bond.[32] This gives me a lower bound on the risk-free rate of 3.93%.

I also considered a scenario in which the appropriate risk-free rate of interest is 4.73%, which adds a portion of the increase in yield spread to the risk-free rate to take the downward pressure on the government bond yield into account. An alternative is to increase the MRP to reflect the widening of the yield spread.[33] The baseline Government bond yield of 3.93% reflects that Government bond yields are expected to increase substantially through 2020, where the Blue Chip forecast indicates a yield around 4.5%.[34]

Q. WHAT VALUES DID YOU USE FOR THE MARKET EQUITY RISK PREMIUM (MRP)?

A. Like the cost of capital itself, the market equity risk premium is a forward-looking concept. It is by definition the premium above the risk-free interest rate that investors can *expect* to earn by investing in a value-weighted portfolio of all risky investments in the market. The premium is not directly observable, and must be inferred or forecasted based on known market information. One commonly used method for estimating the

[31] Blue Chip Economic Indicators, Consensus Forecasts, October 2015.
[32] This maturity premium is estimated by comparing the average excess yield on 20-year versus 10-year Government Bonds over the period 1990 - 2015, using data from Bloomberg.
[33] As of February 29, 2016, the spread between A rated utility and government bond yields was elevated by 90 basis points relative to the historical norm, so the application of only 80 basis points as an upward adjustment to the risk-free interest rate is conservative.
[34] Blue Chip Economic Indicators, October 10, 2015 has a consensus forecast for the 10-year government bond yield of 4.0%, so if the maturity premium remains at 0.53% the 20-year government bond is forecasted to be about 4.5%.

MRP is to measure the historical average premium of market returns over the income returns on government bonds over some long historical period. *Duff and Phelps* performs such a calculation of the MRP. The average market risk premium from 1926 to the present (2014) is 7.0%.[35] I used this value of the MRP in one input scenario to my CAPM analyses.

However, investors may require a higher or lower risk premium, reflecting the investment alternatives and aggregate level of risk aversion at any given time. As explained in Section III, there is substantial evidence that investors' level of risk aversion remains elevated relative to the time before the global financial crisis and ensuing recession that commenced in 2008. In recognition of this evidence, together with forward-looking measurements of the expected market equity risk premium that are higher than the long-term historical average, I also performed CAPM calculations using 8% for the market equity risk premium. The 8% forecasted MRP is consistent with Bloomberg's current forecast.[36]

Q. WHAT IS THE BASIS FOR STATING THAT THE CURRENT MRP IS HIGHER THAN ITS HISTORICAL AVERAGE?

A. Academic articles that were written in the late 1990s or early 2000s often found that the U.S. MRP at the time was lower than the its historical average based on various forward-looking models, such as market-wide versions of the DCF model. A recent article by Duarte and Rosa of the Federal Reserve of New York summarizes many of these models and also estimates the MRP from the models each year from 1960 through

[35] *See Duff and Phelps 2015 Valuation Handbook*, pp. 3-19.

[36] Bloomberg currently forecast the U.S. MRP at 8.5% over a 10-year Government bond, so using a maturity premium of about 0.5%; the forecasted MRP is approximately 8% over a 20-year government bond.

the present.[37] The authors find that the models are converging to provide more consensus around the estimate and that the average annual estimate of the MRP is consistent with the academic literature and with forward-looking estimates such as Bloomberg's. Their analysis shows that the U.S. MRP was lower than its long-term historical average in the early 2000s, but is currently at an all-time high. Chart 3 from Duarte & Rosa 2015 was re-produced in Figure 6, which shows the average estimated MRP (over 30-day T-bills) for 20 models.

These findings are broadly consistent with the forward-looking MRP's calculated by Bloomberg albeit a bit higher even after downward adjustment for the maturity premium. I also note that the approximately 80 basis points elevation in the yield spread indicate a substantial elevation in the MRP.[38] However, I conservatively relied on the historical average MRP of 7% and a forward-looking MERP of 8% in my CAPM analysis.[39]

Q. WHAT BETAS DID YOU USE FOR THE COMPANIES IN YOUR SAMPLE?

A. I used Value Line betas, which are estimated using five years of weekly data, which is consistent with the regulatory practice in Arizona.

[37] Fernando Duarte and Carlo Rosa, "The Equity Risk Premium: A Consensus of Models," *Federal Reserve Bank of New York*, December 2015 (Duarte & Rosa 2015).

[38] *See* Appendix B, Section II for details.

[39] Following the evidence in standard finance textbooks, I rely on the arithmetic average for the historic market risk premium. See, for example, Brealey, Myers and Allen, "Principles of Corporate Finance," 11th Edition, 2014 pp. 162-163 and Ross, Westerfield and Jaffe, "Corporate Finance," 10th Edition, 2013 pp. 322-323.

2. The Empirical CAPM

Q. DID YOU USE ANY OTHER CAPM-BASED MODEL?

A. Yes. Empirical research has shown that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premiums than predicted by the CAPM and high-beta stocks tend to have lower risk premiums than predicted.[40] A number of variations on the original CAPM theory have been proposed to explain this finding, but the observation itself can also be used to estimate the cost of capital directly, using beta to measure relative risk by making a direct empirical adjustment to the CAPM.

The second variation on the CAPM that I employed makes use of these empirical findings. It estimated the cost of capital with the equation,

$$r_S = r_f + \alpha + \beta_S \times (MRP - \alpha) \qquad (2)$$

where α is the "alpha" adjustment of the risk-return line, a constant, and the other symbols are defined as for the CAPM (*see* equation (2) above).

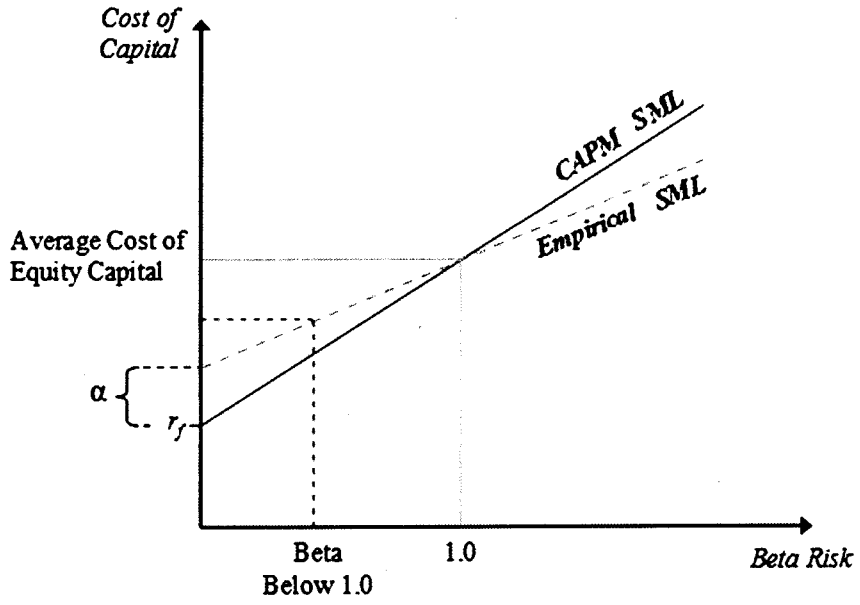
I call this model the Empirical Capital Asset Pricing Model, or "ECAPM." The alpha adjustment has the effect of increasing the intercept but reducing the slope of the Security Market Line in Figure 1, which results in a Security Market Line that more closely matches the results of empirical tests. In other words, the ECAPM produces more accurate predictions of eventual realized risk premiums than does the CAPM.

[40] *See* Figure A-4 in Appendix B for references to relevant academic articles.

Q. WHY DO YOU USE THE ECAPM?

A. Research shows that the analysis performs better empirically performs better, when paired with the ECAPM, which recognizes the consistent empirical observation that the CAPM underestimates the cost of capital for low beta stocks. In other words, the ECAPM is based on recognizing that the actual observed risk-return line is flatter and has a higher intercept than that predicted by the CAPM. The alpha parameter (α) in the ECAPM adjusts for this fact, which has been established by repeated empirical tests of the CAPM. Appendix B discusses the empirical findings that have tested the CAPM and also provides documentation for the magnitude of the adjustment, (α).

Figure 9: The Empirical Security Market Line



3. Results from the CAPM Based Models

Q. PLEASE SUMMARIZE THE PARAMETERS OF THE SCENARIOS AND VARIATIONS YOU CONSIDERED IN YOUR CAPM AND ECAPM ANALYSES.

A. The parameters for the two scenarios are displayed in Figure 10 below. The basis for using the scenarios is the empirical observation that the yield spread is higher than normal as is the forecasted MRP. The increased yield spread could reflect the increase

in the MRP or downward pressure on the yield of government bonds due to a flight to quality or other factors. Therefore, I used the unadjusted forecast risk-free rate with a higher estimate of the MRP, and the unadjusted historical average MRP with the increased estimate of the risk-free interest rate as illustrated in Figure 10. This is a conservative approach as it is plausible that both downward pressure on the risk-free rate and upward pressure on the MRP could simultaneously occur. Scenario 1 normalizes the risk-free rate and uses a historical MRP while Scenario 2 uses an unadjusted forecast of the risk-free rate and a forecasted MRP. Because I did not simultaneously normalize both the government bond rate and the MRP, my estimates are more likely to be downward than upward biased.

Figure 10: Parameters Used in CAPM-based Models

	Scenario 1	Scenario 2
Risk-Free Interest Rate	4.7%	3.9%
Market Equity Risk Premium	7.0%	8.0%

Q. PLEASE EXPLAIN THE DIFFERENCE BETWEEN THE DATA RELIED UPON TO ESTIMATE THE COST OF EQUITY AND THE REGULATORY RATE BASE TO WHICH THE COST OF EQUITY IS APPLIED.

A. Both the CAPM and the DCF models rely on market data to estimate the cost of equity for the sample companies, so the results reflect the value of the capital that investors hold during the estimation period (market values). The allowed return on equity is applied to the fair value rate base, which could be financed differently than the sample companies.

Q. WHY IS THIS DIFFERENCE IMPORTANT TO THE ESTIMATION OF THE COST OF EQUITY?

A. Taking differences in financial leverage into consideration does not change the value of the rate base, but it does consider the fact that the more debt a company has, the higher

is the financial risk associated with an equity investment.[41] To see this I constructed a simple example below, where only the financial leverage of a company varies. I assumed the return on equity is 11% at a 50% equity capital structure and determine the return on equity that would result in the same overall return if the percentage of equity in the capital structure were reduced to 45%.

Figure 11
Illustration of Impact of Financial Risk on Allowed ROE

	Company A (50% Equity)	Company B (40% Equity)
Rate Base	$1,000	$1,000
Equity	$500	$450
Debt	$500	$550
Cost of Debt (5%)	$25	$27.5
Return on Equity	$55	$42.5
Total Cost of Capital (7.5%)	**$80**	**$80**
ROE / Implied ROE	11%	11.67%

The table above illustrates how financial risk affects returns and also the allowed ROE: the overall return does not change, but the allowed ROE required to produce the same return goes up in recognition of the increased risk to equity investors caused by the higher degree of financial leverage.

The principle illustrated in Figure 11 is exemplary of the adjustments I performed to account for differences in financial risk when conducting estimates of the cost of equity applicable to APS. I considered financial risk using several commonly used methods

[41] *See* Appendix B for a description of common practice and underlying finance principles related to the impact of financial risk on the cost of equity.

including the Hamada method to avoid undue influence from any one set of assumptions.[42] The details of these methods are included in Appendix B.

Q. CAN YOU SUMMARIZE THE RESULTS FROM APPLYING THE CAPM-BASED METHODOLOGIES?

A. Yes. The results are presented in Figure 12 below.[43] Note that I included estimates from both the full Electric sample as well as from the sub-sample, whose inclusion of nuclear generation in its generation mix is comparable to that of APS.

[42] These methods include calculating the ROE implied by the overall cost of capital as illustrated in Figure 10, as well as two versions of the so-called Hamada method for levering and unlevering betas in the CAPM and ECAPM. *See* Appendix B for further discussion and detail.

[43] Tables and supporting schedules detailing my cost of capital calculations for Electric sample are contained in Attachment BV-6DR.

Figure 12: Electric Sample CAPM-Based Results

Estimated Return on Equity	Scenario 1 [1]	Scenario 2 [2]
Full Sample		
Financial Risk Adjusted Method		
CAPM	10.2%	10.1%
ECAPM (α = 1.5%)	10.5%	10.5%
Hamada Adjustment Without Taxes		
CAPM	10.2%	10.2%
ECAPM (α = 1.5%)	10.5%	10.5%
Hamada Adjustment With Taxes		
CAPM	10.1%	10.1%
ECAPM (α = 1.5%)	10.5%	10.4%
Nuclear Subsample		
Financial Risk Adjusted Method		
CAPM	10.1%	10.0%
ECAPM (α = 1.5%)	10.5%	10.4%
Hamada Adjustment Without Taxes		
CAPM	10.1%	10.1%
ECAPM (α = 1.5%)	10.4%	10.4%
Hamada Adjustment With Taxes		
CAPM	10.0%	10.0%
ECAPM (α = 1.5%)	10.4%	10.3%

Q. HOW DO YOU INTERPRET THE RESULTS OF YOUR CAPM AND ECAPM ANALYSES?

A. The results indicate an ROE range of 10.0% to 10.5% for a company with 56% equity. Because studies have found that the ECAPM empirically perform better, the ECAPM results deserve higher weight for a range of 10.3% to 10.5%. As seen in Table 12, there is little difference between the estimation results for the full sample and the subsample of entities, whose generation capacity includes 17-37% nuclear generation.

D. *The DCF Based Estimates*

1. Single- and Multi-Stage DCF Models

Q. CAN YOU DESCRIBE THE DCF APPROACH TO ESTIMATING THE COST OF EQUITY?

A. The DCF model attempts to estimate the cost of capital for a given company directly, rather than based on its risk relative to the market as the CAPM does. The DCF method simply assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow—literally a stream of expected "cash flows" discounted at a risk-appropriate discount rate. When the cash flows are dividends, that discount rate is the cost of equity capital:

$$P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \cdots + \frac{D_T}{(1+r)^T} \qquad (3)$$

Where P_0 is the current market price of the stock;

D_t is the dividend cash flow expected at the end of period t;

T is the last period in which a dividend cash flow is to be received; and

r is the cost of equity capital.

Importantly, this formula implies that if the current market price and the pattern of expected dividends are known, it is possible to "solve for" the discount rate, r, that makes the equation true. In this sense, a DCF analysis can be used to estimate the cost of equity capital implied by the market price of a stock and market expectations for its future dividends.

Many DCF applications make the assumption the growth rate last forever, so the formula can be rearranged to estimate the cost of capital. Specifically, the implied DCF

cost of equity can then be calculated using the well-known "DCF formula" for the cost of capital:

$$r = \frac{D_1}{P_0} + g = \frac{D_0}{P_0} \times (1 + g) + g \qquad (4)$$

where D_0 is the current dividend, which investors expect to increase at rate g by the end of the next period, and over all subsequent periods into perpetuity.

Equation (4) says that if equation (3) holds, the cost of capital equals the expected dividend yield plus the (perpetual) expected future growth rate of dividends. I refer to this as the single-stage DCF model; it is also known as the Gordon Growth model.

Q. ARE THERE DIFFERENT VERSIONS OF THE DCF MODEL?

A. Yes. There are many alternative versions, notably (i) multi-stage models, (ii) models that use cash flow rather than dividends, or versions that combine aspects of (i) and (ii).[44]

I do not present evidence on these models in this proceeding, because a model that uses dividends as the only source of cash, current GDP growth forecasts, and current dividend yields would yield unreasonable results.

[44] For example, the Surface Transportation Board uses a cash flow based model with three stages. *See*, for example, Surface Transportation Board Decision, "STB Ex Parte No. 664 (Sub-No. 1)," Decided January 23, 2009.

2. DCF Inputs and Results

Q. WHAT GROWTH RATE INFORMATION DID YOU USE?

A. I looked to a sample of investment analysts' forecasted earnings growth rates from for companies in my samples. I used investment analyst forecasts of company-specific growth rates sourced from *Value Line* and Thomson Reuters *IBES*.

Additionally, I relied on the dividend yield of the companies, which I estimate using the most recently available dividend information (currently) and the average of the last 15 days of stock prices. Because of the stock price of utilities currently is higher than they historically have been and because some companies engage in share buybacks, the dividend yield underestimates the yield on cash distributions to investors.

Q. PLEASE ADDRESS THE INPUT DATA IN THE DCF MODEL.

A. The Gordon Growth / single-stage DCF models require forecast growth rates that reflect investor expectations about the pattern of dividend growth for the companies over a sufficiently long horizon, but estimates are typically only available for 3-5 years.

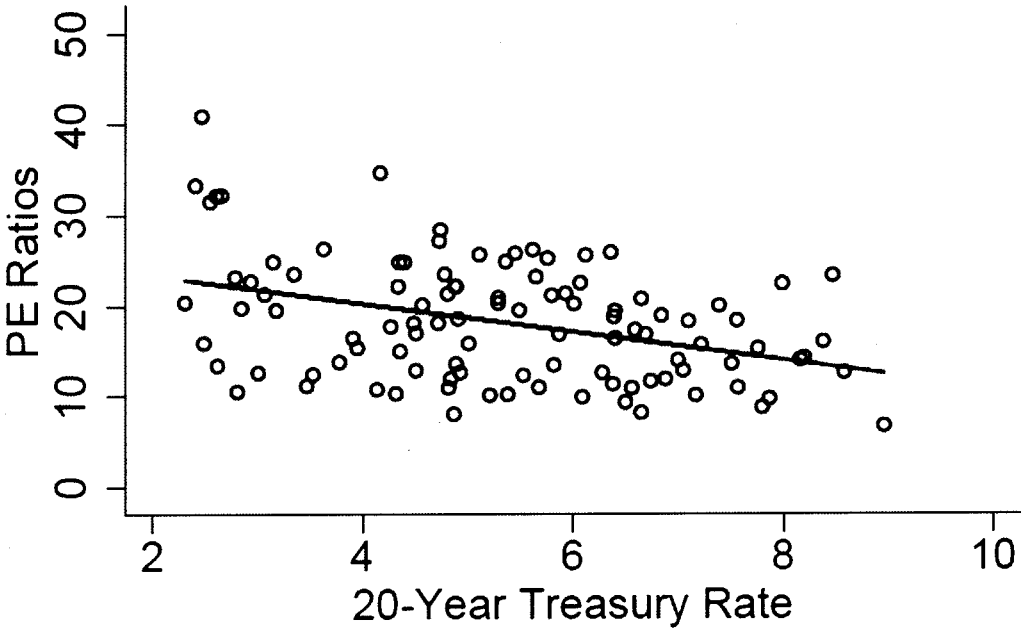
One issue with the data is that it includes solely dividend payments as cash distributions to shareholders, while some companies also use share repurchases to distribute cash to shareholders. To the extent that companies in my samples use share repurchases, the DCF model using dividend yields will under estimate the cost of equity for these companies. While there are companies in my sample that have engaged in share buybacks in the past, the magnitude is currently not large.

A second issue is that the flight to quality has resulted in higher than usual stock prices for electric utilities and hence lower than usual dividend yields. As a result, the dividend yield may be downward biased.

Q. HAVE YOU ATTEMPTED TO DETERMINE THE EFFECT OF THESE ASPECTS OF THE DATA ON YOUR ANALYSIS?

A. Yes. As discussed previously, the Price / Earnings (P/E) ratio for utilities appears to have an inverse relationship to the long-term government bond yield. I therefore regressed the P/E ratios of the companies in my sample as well as the average and median for both the sample and subsample on the 20-year government bond yield. This regression is illustrated in Figure 13 below. Specifically, I regressed the average and median P/E ratio for the sample and subsample on the 20-year government bond yield using quarterly data from 1990-2015.

Figure 13 2: Regression of Average P/E Ratio for Sample Companies on 20-Year Government Bond Yield



My statistical analysis found that the median P/E ratio increases by 0.89 and 1.04 for the full sample and nuclear subsample, when the 20-year government bond yield decline by 1%, respectively. The average impact is higher at 1.31 to 1.55,[45] but these figures cover a relatively wide range across individual companies. Using this range and a generic dividend payout ratio of 60% (the average for my sample is a little over 60%, so the

[45] *See* Attachment BV-11DR.

assumption is conservative), I find that if the P/E ratio increases by, for example, 1.3 for each 1% decline in the government bond yield, then the E/P ratio declines by 0.77 (=1/1.77) for each 1% decline in the yield and if the dividend payout ratio is 60%, the dividend yield would decline by about 46 basis points (=60% × 0.77). Thus, the dividend yield would be understated by an amount relative to what it would be during more normal government bond yields.[46] This is an example of the flight to quality discussed above. I consider the impact of this phenomena below, when discussing my DCF results.[47]

Q. WHAT ARE THE DCF BASED COST OF EQUITY ESTIMATES FOR THE SAMPLES?

A. The results are presented in Figure 14 below.[48] I show both the raw results from the DCF model and the results that would prevail if the interest impact is considered. As for the CAPM, I show the results for the full sample and for the nuclear subsample.

Figure 143: Electric Sample's DCF Results

	Interest Rate Impact not Considered	Interest Rate Impact Considered
Full Sample	9.9%	10.3% - 10.4%
Nuclear Sample	10.4%	10.8% - 10.9%

Q. HOW DO YOU INTERPRET THE RESULTS OF YOUR DCF ANALYSES?

[46] This is consistent with a recent paper by Philip U. Straehl and Roger G. Ibbotson, "The Supply of Stock Returns: Adding Back Buybacks," Morningstar, 2015, who find that "the dividend discount model (DDM), based on current dividend yields and historical per-share growth rates, significantly underestimates expected returns relative to the total payout model."

[47] I note that according to Morningstar, the most commonly used return model determine expected return as dividend yield plus earnings per share growth plus Change in P/E. Morningstar, "Meet CAPE's Older Sister CATY: Using "Total Payout Yield" to Derive Better Equity Return Forecasts" by Philip Straehl, 2016.

[48] Tables and supporting schedules detailing my cost of capital calculations are included in Attachment BV-6DR.

A. The DCF results indicate an ROE of 10.3% to 10.9% once the impact of elevated P/E ratio is considered. Because of the elevated P/E ratios and because APS's assets are more aligned with the assets of the nuclear subsample, I believe the DCF results indicate an ROE well above 10% and in line with to slightly higher than the CAPM-based results reported in Figure 12. Notably, the results from the nuclear subsample are higher than those for the full sample.

E. *Risk Premium Model Estimates*

Q. DID YOU ESTIMATE THE COST OF EQUITY THAT RESULTS FROM AN ANALYSIS OF RISK PREMIUMS IMPLIED BY ALLOWED ROES IN PAST UTILITY RATE CASES?

A. Yes. In this type of analysis, sometimes called the "risk premium model," the cost of equity capital for utilities is estimated based on the historical relationship between allowed ROEs in utility rate cases and the risk-free rate of interest at the time the ROEs were granted. These estimates add a "risk premium" implied by this relationship to the relevant (prevailing or forecast) risk-free interest rate:

$$Cost\ of\ Equity = r_f + Risk\ Premium$$

Q. WHAT ARE THE MERITS OF THIS APPROACH?

A. First, it estimates the cost of equity from regulated entities as opposed to holding companies, so that the relied upon figure is directly applicable to a rate base. Second, the allowed returns are clearly observable to market participants, who will use this data one input to making investment decisions, so that the information is at the very least a good check on whether the return is comparable to that of other investments. Third, I analyze spread between the allowed ROE at a given time and the then prevailing interest rate to ensure that I properly consider the interest rate regime at the time the ROE was awarded. This implementation ensures that I can compare allowed ROE granted at different times and under different interest rate regimes.

Q. HOW DID YOU USE RATE CASE DATA TO ESTIMATE THE RISK PREMIUMS FOR YOUR ANALYSIS?

A. Using quarterly data from Regulatory Research Associates from Q1 1990 to Q4 2015,[49] I compared (statistically) the average allowed rate of return on equity granted by U.S. state regulatory agencies in integrated electric utility rate cases to the average 20-year Treasury bond yield that prevailed in each quarter. I calculated the allowed utility "risk premium" in each quarter as the difference between allowed returns and the Treasury bond yield, since this represents the compensation for risk allowed by regulators. Then I used the statistical technique of ordinary least squares (OLS) regression to estimate the parameters of the linear equation:

$$Risk\ Premium = A_0 + A_1 \times (Treausury\ Bond\ Yield) \qquad (5)$$

I derived my estimates of A_0 and A_1 using standard statistical methods (OLS regression) and find that the regression has a high degree of explanatory power in a statistical sense (R^2=0.79) and the parameter estimates, A_0=8.886% and A_1= -0.593, are statistically significant. The negative slope coefficient reflects the empirical fact that regulators grant smaller risk premiums when risk-free interest rates (as measured by Treasury bond yields) are higher. This is consistent with past observations that the premium investors require to hold equity over government bonds increases as government bond yields decline. In the regression described above, the allowed ROE on average declined by 59 basis point when the government bond yield declined by 100 basis points. This relationship is illustrated graphically in Attachment BV-8DR, which contains my risk premium analysis.

[49] SNL Financial as of 1/7/2016.

Q. WHAT RESULT DID YOUR RISK PREMIUM ANALYSIS PROVIDE FOR THE APS'S COST OF EQUITY?

A. To estimate a cost of equity, I apply my regression equation at the normalized risk-free interest of 4.7%.[50] The calculation is shown below and gives a cost of equity estimate of 10.8% for the sample:

$$\textbf{\textit{Risk Premium}} = 8.886\% - 0.593 \times 4.7\% = \mathbf{6.32\%}$$

$$\textbf{\textit{Cost of Equity}} = 4.7\% + 6.32\% = \mathbf{10.8\%}$$

I note that the average equity percentage for integrated electric utilities recently has been about 51%, so if I take the financial risk into account, the risk premium model indicates an ROE of 10.3% for an entity with 56% equity (*see* Attachment BV-8DR).

Q. WHAT CONCLUSIONS DID YOU DRAW FROM YOUR RISK PREMIUM ANALYSIS?

A. Although risk premium models based on historical allowed returns are not underpinned by fundamental finance principles in the manner of the CAPM or DCF models, I believe they can provide useful benchmarks for evaluating appropriate rates of return. My risk premium model cost of equity estimates demonstrate that the results of my DCF and CAPM analyses are in line with the actions of utility regulators. Because the risk premium analysis as implemented takes into account the interest rate prevailing during the quarter the decision was issued, it provides a useful benchmark for the cost of equity in any interest environment.

[50] As discussed above, this represents the Blue Chip estimate for the 10-year Government Bond yield at the end of 2017, adjusted upward by 53 basis points to account for the maturity premium between 10- and 20-yr government bonds and by a further 80 basis points to account for the elevated levels of utility yield spreads.

V. RISK CHARACTERISTICS AND THE COST OF EQUITY

A. *BACKGROUND*

Q. PLEASE SUMMARIZE YOUR ROE EVIDENCE.

A. Based on my analysis, I find the range of ROE estimates displayed in Figure 15 below.[51]

Figure 15: Range of ROE Estimates

	Full Sample	Nuclear Sample
	[1]	[2]
CAPM	10.1% - 10.2%	10.0% - 10.1%
ECAPM	10.4% - 10.5%	10.3% - 10.5%
Simple DCF	9.9%	10.4%
DCF Considering Interest Rates	10.3% - 10.4%	10.8% - 10.9%
Risk Premium	10.3%	n/a

I note that in considering the impact of interest rates on the DCF estimates, I rely on the current widening of the spread between utility and government bonds of 80 basis points. An alternative would be to use the difference between the forecasted government bond yield and the current bond yield of almost 110 basis points (3.4% in Q4, 2017 versus the December 2015 yield of 2.24%). Thus, my estimates use the more conservative estimate. Based on the data above, I consider a **reasonable range for the sample** to be 10.0% to 10.8% (excluding the highest and lowest estimate) and will next address APS specific risks and its ROE relative to the sample.

B. *APS And Arizona-Specific Risks*

Q. PLEASE IDENTIFY THE APS AND ARIZONA-SPECIFIC RISKS THAT YOU ANALYZED.

A. My analysis included the following APS and Arizona-specific risk factors: (i) APS relies to a larger degree than the sample companies on nuclear generation, (ii) the magnitude and growth in distributed generation is higher than in most states (iii) APS has been

[51] I acknowledge that some companies in the subsample (e.g., Dominion, NextEra, PSE&G, and Scana) have non-trivial non-regulated activities.

unable to earn its allowed ROE in the last 13 years, and (iv) APS is smaller than the average company in my sample. All of these characteristics add to APS's risk.

Q. PLEASE DISCUSS THE IMPACT OF BEING MORE DEPENDENT ON NUCLEAR GENERATION THAN ITS PEERS.

A. Figure 16 below summarizes the generation composition in my sample and Attachment BV-7DR provides details.

Figure 16: Generation Composition

	APS	Subsample	Sample
[1]	[2]	[3]	[4]
Nuclear	27%	24%	13%
Coal	34%	33%	39%
Natural Gas	17%	21%	21%
Other (incl. purchases)	22%	21%	27%

Sources:
Value Line and SEC 2014 Form 10-Ks.

It is evident from Figure 16 that APS relies more heavily on nuclear generation than the sample and more heavily on nuclear and coal than the subsample, but the Company's generation mix is closer to that of the subsample. There are at least three reasons why nuclear generation and to a degree coal impacts the utility's risk. First, nuclear generation (and coal more than natural gas) has very large fixed costs relative to their variable costs, which means that the operating leverage is higher. As a result, the asset risk (beta) increases relative to that of an asset with less operating leverage. Simply put, the costs associated with operating a nuclear facility cannot readily be reduced simply because demand is reduced. Second, nuclear facilities tend to be very large and indeed APS operates the largest nuclear generating facility in the country, Palo Verde units 1, 2 and 3 but is a much smaller utility than the majority of those included in my sample / nuclear subsample. Because the generation facility is one large unit (as opposed to

many smaller units), the operation has less flexibility than other types of generation. Third, nuclear facilities are subject to substantial scrutiny and decommissioning costs are significant. This again adds to the risk profile and certainly the subsample results may be more representative than those of the sample.[52]

Q. HOW DOES THE MAGNITUDE AND GROWTH IN DISTRIBUTED GENERATION IMPACT APS?

A. APS has more distributed generation in its service territory than the majority of U.S. utilities; including those in my sample. Photovoltaic capacity constitute .82% of the total installed capacity in Arizona and is among the sample companies only exceeded by the magnitude installed in California and New Jersey with the latter being a deregulated state (*see* Attachment BV-9DR). Therefore, it is imperative that the utility's rates are structured so that it does not undermine its ability to earn the allowed ROE or APS will face asymmetric risk of earning below its allowed ROE.

Q. WHY IS AN ANALYSIS OF THE EARNED VS. ALLOWED ROE RELEVANT TO A DETERMINATION OF THE ROE IN THIS CASE?

A. Based on data obtained from APS, I have calculated the degree to which the company has under earned its allowed ROE since 2002. I found that APS has under earned its allowed ROE every year since 2002 and by a substantial amount as the average under earning is close to 2%. While APS's ability to earn its allowed ROE has improved in recent years, the fact that it has under earned in the most recent 13 years indicates that absent constructive rate making, the Company may be facing an asymmetric risk. There are two consequences to this observation. First, I recommend that the barriers to earning the allowed ROE be removed if possible and second, if it is not possible to remove the

[52] I acknowledge that some companies in the subsample (e.g., Dominion, NextEra, PSE&G, and Scana) have non-trivial non-regulated activities.

barriers to on average earn the allowed ROE, it may be necessary to provide APS with a cushion to ensure it earns its allowed ROE. Put differently, it would be misguided to award APS an ROE towards the lower end of what is reasonable because providing an inadequate return because a return below the cost of capital may adversely affect the utility's ability to provide stable and favorable rates because some potential efficiency investments may be delayed and the company may be forced to file more frequent rate cases. Moreover, in the long run, inadequate returns are likely to cost customers—and society generally—far more than may be saved in the short run. Inadequate returns lead to inadequate investment, whether for maintenance or for new plant and equipment. Without access to investor capital, the company may be forced to forgo opportunities to maintain, upgrade, and expand its systems and facilities in ways that decrease long run costs. Indeed, the cost to consumers of an undercapitalized industry can be far greater than any short-run gains from shortfalls in the cost of capital. This is especially true in capital-intensive industries (such as the electric utility industry), which feature systems that take a long time to decay. Such long-lived infrastructure assets cannot be repaired or replaced overnight, because of the time necessary to plan and construct the facilities. Thus, it is in customers' interest not only to make sure the return investors expect does not exceed the cost of capital, but also to make sure that the return does not fall short of the cost of capital.

Q. HOW DOES APS'S SMALLER SIZE AFFECT INVESTORS' EXPECTED RETURN?

A. Empirical studies have shown that the return investors require depend on the size of the company in which they invest and that the required return is larger the smaller the company is.[53] As APS is approximately half the size of the average sample company as

[53] Duff & Phelps, "2014 Valuation Handbook: Guide to Cost of Capital," (Duff & Phelps (2014), pp. 7-2.

measured by revenue and Pinnacle West is half (one third) of the sample's (subsample's) size as measured by market capitalization, it is evident that APS is smaller than the average sample / subsample company. Duff & Phelps looks at 25 deciles of companies by market capitalization size and report the average premium that a company requires based on the decile in which the company's capitalization falls. Based on the market capitalization of Pinnacle West, which predominantly is APS, and that of the subsample (sample), APS's size merits a size premium. Looking to Duff & Phelp (2014) risk premia by market capitalization, APS smaller size would merit a size premium of up to 75 basis points over the average sample company.[54] Because there are companies in the sample (subsample), who are of the same size as APS, I do not simply add 75 basis points to APS's ROE but instead use this information to place APS relative to the estimates displayed in Section V.

Q. WHAT CONCLUSIONS DO YOU DRAW FROM THE ANALYSIS ABOVE?

A. As APS faces larger operating leverage from nuclear generation than the sample, is of a smaller size than the sample, have a larger exposure to distributed generation, and may be subject to asymmetric risk in earning its allowed ROE, I submit that a lower bound on APS's cost of equity is the upper half of the estimated range; i.e., 10.25% – 10.75%. I recommend that APS be allowed a ROE at the midpoint of the range; 10.5% as the Company's smaller size and operating leverage increases its cost of capital over that of the sample. I further note that it is important that any obstacles to APS earning its allowed ROE be removed as credit rating agencies look to earned returns and investors ultimately are paid from earned returns.

[54] Duff & Phelps (2014), Appendix A-3.

VI. DECOUPLING AND ROE

Q. PLEASE EXPLAIN DECOUPLING.

A. Decoupling is a regulated ratemaking approach that severs the direct link and relationship between level of unit sales (kilowatt-hours) to consumers and the level of base revenues that are approved for through the collection of volumetric rates. Specific decoupling mechanisms are in place in 28 states.[55]

Q. WHY DO YOU CONSIDER THE IMPACT OF DECOUPLING ON COST OF CAPITAL?

A. Because decoupling has the effect of reducing the volatility of the utility's revenue, some have argued that it reduces the cost of capital. The basis for the assumption was that volatility is related to risk, so a reduction in revenue volatility could impact the utility's risk and hence it's cost of capital.

Q. WHAT IS THE EVIDENCE REGARDING THE RELATIONSHIP BETWEEN DECOUPLING AND COST OF CAPITAL?

A. First, the majority of the companies in my sample have some form of decoupling for some subsidiaries, so any impact on the cost of capital would already be captured in the data displayed in Section V. Second, empirical studies have shown that there is no impact of decoupling on the cost of capital among U.S. electric utilities (or gas utilities). Third, finance theory holds that only systematic (or non-diversifiable) risk affects the cost of equity, so only if decoupling affected the systematic risk would it impact the cost of equity. I discuss each of these in turn below.

[55] Joe Wharton & Michael J. Vilbert, "Decoupling and the Cost of Capital," *The Electricity Journal*, vol. 28, 2015, pp. 19-28.

Q. PLEASE SUMMARIZE THE PREVALENCE OF DECOUPLING MECHANISMS AMONG YOUR SAMPLE COMPANIES.

A. Figure 17 below shows the prevalence of decoupling mechanisms among the sample companies and subsample companies. In the table, I also indicate in parentheses restructured states where the utility operates as well as any decoupled gas operations.

From the table, it appears that of the 10 companies in the subsample, 7 have some form of decoupling in place and among the 27 sample companies only 7 have no decoupling of which some operations are in restructured states, where the operating utility owns no generation. Thus, both the sample and the subsample has a substantial amount of decoupling and much of the effect decoupling, if any, would be captured in the estimation results (*see* Attachment BV-10DR).

Figure 17: Decoupling Mechanisms Among Sample Companies

Company	Decoupling	No Decoupling	Restructured States
[1]	[2]	[3]	[4]
ALLETE		MN	
Alliant Energy		IA, (IA), WI, (WI)	
Amer. Elec. Power	AR*, IN*, KY*, LA*, OH*, OK*	MI, TN, TX, VA, WV	OH, TX
Ameren Corp.	MO*	IL, (IL), (MO)	IL
CenterPoint Energy	(AR), (LA)*, (MN), (OK)*	TX, (TX)	TX
CMS Energy Corp.		MI, (MI)	
Consol. Edison	NY, (NY)	NJ	NJ
Dominion Resources		NC, (OH), VA, (WV)	OH
DTE Energy	(MI)*	MI	
Edison Int'l	CA		
El Paso Electric		NM, TX	TX
Entergy Corp.	AR*, LA*, (LA), MS*	TX	TX
G't Plains Energy	MO*	KS	
IDACORP Inc.	ID*	OR	
MGE Energy		WI, (WI)	
NextEra Energy		FL, TX	TX
OGE Energy	AR*, OK*		
Otter Tail Corp.		MN, ND	
PG&E Corp.	CA, (CA)		
Pinnacle West Capital	AZ*		
Portland General	OR*		
Public Serv. Enterprise	(NJ)*	NJ	NJ
SCANA Corp.	(NC), (SC)*	SC	
Sempra Energy	(AL)*, CA, (CA)		
Vectren Corp.	IN*, (IN)	(OH)	OH
Westar Energy	KS*		
Xcel Energy Inc.	(CO)*, SD*	CO, MN, (MN), NM, ND, (ND), TX, WI, (WI)	TX

Sources/Notes:
Regulatory Research Associates, "Adjustment Clauses," October 2, 2015.
Highlighted companies are included in our subsample of utilities with 17% to 37% nuclear generation.
"*" indicates partial decoupling.
"( )" indicates decoupling status for associated gas operations.

Q. PLEASE DISCUSS THE EMPIRICAL EVIDENCE YOU MENTIONED REGARDING DECOUPLING.

A. Empirical studies of the effect of decoupling on the cost of capital have found none. More specifically, Wharton & Vilbert (2015) studied electric utilities that introduced decoupling or had decoupling removed during the period 2007-14 using quarterly and estimated the cost of capital for those with and without decoupling. They found no

statistical evidence that decoupling affected the cost of equity.[56] A study by Michenfelder similarly found that no effect of decoupling on the cost of equity.[57] Thus, empirical studies have not found any impact of decoupling on the cost of capital.

Q. DO YOU HAVE ANY OTHER COMMENTS ON THE RELATIONSHIP BETWEEN DECOUPLING AND THE COST OF CAPITAL?

A. Yes. Finance theory holds that only systematic (non-diversifiable) risk affects the cost of capital. Therefore, decoupling only affects the cost of capital to the extent it affects systematic risk. While decoupling mechanisms vary substantially across jurisdictions, it is plausible that an investor can diversify away from any specific volumetric effect and hence diversify the risk away. If that is the case there is no impact on the cost of capital from decoupling.

Q. BASED ON THE DISCUSSION ABOVE, WHAT DO YOU CONCLUDE?

A. Because a large number of the companies in my sample have decoupling mechanisms in place, any impact on the cost of equity is already captured in my estimates. Further, empirical research have not detected any relationship between the cost of equity and decoupling, so there is no evidence that decoupling affect the cost of equity. Therefore, decoupling should not affect the allowed ROE.

VII. FAIR VALUE RATE BASE AND FAIR VALUE ROR

Q. PLEASE EXPLAIN THE FAIR VALUE RATE BASE CONCEPT.

A. According to the Arizona Constitution,

> The corporation commission shall, to aid it in the proper discharge of its duties, ascertain the fair value of the property within the state of every

[56] Joe Wharton & Michael J. Vilbert, "Decoupling and the Cost of Capital," *The Electricity Journal*, vol. 28, 2015, pp. 19-28.

[57] Richard A. Michelfelder, "Decoupling: Impact on the Risk of Public Utility Stocks," Presentation at SURFA, April 15, 2011.

> public service corporation doing business therein; and every public service corporation doing business within the state shall furnish to the commission all evidence in its possession, and all assistance in its power, requested by the commission in aid of the determination of the value of the property within the state of such public service corporation.[58]

Thus, the state Constitution requires Commission to determine the fair value of the property APS uses in the state of Arizona in connection with setting rates.

Q. HOW HAS THE COMMISSION IMPLEMENTED THE FAIR VALUE RATE BASE CONCEPT?

A. For decades, the Commission has determined the Fair Value Rate Base (FVRB) and the Fair Value Rate of Return (FVROR). In these cases, the Commission has determined the FVRB as the average of the Original Cost Rate Base and the Reconstruction Cost New Less Depreciation Rate Base (RCND). The latter was determined as the original cost adjusted by inflation with accumulated depreciation deducted according to the estimated useful life of the assets.

Q. DO YOU HAVE ANY COMMENTS ON THIS APPROACH?

A. Yes. Standard financial economics would define Fair Market Value (FMV) as the price at which a willing buyer and seller would exchange the assets in question. Now I know that FMV is not the same as fair value, but my analysis shows that the Commission's approach is not unreasonable, albeit likely conservative at least as to the case of APS.

[58] Arizona Constitution, Article 15, Section 14. http://www.azleg.gov/FormatDocument.asp?inDoc=/const/15/14.htm

Q. PLEASE DISCUSS ANY ANALYSIS YOU HAVE DONE TO TEST THE REASONABLENESS OF CALCULATING THE FVRB USING THE COMMISSION'S TRADITIONAL 50/50 WEIGHTING OF ORIGINAL COST AND RECONSTRUCTION COST NEW LESS DEPRECIATION RATE BASES.

A. To determine whether the methodology described above is reasonable, I looked at investor valuations of integrated electric utilities. Specifically, I analyzed the implied value of electric utilities' assets using recent transactions multiples. Using transaction data for 2013-2016, I found that the average implied asset value of integrated electric utilities were approximately 1.89 times the book value of assets. Transactions are a direct measure of the value that investors assign to a utility. The specifics of my analysis is presented in Attachment BV-5DR.

Figure 18: Market Valuations Indications

	Integrated Elec Util	Utilities
Transactions		
Average	89%	109%
Median	93%	97%
Minimum	46%	46%
Maximum	120%	156%%

Transaction multiples generally are the best indicator of fair value, so I recommend that the fair value be measured using the transaction multiple. Consequently, an analysis of financial markets show the FMV of the adjusted jurisdictional original cost rate base of $6.771 is about $12.797 billion.[59] The Company's calculation of FVRB is $9.976 billion, which is within the range of my above estimates, albeit near the bottom.

Q. HOW DO YOU PROPOSE THAT THE FVROR IS ESTIMATED?

A. The FVRB is supported by the same capital elements as is APS's original cost rate base, and there is no reason to believe that the weighting would change simply because the dollar amount is higher. Therefore, I propose that the FVRB be allowed a ROR that is

[59] Calculated as 1.89×$6.771 billion.

the weighted average of my recommended ROE of 10.5% and the embedded cost of debt of 5.13%, or 8.13%.

Another way would be to determine a return for the Fair Value Increment on a standalone basis and simply weight it in with the debt and equity components of original cost rate base. I suggest that a return of up to the inflation adjusted ROR is appropriate for the Fair Value Increment – this figure is 6.04%.[60] This would produce an overall FVROR of 7.46% by weighting the 6.04% return by the percentage of FVRB represented by the Fair Value Increment (32.13%) and weighting the 8.13% by the remaining percent of FVRB represented by original cost (67.87%).[61] Therefore, APS's proposed FVROR of 5.84%, including only a 1% return on the Fair Value Increment, is conservative.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

[60] Using Blue Chip as of October 2015, the forecasted GDP inflation is 2.1%, so FVROR can be calculated as follows: (5.13%-2.1%)×44% + (10.5% - 2.1%%)×56% = 6.04%.

[61] Numbers are taken from Schedule A-1 of the Commission's Standard Filing Requirements accompanying the Application in this case.

BEFORE THE
ARIZONA CORPORATION COMMISSION

APPENDICES TO THE DIRECT TESTIMONY OF BENTE VILLADSEN

FOR
ARIZONA PUBLIC SERVICE COMPANY

Cost of Capital

June 1, 2016

TABLE OF CONTENTS

Appendix A: Resume of Dr. Bente Villadsen

Dr. Bente Villadsen's work concentrates in the areas of regulatory finance and accounting. Her recent work has focused on accounting issues, damages, cost of capital and regulatory finance. In the regulatory finance area, Dr. Villadsen has testified on cost of capital and accounting, analyzed credit issues in the utility industry, risk management practices as well the impact of regulatory initiatives such as energy efficiency and de-coupling on cost of capital and earnings. Among her recent accounting work, she has been involved in accounting disclosure issues and principles including impairment testing, fair value accounting, leases, accounting for hybrid securities, accounting for equity investments, cash flow estimation as well as overhead allocation. Dr. Villadsen has estimated damages in the U.S. as well as internationally for companies in the construction, telecommunications, energy, cement, and rail road industry. She has filed testimony and testified in federal and state court, in international and U.S. arbitrations and before state and federal regulatory commissions. Her testimonies and expert reports pertain to accounting issues, damages, discount rates and cost of capital for regulated entities.

Dr. Villadsen holds a Ph.D. from Yale University's School of Management with a concentration in accounting. She has a joint degree in mathematics and economics (BS and MS) from University of Aarhus in Denmark. Prior to joining The Brattle Group, she was a Professor of Accounting at the University of Iowa, University of Michigan, and at Washington University in St. Louis where she taught financial and cost accounting. She has also taught graduate classes in econometrics and quantitative methods. Dr. Villadsen also worked as a consultant for Risoe National Laboratories in Denmark.

AREAS OF EXPERTISE

- Regulatory Finance
  - Cost of Capital
  - Cost of Service (including prudence)
  - Energy Efficiency, De-coupling and the Impact on Utilities Financials
  - Relationship between regulation and credit worthiness
  - Risk Management
  - Regulatory Advisory
- Accounting and Corporate Finance
  - Application of Accounting Standards
  - Disclosure Issues
  - Credit Issues in the Utility Industry
- Damages and Valuation
  - Utility valuation
  - Lost Profit
  - Stock Price Drop

EXPERIENCE

Regulatory Finance

- On behalf of the Association of American Railroads, Dr. Villadsen appeared as an expert before the Surface Transportation Board and submitted expert reports on the determination of the cost of equity for U.S. freight railroads.
- For several electric, gas and transmission utilities in Alberta, Canada, Dr. Villadsen filed evidence on the cost of equity and appropriate capital structure for 2015-17. Her evidence was filed with the Alberta Utilities Commission.
- She has estimated the cost of equity on behalf of Portland General Electric, Anchorage Water and Wastewater, American Water, California Water, and EPCOR in state regulatory proceedings. She has also submitted testimony to Bonneville Power Authority. Much of her testimony involves not only cost of capital estimation but also the impact of credit metrics and various regulatory mechanisms such as revenue stabilization, riders and trackers.
- In Australia, she has submitted led and co-authored a report on cost of equity and debt estimation methods for the Australian Pipeline Industry Association. The equity report was filed with the Australian Energy Regulator as part of the APIA's response to the Australian Energy Regulator's development of rate of return guidelines and both reports were filed with the Economic Regulation Authority by the Dampier Bunbury Pipeline. She has also submitted a report on aspects of the WACC calculation for Aurizon Network to the Queensland Competition Authority.
- In Canada, Dr. Villadsen has co-authored reports for the British Columbia Utilities Commission and the Canadian Transportation Agency regarding cost of capital methodologies. Her work consisted partly of summarizing and evaluating the pros and cons of methods and partly of surveying Canadian and world-wide practices regarding cost of capital estimation.
- Dr. Villadsen worked with utilities to estimate the magnitude of the financial risk inherent in long-term gas contracts. In doing so, she relied on the rating agency of Standard & Poor's published methodology for determining the risk when measuring credit ratios.

- For utilities that are providers of last resort, she has provided estimates of the proper compensation for providing the state-mandated services to wholesale generators.
- In connection with the AWC Companies application to construct a backbone electric transmission project off the Mid-Atlantic Coast, Dr. Villadsen submitted testimony before the Federal Energy Regulatory Commission on the treatment the accounting and regulatory treatment of regulatory assets, pre-construction costs, construction work in progress, and capitalization issues.
- On behalf of ITC Holdings, she filed testimony with the Federal Energy Regulatory Commission regarding capital structure issues.
- Testimony on the impact of transaction specific changes to pension plans and other rate base issues on behalf of Balfour Beatty Infrastructure Partners before the Michigan Public Service Commission.
- On behalf of financial institutions, Dr. Villadsen has led several teams that provided regulatory guidance regarding state, provincial or federal regulatory issues for integrated electric utilities, transmission assets and generation facilities. The work was requested in connection with the institutions evaluation of potential investments.
- For a natural gas utility facing concerns over mark to market losses on long term gas hedges, Dr. Villadsen helped develop a program for basing a portion of hedge targets on trends in market volatility rather than on just price movements and volume goals. The approach was refined and approved in a series of workshops involving the utility, the state regulatory staff, and active intervener groups. These workshops evolved into a forum for quarterly updates on market trends and hedging positions.
- She has advised the private equity arm of three large financial institutions as well as two infrastructure companies, a sovereign fund and pension fund in connection with their acquisition of regulated transmission, distribution or integrated electric assets in the U.S. and Canada. For these clients, Dr. Villadsen evaluated the regulatory climate and the treatment of acquisition specific changes affecting the regulated entity, capital expenditures, specific cost items and the impact of regulatory initiatives such as the FERC's incentive return or specific states' approaches to the recovery of capital expenditures riders and trackers. She has also reviewed the assumptions or worked directly with the acquirer's financial model.

- On behalf of a provider of electric power to a larger industrial company, Dr. Villadsen assisted in the evaluation of the credit terms and regulatory provisions for the long-term power contract.
- For several large electric utility, Dr. Villadsen reviewed the hedging strategies for electricity and gas and modeled the risk mitigation of hedges entered into. She also studies the prevalence and merits of using swaps to hedge gas costs. This work was used in connection with prudence reviews of hedging costs in Colorado, Oregon, Utah, West Virginia, and Wyoming.
- She estimated the cost of capital for major U.S. and Canadian utilities, pipelines, and railroads. The work has been used in connection with the companies' rate hearings before the Federal Energy Regulatory Commission, the Canadian National Energy Board, the Surface Transportation Board, and state and provincial regulatory bodies. The work has been performed for pipelines, integrated electric utilities, non-integrated electric utilities, gas distribution companies, water utilities, railroads and other parties.
- For a Canadian pipeline, Dr. Villadsen co-authored an expert report regarding the cost of equity capital and the magnitude of asset retirement obligations. This work was used in arbitration between the pipeline owner and its shippers.
- In a matter pertaining to regulatory cost allocation, Dr. Villadsen assisted counsel in collecting necessary internal documents, reviewing internal accounting records and using this information to assess the reasonableness of the cost allocation.
- She has been engaged to estimate the cost of capital or appropriate discount rate to apply to segments of operations such as the power production segment for utilities.
- In connection with rate hearings for electric utilities, Dr. Villadsen has estimated the impact of power purchase agreements on the company's credit ratings and calculated appropriate compensation for utilities that sign such agreements to fulfill, for example, renewable energy requirements.
- Dr. Villadsen has been part of a team assessing the impact of conservation initiatives, energy efficiency, and decoupling of volumes and revenues on electric utilities financial performance. Specifically, she has estimated the impact of specific regulatory proposals on the affected utilities earnings and cash flow.

- On behalf of Progress Energy, she evaluated the impact of a depreciation proposal on an electric utility's financial metric and also investigated the accounting and regulatory precedent for the proposal.
- For a large integrated utility in the U.S., Dr. Villadsen has for several years participated in a large range of issues regarding the company's rate filing, including the company's cost of capital, incentive based rates, fuel adjustment clauses, and regulatory accounting issues pertaining to depreciation, pensions, and compensation.
- Dr. Villadsen has been involved in several projects evaluating the impact of credit ratings on electric utilities. She was part of a team evaluating the impact of accounting fraud on an energy company's credit rating and assessing the company's credit rating but-for the accounting fraud.
- For a large electric utility, Dr. Villadsen modeled cash flows and analyzed its financing decisions to determine the degree to which the company was in financial distress as a consequence of long-term energy contracts.
- For a large electric utility without generation assets, Dr. Villadsen assisted in the assessment of the risk added from offering its customers a price protection plan and being the provider of last resort (POLR).

Accounting and Corporate Finance

- In arbitration before the International Chamber of Commerce Dr. Villadsen testified regarding the true-up clauses in a sales and purchase agreement, she testified on the distinction between accruals and cash flow measures as well as on the measurement of specific expenses and cash flows.
- On behalf of a taxpayer, Dr. Villadsen recently testified in federal court on the impact of discount rates on the economic value of alternative scenarios in a lease transaction.
- In an arbitration matter before the International Centre for Settlement of Investment Disputes, she provided expert reports and oral testimony on the allocation of corporate overhead costs and damages in the form of lost profit. Dr. Villadsen also reviewed internal book keeping records to assess how various inter-company transactions were handled.

- Dr. Villadsen provided expert reports and testimony in an international arbitration under the International Chamber of Commerce on the proper application of US GAAP in determining shareholders' equity. Among other accounting issues, she testified on impairment of long-lived assets, lease accounting, the equity method of accounting, and the measurement of investing activities.
- In a proceeding before the International Chamber of Commerce, she provided expert testimony on the interpretation of certain accounting terms related to the distinction of accruals and cash flow.
- In an arbitration before the American Arbitration Association, she provided expert reports on the equity method of accounting, the classification of debt versus equity and the distinction between categories of liabilities in a contract dispute between two major oil companies. For the purpose of determining whether the classification was appropriate, Dr. Villadsen had to review the company's internal book keeping records.
- In U.S. District Court, Dr. Villadsen filed testimony regarding the information required to determine accounting income losses associated with a breach of contract and cash flow modeling.
- Dr. Villadsen recently assisted counsel in a litigation matter regarding the determination of fair values of financial assets, where there was a limited market for comparable assets. She researched how the designation of these assets to levels under the FASB guidelines affect the value investors assign to these assets.
- She has worked extensively on litigation matters involving the proper application of mark-to-market and derivative accounting in the energy industry. The work relates to the proper valuation of energy contracts, the application of accounting principles, and disclosure requirements regarding derivatives.
- Dr. Villadsen evaluated the accounting practices of a mortgage lender and the mortgage industry to assess the information available to the market and ESOP plan administrators prior to the company's filing for bankruptcy. A large part of the work consisted of comparing the company's and the industry's implementation of gain-of-sale accounting.

- In a confidential retention matter, Dr. Villadsen assisted attorneys for the FDIC evaluate the books for a financial investment institution that had acquired substantial Mortgage Backed Securities. The dispute evolved around the degree to which the financial institution had impaired the assets due to possible put backs and the magnitude and estimation of the financial institution's contingencies at the time of it acquired the securities.
- In connection with a securities litigation matter she provided expert consulting support and litigation consulting on forensic accounting. Specifically, she reviewed internal documents, financial disclosure and audit workpapers to determine (1) how the balance's sheets trading assets had been valued, (2) whether the valuation was following GAAP, (3) was properly documented, (4) was recorded consistently internally and externally, and (5) whether the auditor had looked at and documented the valuation was in accordance with GAAP.
- In a securities fraud matter, Dr. Villadsen evaluated a company's revenue recognition methods and other accounting issues related to allegations of improper treatment of non-cash trades and round trip trades.
- For a multi-national corporation with divisions in several countries and industries, Dr. Villadsen estimated the appropriate discount rate to value the divisions. She also assisted the company in determining the proper manner in which to allocate capital to the various divisions, when the company faced capital constraints.
- Dr. Villadsen evaluated the performance of segments of regulated entities. She also reviewed and evaluated the methods used for overhead allocation.
- She has worked on accounting issues in connection with several tax matters. The focus of her work has been the application of accounting principles to evaluate intra-company transactions, the accounting treatment of security sales, and the classification of debt and equity instruments.
- For a large integrated oil company, Dr. Villadsen estimated the company's cost of capital and assisted in the analysis of the company's accounting and market performance.
- In connection with a bankruptcy proceeding, Dr. Villadsen provided litigation support for attorneys and an expert regarding corporate governance.

Damages and Valuation

- For the Alaska Industrial Development and Export Authority, Dr. Villadsen co-authored a report that estimated the range of recent acquisition and trading multiples for natural gas utilities.

- On behalf of a taxpayer, Dr. Villadsen testified on the economic value of alternative scenarios in a lease transaction regarding infrastructure assets.

- For a foreign construction company involved in an international arbitration, she estimated the damages in the form of lost profit on the breach of a contract between a sovereign state and a construction company. As part of her analysis, Dr. Villadsen relied on statistical analyses of cost structures and assessed the impact of delays.

- In an international arbitration, Dr. Villadsen estimated the damages to a telecommunication equipment company from misrepresentation regarding the product quality and accounting performance of an acquired company. She also evaluated the IPO market during the period to assess the possibility of the merged company to undertake a successful IPO.

- On behalf of pension plan participants, Dr. Villadsen used an event study estimated the stock price drop of a company that had engaged in accounting fraud. Her testimony conducted an event study to assess the impact of news regarding the accounting misstatements.

- In connection with a FINRA arbitration matter, Dr. Villadsen estimated the value of a portfolio of warrants and options in the energy sector and provided support to counsel on finance and accounting issues.

- She assisted in the estimation of net worth of individual segments for firms in the consumer product industry. Further, she built a model to analyze the segment's vulnerability to additional fixed costs and its risk of bankruptcy.

- Dr. Villadsen was part of a team estimating the damages that may have been caused by a flawed assumption in the determination of the fair value of mortgage related instruments. She provided litigation support to the testifying expert and attorneys.

- For an electric utility, Dr. Villadsen estimated the loss in firm value from the breach of a power purchase contract during the height of the Western electric power crisis. As part of the assignment, Dr. Villadsen evaluated the creditworthiness of the utility before and after the breach of contract.

- Dr. Villadsen modeled the cash flows of several companies with and without specific power contract to estimate the impact on cash flow and ultimately the creditworthiness and value of the utilities in question.

PUBLICATIONS AND REPORTS

"Report on Gas LDC multiples," with Michael J. Vilbert, *Alaska Industrial Development and Export Authority*, May 2015.

"Aurizon Network 2014 Draft Access Undertaking: Comments on Aspects of the WACC," prepared for Aurizon Network and submitted to the *Queensland Competition Authority*, December 2014

"Brattle Review of AE Planning Methods and Austin Task Force Report." (with Frank C. Graves) September 24, 2014.

Report on "Cost of Capital for Telecom Italia's Regulated Business" with Stewart C. Myers and Francesco Lo Passo before the *Communications Regulatory Authority of Italy* ("AGCOM"), March 2014. *Submitted in Italian.*

"Alternative Regulation and Ratemaking Approaches for Water Companies: Supporting the Capital Investment Needs of the 21st Century," (with J. Wharton and H. Bishop), prepared for the *National Association of Water Companies*, October 2013.

"Estimating the Cost of Debt," (with T. Brown), prepared for the Dampier Bunbury Pipeline and filed with the *Economic Regulation Authority*, Western Australia, March 2013.

"Estimating the Cost of Equity for Regulated Companies," (with P.R. Carpenter, M.J. Vilbert, T. Brown, and P. Kumar), prepared for the Australian Pipeline Industry Association and filed with the *Australian Energy Regulator* and the *Economic Regulation Authority*, Western Australia, February 2013.

"Calculating the Equity Risk Premium and the Risk Free Rate," (with Dan Harris and Francesco LoPasso), prepared for *NMa and Opta, the Netherlands*, November 2012.

"Shale Gas and Pipeline Risk: Earnings Erosion in a More Competitive World," (with Paul R. Carpenter, A. Lawrence Kolbe, and Steven H. Levine), *Public Utilities Fortnightly*, April 2012.

"Survey of Cost of Capital Practices in Canada," (with Michael J. Vilbert and Toby Brown), prepared for *British Columbia Utilities Commission*, May 2012.

"Public Sector Discount Rates" (with rank Graves, Bin Zhou), *Brattle* white paper, September 2011

"FASB Accounting Rules and Implications for Natural Gas Purchase Agreements," (with Fiona Wang), *American Clean Skies Foundation*, February 2011.

"IFRS and You: How the New Standards Affect Utility Balance Sheets," (with Amit Koshal and Wyatt Toolson), *Public Utilities Fortnightly*, December 2010.

"Corporate Pension Plans: New Developments and Litigation," (with George Oldfield and Urvashi Malhotra), Finance Newsletter, Issue 01, *The Brattle Group*, November 2010.

"Review of Regulatory Cost of Capital Methodologies," (with Michael J. Vilbert and Matthew Aharonian), *Canadian Transportation Agency*, September 2010.

"Building Sustainable Efficiency Businesses: Evaluating Business Models," (with Joe Wharton and Peter Fox-Penner), *Edison Electric Institute*, August 2008.

"Understanding Debt Imputation Issues," (with Michael J. Vilbert and Joe Wharton and *The Brattle Group* listed as an author), *Edison Electric Institute*, June 2008.

"Measuring Return on Equity Correctly: Why current estimation models set allowed ROE too low," *Public Utilities Fortnightly*, August 2005 (with A. Lawrence Kolbe and Michael J. Vilbert).

"The Effect of Debt on the Cost of Equity in a Regulatory Setting," (with A. Lawrence Kolbe and Michael J. Vilbert, and with "*The Brattle Group*" listed as author), *Edison Electric Institute*, April 2005.

"Communication and Delegation in Collusive Agencies," *Journal of Accounting and Economics*, Vol. 19, 1995.

"Beta Distributed Market Shares in a Spatial Model with an Application to the Market for Audit Services" (with M. Hviid), *Review of Industrial Organization*, Vol. 10, 1995.

SELECTED PRESENTATIONS

"Capital Structure and Liability Management," *American Gas Association and Edison Electric Institute Public Utility Accounting Course*, August 2015, 2014.

"Current Issues in Cost of Capital," *Edison Electric Institute Advanced Rate School*, July 2015, 2014 and 2013.

"Alternative Regulation and Rate Making Approaches for Water Companies," *Society of Depreciation Professionals Annual Conference*, September 2014.

"Capital Investments and Alternative Regulation," *National Association of Water Companies Annual Policy Forum*, December 2013.

"Accounting for Power Plant," *SNL's Inside Utility Accounting Seminar*, Charlotte, NC, October 2012.

"GAAP / IFRS Convergence," *SNL's Inside Utility Accounting Seminar*, Charlotte, NC, October 2012.

"International Innovations in Rate of Return Determination," *Society of Utility Financial and Regulatory Analysts' Financial Forum*, April 2012.

"Utility Accounting and Financial Analysis: The Impact of Regulatory Initiatives on Accounting and Credit Metrics," 1.5 day seminar, EUCI, Atlanta, May 2012.

"Cost of Capital Working Group Eforum," *Edison Electric Institute webinar*, April 2012.

"Issues Facing the Global Water Utility Industry" Presented to Sensus' Executive Retreat, Raleigh, NC, July 2010.

"Regulatory Issues from GAAP to IFRS," NASUCA *2009 Annual Meeting*, Chicago, November 2009.

"Subprime Mortgage-Related Litigation: What to Look for and Where to Look," *Law Seminars International: Damages in Securities Litigation*, Boston, May 2008.

"Evaluating Alternative Business / Inventive Models," (with Joe Wharton). *EEI Workshop, Making a Business of Energy Efficiency: Sustainable Business Models for Utilities*, Washington DC, December 2007.

"Deferred Income Taxes and IRS's NOPR: Who should benefit?" *NASUCA Annual Meeting*, Anaheim, CA, November 2007.

"Discussion of 'Are Performance Measures Other Than Price Important to CEO Incentives?'" *Annual Meeting of the American Accounting Association*, 2000.

"Contracting and Income Smoothing in an Infinite Agency Model: A Computational Approach," (with R.T. Boylan) *Business and Management Assurance Services Conference*, Austin 2000.

TESTIMONY

Written evidence regarding the cost of equity and capital structure for Alberta-based utilities, the Alberta Utilities Commission, Proceeding No. 20622 on behalf of AltaGas Utilities Inc., ENMAX Power Corporation, FortisAlberta Inc., and The ATCO Utilities, February 2016.

Verified Statement, Verified Reply Statement, and Hearing Appearance regarding the cost of capital methodology to be applied to freight railroads, the *Surface Transportation Board* on behalf of the Association of American Railroads, Docket No. EP 664 (Sub-No. 2), July 2015, September and November 2014.

Direct Testimony on cost of capital submitted to the Oregon Public Utility Commission on behalf of Portland General Electric, Docket No. UE 294, February 2015.

Supplemental Direct Testimony and Reply Testimony on cost of capital submitted to the *Regulatory Commission of Alaska* on behalf of Anchorage Water and Wastewater utilities, Docket U-13-202, September 2014, March 2015.

Expert Report and hearing appearance on specific accrual and cash flow items in a Sales and Purchase Agreement in international arbitration before the *International Chamber of Commerce*. Case No. 19651/TO, July and November 2014.

Rebuttal Testimony regarding Cost of Capital before the *Oregon Public Utility Commission* on behalf of Portland General Electric, Docket No. UE 283, July 2014.

Direct Testimony on the rate impact of the pension re-allocation and other items for Upper Peninsula Power Company in connection with the acquisition by BBIP before the *Michigan Public Service Commission* in Docket No. U-17564, March 2014.

Expert Report on cost of equity, non-recovery of operating cost and asset retirement obligations on behalf of oil pipeline in arbitration, April 2013.

Direct Testimony on the treatment of goodwill before the *Federal Energy Regulatory Commission* on behalf of ITC Holdings Corp and ITC Midwest, LLC in Docket No. PA10-13-000, February 2012.

Direct and Rebuttal Testimony on cost of capital before the *Public Utilities Commission of the State of California* on behalf of California-American Water in Application No. 11-05, May 2011.

Direct Testimony, Rebuttal Testimony, and Hearing Appearance on cost of capital before the *New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Case No. 11-00196-UT, May 2011, November 2011, and December 2011.

Direct Testimony on regulatory assets and FERC accounting before the *Federal Energy Regulatory Commission* on behalf of AWC Companies, ER11-13-000/Eli-1-3-000, December 2010.

Expert Report and deposition in Civil Action No. 02-618 (GK/JMF) in the *United States District Court for the District of Columbia*, November 2010, January 2011.

Direct Testimony, Rebuttal Testimony, and Rejoinder Testimony on the cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-10-0448, November 2010, July 2011, and August 2011.

Direct Testimony on the cost of capital before *the New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Docket No. 09-00156-UT, August 2009.

Direct and Rebuttal Testimony and Hearing Appearance on the cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-09-0343, July 2009, March 2010 and April 2010.

Rebuttal Expert Report, Deposition and Oral Testimony re. the impact of alternative discount rate assumptions in tax litigation. *United States Court of Federal Claims*, Case No. 06-628 T, January, February, April 2009. (*Confidential*)

Direct Testimony, Rebuttal Testimony and Hearing Appearance on cost of capital before the *New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Docket No. 08-00134-UT, June 2008 and January 2009.

Direct Testimony on cost of capital and carrying charge on damages, U.S. Department of Energy, *Bonneville Power Administration*, BPA Docket No. WP-07, March 2008.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-08-0227, April 2008, February 2009, March 2009.

Expert Report, Supplemental Expert Report, and Hearing Appearance on the allocation of corporate overhead and damages from lost profit. *The International Centre for the Settlement of Investment Disputes*, Case No. ARB/03/29, February, April, and June 2008 (*Confidential*).

Expert Report on accounting information needed to assess income. *United States District Court* for the District of Maryland (Baltimore Division), Civil No. 1:06cv02046-JFM, June 2007 (*Confidential*)

Expert Report, Rebuttal Expert Report, and Hearing Appearance regarding investing activities, impairment of assets, leases, shareholder' equity under U.S. GAAP and valuation. *International Chamber of Commerce* (ICC), Case No. 14144/CCO, May 2007, August 2007, September 2007. (Joint with Carlos Lapuerta, *Confidential*)

Direct Testimony, Rebuttal Testimony, and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0491, July 2006, July 2007.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony, Supplemental Rejoinder Testimony and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0403, June 2006, April 2007, May 2007.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony, and Hearing Appearance on cost of capital before *the Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0014, January 2006, October 2006, November 2006.

Expert report, rebuttal expert report, and deposition on behalf of a major oil company regarding the equity method of accounting and classification of debt and equity, *American Arbitration Association*, August 2004 and November 2004. (*Confidential*).

Appendix B: Technical Appendix

I. Sample Selection

To identify publicly traded companies that engaged in electric utility operations, I rely on industry classifications provided by the *Value Line Investment Survey Plus Edition. Value Line* identifies 47 companies as electric utility companies.

To include a company, I require that over a five year study period and up to the date of the analysis, the sample companies have investment grade credit ratings, a high percentage of regulated assets (greater than 50 percent),[1] no dividend cuts, and no substantial mergers and acquisitions or other activity that could cause the growth rates or beta estimates to be biased. I also require that each of the sample companies has more than $300 million in reported revenue over the last four quarters of available financial data, since very small (in terms of market capitalization) publicly traded companies have been shown to have a higher cost of equity. Finally, I require that data from S&P or Moody's, Value Line, and Bloomberg — each widely known and utilized by investors — be available for all sample companies. These screens result in a sample of 27 companies of which two (Consolidated Edison and Centerpoint) own no or minimal generation. I further consider a subsample of companies, whose nuclear generation mix is of a magnitude that is within +/- 10% of that of APS and therefore constitute 17-37% of the sample company's total generation capacity.

II. CAPM and ECAPM

A. The Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) is a theoretical model stating that the collective investment decisions of investors in capital markets will result in equilibrium prices for all risky assets such that the returns investors expect to receive on their investments are commensurate with the risk of those assets relative to the market as a whole. The CAPM posits a risk-return relationship known as the Security Market Line (see Figure 1 in my Written Evidence), in which the required expected return on an asset is proportional to that asset's risk relative to the market

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[1] I use the Edison Electric Institute's classification of electric utilities as Regulated (greater than 80 percent of total assets are regulated), Mostly Regulated (50 to 80 percent of total assets are regulated) or Diversified (less than 50% of total assets are regulated). My sample includes only electric utilities classified by EEI as Regulated or Mostly Regulated.

as measured by its "beta". More precisely, the CAPM states that the cost of capital for an investment *S* (e.g., a particular common stock), is given by the following equation:

$$r_s = r_f + \beta_s \times MRP \quad (1)$$

where r_S is the required return on investment S;
r_f is the risk-free interest rate;
β_S is the beta risk measure for the investment S; and
MRP is the market equity risk premium.

The CAPM is based on portfolio theory, and recognizes two fundamental principles of finance: (1) investors seek to minimize the possible variance of their returns for a given level of expected returns (or alternatively, they demand higher *expected* returns when there is greater uncertainty about those returns), and (2) investors can reduce the variability of their returns by diversifying—constructing portfolios of many assets that do not all go up or down at the same time or to the same degree. Under the assumptions of the CAPM, the market participants will construct portfolios of risky investments that minimize risk for a given return so that the aggregate holdings of all investors represent the "market portfolio". The risk-return trade-off faced by investors then concerns their exposure to the risk inherent in the market portfolio, as they weight their investment capital between the portfolio of risky assets and the risk-free asset.

Because of the effects of diversification, the relevant measure of risk for an individual security is its *contribution* to the risk of the market portfolio. Therefore, beta (β) is defined to capture the sensitivity of the security's returns to the market's returns. Formally,

$$\beta_s = \frac{covariance(r_s, R_m)}{variance(R_m)} \quad (2)$$

where R_m is the return on the market portfolio.

Beta is usually calculated by statistically comparing (using regression analysis) the excess (positive or negative) of the return on the individual security over the government bond rate with the excess of the return on a market index such as the S&P 500 over a government bond rate.

The basic idea behind beta is the risk that cannot be diversified away in large portfolios is what matters to investors. Beta is a measure of the risks that *cannot* be eliminated by diversification. It is this non-diversifiable risk, or "systematic risk", for which investors require compensation in the form of higher expected returns. By definition, a stock with a beta equal to 1.0 has average non-diversifiable risk; its returns vary to the same degree as those on the market as a whole.

According to the CAPM, the required return demanded by investors (i.e., the cost of equity) for investing in that stock will match the expected return on the market as a whole. Similarly, stocks with betas above 1.0 have more than average risk, and so have a cost of equity greater than the expected market return; those with betas below 1.0 have less than average risk, and are expected to earn lower than market levels of return.

B. INPUTS TO THE CAPM

1. The Risk-free Interest Rate

The precise meaning of a "risk-free" asset according to the finance theory underlying the CAPM is an investment whose return is guaranteed, with no possibility that it will vary around its expected value in response to the movements of the broader market. (Equivalently, the CAPM beta of a risk-free asset is zero.) In developed economies like the U.S., government debt are generally considered have no default risk. In this sense they are "risk-free"; however, unless they are held to maturity, the rate of return on government bonds may in fact vary around their stated or expected yields.[2]

The theoretical CAPM is a single period model, meaning that it posits a relationship between risk and return over a single "holding period" of an investment. Because investors can rebalance their portfolios over short horizons, many academic studies and practical applications of the CAPM use the short-term government bond as the measure of the risk-free rate of return. However, regulators frequently use a version based on a measure of the long-term risk-free rate; e.g., a long-term government bond. In accordance with the established practice, I rely on the 20-year Treasury bond as a measure of the risk-free asset in this proceeding. I use the term "risk-free rate" as describing the yield on the 20-year Treasury bond.

However, I do not believe the *current* yield on long-term Treasury bonds is a good estimate for the risk-free rate that will prevail over the time period relevant to this proceeding as currently prevailing bond yields are near historic lows for a variety of circumstances that should not be expected to persist for the reasons discussed in my direct testimony. For this reason I rely on Blue Chip's forecast of 3.4% for the yield on a 10-year Treasury bond for Q1 2017.[3] I adjust this value upward by 53 basis points, which is my estimate of the maturity premium for the 20-year

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[2] This is due to interest rate fluctuations that can change the market value of previously issued debt in relation to the yield on new issuances

[3] Blue Chip Economic Indicators, January 10, 2016.

over the 10-year Treasury Bond.[4] This gives me a base input of 3.93% for the risk-free rate of interest before considering any downward pressure on government bond yields.

Additionally, it is important to recognize the implications of the elevated level of spread between yields on utility bonds and Treasury bonds of the same horizon. Figure A-1 below shows that this yield spread is about 90 basis points higher now than it was on average prior to the 2008 financial crisis. One way to account for this observation is if the prevailing and near-term expected government bond yields are artificially depressed relative to longer-term market expectations. Therefore, I consider a scenario with the risk-free rate (conservatively) 80 basis points higher at 4.73% when performing my CAPM-based analyses.

Figure A-1

Spreads between U.S. Utility Bond (20 year maturity) and U.S. Government Bond (20 year maturity) - %

Periods	A-Rated Utility and Treasury	BBB-Rated Utility and Treasury	Notes
Period 1 - Average Apr-1991 - 2007	0.93	1.23	[1]
Period 2 - Average Aug-2008 - Feb-2016	1.54	2.00	[2]
Period 3 - Average Feb-2016	1.83	2.59	[3]
Period 4 - Average 15-Day (Mar 02, 2016 to Feb 10, 2016)	1.85	2.56	[4]
Spread Increase between Period 2 and Period 1	0.60	0.77	[5] = [2] - [1]
Spread Increase between Period 3 and Period 1	0.90	1.36	[6] = [3] - [1]
Spread Increase between Period 4 and Period 1	**0.92**	**1.33**	[7] = [4] - [1]

Sources and Notes:
Spreads for the periods are calculated from Bloomberg's yield data.
Average monthly yields for the indices were retrieved from Bloomberg as of March 2, 2016.

2. The Market Equity Risk Premium

a. Historical Average Market Risk Premium

Like the cost of capital itself, the market risk premium is a forward-looking concept. It is by definition the premium above the risk-free interest rate that investors can *expect* to earn by investing in a value-weighted portfolio of all risky investments in the market. The premium is not directly observable, and must be inferred or forecasted based on known market information.

[4] This maturity premium is estimated by comparing the average excess yield on 20-year versus 10-year Treasury Bonds over the period 1990 - 2015, using data from Bloomberg. See BV Workpaper 1.

One commonly use method for estimating the MRP is to measure the historical average premium of market returns over the income returns on risk-free government bonds over some long historical period. *Duff and Phelps* performs such a calculation of the MRP using the traditional Ibbotson data. The arithmetic average of annual observed market equity risk premiums from 1926 to the present is 7.0%.[5]

b. Forward Looking Market Equity Risk Premium

An alternative approach to estimating the MRP eschews historical averages in favor of using current market information and forecasts to infer the expected return on the market as a whole, which can then be compared to prevailing government bond yields to estimate the equity risk premium. Bloomberg performs such estimates of country-specific MRPs by implementing the DCF model on the market as a whole—using forecast market-wide dividend yields and current level on market indexes; for the U.S. Bloomberg uses the S&P500 to infer the expected market return.

The forward-looking market-implied MRP is elevated relative to the historical MRS and currently stands at 8.47%. The Bloomberg MRP measure is over a 10-year government bond, so converting that to the forecasted MRP over a 20-year government bond results in about 8%.[6]

c. Yield Spread Adjustments to the Market Equity Risk Premium

Figure A-1 above shows that the yield spreads for A and BBB rated utility debt over Treasury bonds have increased by approximately 90 bps and 130 bps for 20-year maturities relative to its long-term average leading up to the 2008 financial crisis. This means that investors require a higher return on investment grade utility debt relative to the return on t bonds than they did before the crisis and ensuing economic turmoil.

This information can be used to provide a quantitative benchmark for the implied increase in MRP based on a paper by Edwin J. Elton, et al., which documents that the yield spread on corporate bonds is normally a combination of a default premium, a tax premium, and a systematic risk premium.[7] Of these components, it is the systematic risk premium that likely

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5 Duff & Phelps, "2015 Valuation Handbook: Guide to Cost of Capital," p. 3-24.

6 Estimates of the MRP over a 20-year bond is obtained by subtracting the maturity premium of the 20-year over the 10-year government bond from the figure reported by Bloomberg. This maturity premium is about 50 basis points in the U.S.

7 "Explaining the Rate Spread on Corporate Bonds," Edwin J. Elton, Martin J. Gruber, Deepak Agarwal, and Christopher Mann, *The Journal of Finance*, February 2001, pp. 247-277.

explains the vast majority of the yield spread increase. In other words, unless the risk-free rate is underestimated as described above, the market equity risk premium has increased relative to its "normal" level.[8] Therefore, I consider a scenario allocating the majority of the 90 bps increase in A-rated utility spreads to an increase in the MRP (which drives the increase in systematic risk premium on A rated debt). As a conservative measure I allocate 80 bps as the downward bias in the current 20-year Treasury bond yield.

Assuming a beta of 0.25 for A rated debt[9] means that an increase in the MRP of one percentage point translates into a ¼ percentage point increase in the risk premium on A rated debt (i.e., 0.25 (beta) times 1 percentage point (increase in MRP) = ¼ percentage point increase in yield spread). Thus, an 80 bps increase in the yield spread is therefore consistent with a 3.2 percentage point increase in the MRP ($\frac{0.80\%}{0.25} = 3.2\%$). I consider this evidence as confirmation that the current MRP could be much higher than the historical MRP of 7%, but use conservatively 8% based on the recent Bloomberg forecast.

C. THE EMPIRICAL CAPM

1. Description of the ECAPM

Empirical research has shown that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premiums than predicted by the CAPM and high-beta stocks tend to have lower risk premiums than predicted. A number of variations on the original CAPM theory have been proposed to explain this finding, but the observation itself can also be used to estimate the cost of capital directly, using beta to measure relative risk by making a direct empirical adjustment to the CAPM.

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[8] In theory, some of the increase in yield spread for A rated debt may be due to an increase in default risk, but the increase in default risk for A rated debt is undoubtedly very small because utilities with A range rated debt have a low default risk. This means that the vast majority—if not all—of the increase in A rated yield spreads is due to a combination of the increased systematic risk premium and the downward pressure on the yields of government debt. Although there is no increase in the tax premium discussed in the Elton et al. paper due to coupon payments, there may be some increase due to a small tax effect resulting from the probability of increased capital gains taxes when the debt matures.

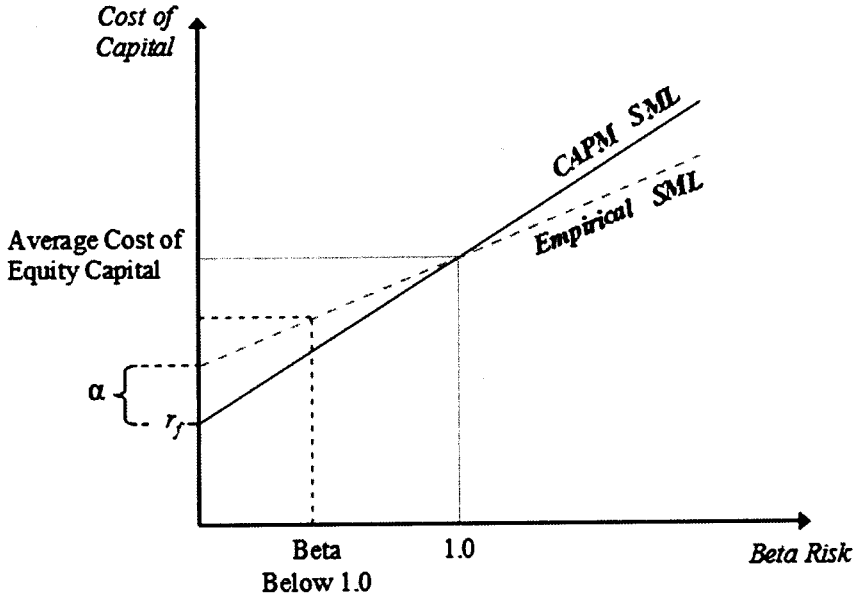
[9] Elton, *et al.* estimates the average beta on BBB-rated corporate debt as 0.26 over the period of their study, and A-rated debt will have a slightly lower beta than BBB-rated debt. I note that 0.25 is a conservatively high estimate of the beta on A-rated utility debt. Most academic estimates, including those presented in *Berk & Demarzo* that I utilize for my Hamada adjustments are significantly lower: in the range of 0.0 – 0.1 percent and would result in a substantially higher MRP estimate.

The Empirical CAPM (ECAPM) makes use of these empirical findings. It estimates the cost of capital with the equation,

$$r_S = r_f + \alpha + \beta_S \times (MRP - \alpha) \quad (3)$$

where α is the "alpha" adjustment of the risk-return line, a constant, and the other symbols are defined as for the CAPM (see Equation (1)). The alpha adjustment has the effect of increasing the intercept but reducing the slope of the Security Market Line, which results in a Security Market Line that more closely matches the results of empirical tests. In other words, the ECAPM produces more accurate predictions of eventual realized risk premiums than does the CAPM.

Figure A-2
The Empirical Security Market Line



2. Academic Evidence on the Alpha Term in the ECAPM

Figure A-3 below summarizes the empirical results of tests of the CAPM, including their estimates of the "alpha" parameter necessary to improve the accuracy of the CAPM's predictions of realized returns.

Figure A-3

EMPIRICAL EVIDENCE ON THE ALPHA FACTOR IN ECAPM*

AUTHOR	RANGE OF ALPHA	PERIOD RELIED UPON
Black (1993)[1]	1% for betas 0 to 0.80	1931-1991
Black, Jensen and Scholes (1972)[2]	4.31%	1931-1965
Fama and McBeth (1972)	5.76%	1935-1968
Fama and French (1992)[3]	7.32%	1941-1990
Fama and French (2004)[4]	N/A	
Litzenberger and Ramaswamy (1979)[5]	5.32%	1936-1977
Litzenberger, Ramaswamy and Sosin (1980)	1.63% to 3.91%	1926-1978
Pettengill, Sundaram and Mathur (1995)[6]	4.6%	1936-1990

*The figures reported in this table are for the longest estimation period available and, when applicable, use the authors' recommended estimation technique. Many of the articles cited also estimate alpha for sub-periods and those alphas may vary.

[1]Black estimates alpha in a one step procedure rather than in an un-biased two-step procedure.
[2]Estimate a negative alpha for the subperiod 1931-39 which contain the depression years 1931-33 and 1937-39.
[3]Calculated using Ibbotson's data for the 30-day treasury yield.
[4]The article does not provide a specific estimate of alpha; however, it supports the general finding that the CAPM underestimates returns for low-beta stocks and overestimates returns for high-beta stocks.
[5]Relies on Lizenberger and Ramaswamy's before-tax estimation results. Comparable after-tax alpha estimate is 4.4%.
[6]Pettengill, Sundaram and Mathur rely on total returns for the period 1936 through 1990 and use 90-day treasuries. The 4.6% figure is calculated using auction averages 90-day treasuries back to 1941 as no other series were found this far back.

Sources:
Black, Fischer. 1993. Beta and Return. *The Journal of Portfolio Management* 20 (Fall): 8-18.
Black, F., Michael C. Jensen, and Myron Scholes. 1972. The Capital Asset Pricing Model: Some Empirical Tests, from Studies in the theory of Capital Markets. In *Studies in the Theory of Capital Markets*, edited by Michael C. Jensen, 79-121. New York: Praeger.
Fama, Eugene F. and James D. MacBeth. 1972. Risk, Returns and Equilibrium: Empirical Tests. *Journal of Political Economy* 81 (3): 607-636.
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Fama, Eugene F. and Kenneth R. French. 2004. The Capital Asset Pricing Model: Theory and Evidence. *Journal of Economic Perspectives* 18 (3): 25-46.
Litzenberger, Robert H. and Krishna Ramaswamy. 1979. The Effect of Personal Taxes and Dividends on Capital Asset Prices, Theory and Empirical Evidence. *Journal of Financial Economics* XX (June): 163-195.
Litzenberger, Robert H. and Krishna Ramaswamy and Howard Sosin. 1980. On the CAPM Approach to Estimation of a Public Utility's Cost of Equity Capital. *The Journal of Finance* 35 (2): 369-387.

III. DCF Models

A. DCF Estimation of Cost of Equity

The DCF method for estimating the cost of equity capital assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow stream:

$$P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \cdots + \frac{D_T}{(1+r)^T} \quad (4)$$

where P_0 is the current market price of the stock; D_t is the dividend cash flow expected at the end of period t; r is the cost of equity capital; and T is the last period in which a dividend cash flow is to be received. The formula simply says that the stock price is equal to the sum of the expected future dividends, each discounted for the time and risk between now and the time the dividend is expected to be received. Since the current market price is known, it is possible to infer the cost of equity that corresponds to that price and a forecasted pattern of expected future dividends. In terms of Equation (4, if P_0 is known and $D_1, D_2, \ldots D_T$ are estimated, an analyst can "solve for" the cost of equity capital r.

B. Details of the DCF Model

Perhaps the most widely known and used application of the DCF method assumes that the expected rate of dividend growth remains constant forever. In the so-called Gordon Growth Model, the relationship expressed in Equation (4) is such that the present value equation can be rearranged algebraically into a formula for estimating the cost of equity. Specifically, if investors expect a dividend stream that will grow forever at a steady rate, then the market price of the stock will be given by

$$P_0 = \frac{D_1}{r-g} \quad (5)$$

where D_1 is the dividend expected at the end of the first period, g is the perpetual growth rate, and P_0 and r are the market price and the cost of capital, as before. Equation (5) is a simplified version of Equation (4) that can be solved algebraically to yield the well-known "DCF formula" for the cost of equity capital,

$$r = \frac{D_1}{P_0} + g = \frac{D_0 \times (1+g)}{P_0} + g \qquad (6)$$

There are other versions of the DCF model that relax this restrictive assumption and posit a more complex or nuanced pattern of expected future dividend payments. For example, if there is reason to believe that investors do *not* expect a company's dividends to grow at a steady rate forever, but rather have different growth rate expectations in the near term (e.g., over the next five or ten years), compared to the distant future (e.g., a period *starting* ten years from the present moment), a "multi-stage" growth pattern can be modeled in the present value formula (Equation (4)). I do not consider this model in this proceeding.

1. Dividends, Cash Flows, and Share Repurchases

In addition to the DCF model described above, there are many alternative formulations. Notable among these are versions of the model that use cash flows rather than dividends in the present value formula (Equation (4)).[10]

Because investors are interested in cash flow, it is technically important to capture *all* cash flows that are distributed to shareholders when estimating the cost of equity using the DCF method. In some circumstances, investors may expect to receive cash in forms other than dividends. An important example concerns the fact that many companies distribute cash to shareholders through share buybacks in addition to dividends. To the extent such repurchases are expected by investors, but not captured in the forecasted pattern of future dividends; a dividend-based implementation of the DCF model will underestimate the cost of equity.

Similarly, if investors have reason to suspect that a company's dividend payments will not reflect a full distribution of its available cash free cash flows in the period they were generated, it may be appropriate replace the forecasted dividends with estimated free cash flows to equity in the present value formula (Equation (4)). Focusing on *available* cash rather than that actually distributed in the form of dividends can help account for instances when near-term investing and financing activities (e.g., capital expenditures or asset sales, debt issuances or retirements, or share repurchases) may cause dividend growth patterns to diverge from growth in earnings.

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[10] For an example in a regulatory context, the U.S. Surface Transportation Board uses a cash flow based model with three stages to estimate the cost of equity for the railroads. See Surface Transportation Board Decision, "STB Ex Parte No. 664 (Sub-No. 1)," Decided January 23, 2009.

Many utility companies such as those included in my samples have long histories of paying a dividend. In fact, as mentioned in Section I of this Appendix, one of my requirements for inclusion in my samples is that a company pays dividends for 5-years without a gap or a dividend cut (on per share basis). Additionally, although some electric utility companies have recently engaged in share repurchase programs, the companies in my samples do not distribute substantial cash flows by means other than dividends.[11]

C. DCF Model Inputs

1. Dividends and Prices

As described above, DCF models are forward-looking, comparing the *current* price of a stock to its expected *future* dividends to estimate the required expected return demanded by the market for that stock (i.e., the cost of equity). Therefore, the models demand the current market price and currently prevailing forecasts of future dividends as inputs.

The stock price input I employ for each sample company is the average of the closing stock prices for the 15 trading days ending on the date of my analysis. This guards against biases that may arise on a single trading day, yet is consistent with using current stock prices.

2. Company Specific Growth Rates

a. Analysts' Forecasted Growth Rates

Finding the right growth rate(s) is usually the "hard part" of applying the DCF model, which is sometimes criticized due to what has been called "optimism bias" in the earnings growth rate forecasts of security analysts. Optimism bias is related to the observed tendency for analysts to forecast earnings growth rates that are higher than are actually achieved. This tendency to overestimate growth rates is perhaps related to incentives faced by analysts that provide rewards not strictly based upon the accuracy of the forecasts. To the extent optimism bias is present in the analysts' earnings forecasts the cost of capital estimates from the DCF model would be too high.

While academic researchers during the 1990s as well as in early 2000s found evidence of analysts' optimism bias, there is some evidence that regulatory reforms have eliminated the

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[11] While a number of companies in my samples have or have had share repurchase programs (e.g., El Paso), the magnitude tends to be relatively small, so that an inclusion of the cash flow from repurchases would likely have a minimal impact on the average results for the samples. However, it is clear that not including such repurchases downwardly biases the estimated cost of equity.

issue. A recent paper by Hovakimina and Saenyasiri (2010) found that recent efforts to curb analysts' incentive to provide optimistic forecasts have worked, so that "the median forecast bias essentially disappeared."[12] Thus, some recent research indicates that the analyst bias may be a problem of the past.

The findings of several academic studies[13] show that analyst earnings forecasts turn out to be too optimistic for stocks that are more difficult to value, for instance, stocks of smaller firms, firms with high volatility or turnover, younger firms, or firms whose prospects are uncertain. Coincidentally, stocks with greater analyst disagreement have higher analyst optimism bias—all of these describe companies that are more volatile and/or less transparent—none of which is applicable to the majority of utility companies with wide analyst coverage and information transparency.

b. Sources for Forecasted Growth Rates

For the reasons described above, I rely on analyst forecasts of earnings growth for the company-specific growth rate inputs to my implementations of the single- and multi-stage DCF models. All of the companies in my samples have coverage from equity analysts reporting to Thomson Reuters IBES, so I use the consensus 3-5 year EPS growth rate provided by that service. For the U.S. based samples, I supplement these consensus values with growth rates based on EPS estimates from *Value Line*.[14]

IV. Financial Risk and the Cost of Equity

A common issue in regulatory proceedings is how to apply data from a benchmark set of comparable securities when estimating a fair return on equity for the target/regulated company.[15]

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[12] A. Hovakimian and E. Saenyasiri, "Conflicts of Interest and Analyst Behavior: Evidence from Recent Changes in Regulation," *Financial Analysts Journal*, vol. 66, 2010.

[13] These studies include the following: (i) Hribar, P, McInnis, J. "Investor Sentiment and Analysts' Earnings Forecast Errors," *Management Science* Vol. 58, No. 2 (February 2012): pp. 293-307; (ii) Scherbina, A. (2004), "Analyst Disagreement, Forecast Bias and Stock Returns," downloaded from Harvard Business School Working Knowledge: http://hbswk.hbs.edu/item/5418.html; and (iii) Michel, J-S., Pandes J.A. (2012), "Are Analysts Really Too Optimistic?" downloaded from http://www.efmaefm.org.

[14] Specifically, I compute the growth rate implied by *Value Line*'s current year EPS estimate and its projected 3-5 year EPS estimate. I then average this in with the IBES consensus estimate as an additional independent estimate, giving it a weight of 1 and weighting the IBES consensus according to the number of analysts who contributed estimates.

[15] This is also a common valuation problem in general business contexts.

It may be tempting to simply estimate the cost of equity capital for each of the sample companies (using one of the above approaches) and average them. After-all, the companies were chosen to be comparable in their business risk characteristics, so why would an investor necessarily prefer equity in one to the other (on average)?

The problem with this argument is that it ignores the fact that underlying asset risk (i.e., the risk inherent in the lines of business in which the firm invests its assets) for each company is typically divided between debt and equity holders. The firm's debt and equity are therefore financial derivatives of the underlying asset return, each offering a differently structured claim on the cash flows generated by those assets. Even though the risk of the underlying assets may be comparable, a different capital structure splits that risk differently between debt and equity holders. The relative structures of debt and equity claims are such that higher degrees of debt financing increase the variability of returns on equity, *even when the variability of asset returns remains constant.* As a consequence, otherwise identical firms with different capital structures will impose different levels of risk on their equity holders. Stated differently, increased leverage adds financial risk to a company's equity.[16]

A. THE EFFECT OF FINANCIAL LEVERAGE ON THE COST OF EQUITY

To develop an intuition for the manner in which financial leverage affects the risk of equity, it is helpful to consider a concrete example. Figure A-4 and Figure A-5 below demonstrate the impact of leverage on the risk and return for equity by comparing equity's risk when a company uses no debt to finance its assets, and when it uses a 50-50 capital structure (i.e., it finances 50 percent of its assets with equity, 50 percent with debt). For illustrative purposes, the figures assume that the cash flows will be either $5 or $15 and that these two possibilities have the same chance of occurring (e.g., the chance that either occurs is ½).

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[16] I refer to this effect in terms of *financial risk* because the additional risk to equity holders stems from how the company chooses to finance its assets. In this context financial risk is distinct from and independent of the *business risk* associated with the manner in which the firm deploys its cash flow generating assets. The impact of leverage on risk is conceptually no different than that faced by a homeowner who takes out a mortgage. The equity of a homeowner who finances his home with 90% debt is much riskier than the equity of one who only finances with 50% debt.

Figure A-4: All Equity Capital Structure

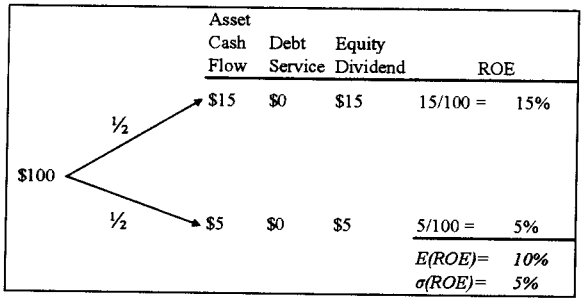
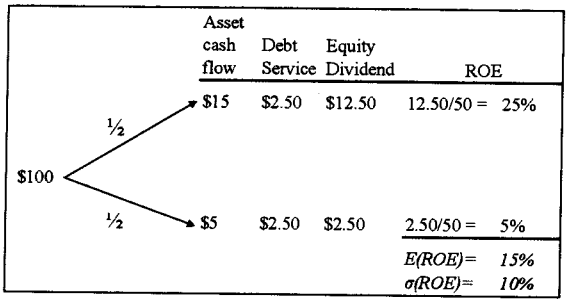


Figure A-5: 50/50 Capital Structure.



In the figures, E(ROE) indicates the mean return and σ(ROE) represents the variance. This simple example illustrates that the introduction of debt increases both the mean (expected) return to equity holders and the variance of that return, even though the firm's expected cash flows—which are a property of the line of business in which its assets are invested—are unaffected by the firm's financing choices. The "magic" of financial leverage is not magic at all—leveraged equity investors can only earn a higher return because they take on greater risk.

B. Methods to Account for Financial Risk

1. Cost of Equity Implied by the Overall Cost of Capital

If the companies in a sample are truly comparable in terms of the systematic risks of the underlying assets, then the overall cost of capital of each company should be about the same across companies (except for sampling error), so long as they do not use extreme leverage or no leverage. The intuition here is as follows. A firm's asset value (and return) is allocated between equity and debt holders.[17] The expected return to the underlying asset is therefore equal to the

[17] Other claimants can be added to the weighted average if they exist. For example, when a firm's capital structure contains preferred equity, the term $\frac{P}{V} \times r_p$ is added to the expression for the overall cost of capital shown in Equation (7), where P refers to the market value of preferred equity, r_p is the cost of preferred equity and $V = E + D + P$. In my analysis, I attribute the same implied yield to the cost of preferred equity as to the cost of debt.

value weighted average of the expected returns to equity and debt holders – which is the overall cost of capital (r^*), or the expected return on the assets of the firm as a whole.[18]

$$r^* = \frac{E}{V} \times r_E + \frac{D}{V} \times r_D(1 - \tau_c) \quad (7)$$

where r_D is the market cost of debt,
r_E is the market cost of equity,
τ_c is the corporate income tax rate,
D is the market value of the firm's debt,
E is the market value of the firm's equity, and
$V = E + D$ is the total market value of the firm.

Since the overall cost of capital is the cost of capital for the underlying asset risk, and this is comparable across companies, it is reasonable to believe that the overall cost of capital of the underlying companies should also be comparable, so long as capital structures do not involve unusual leverage ratios compared to other companies in the industry.[19]

The notion that the overall cost of capital is constant across a broad middle range of capital structures is based upon the Modigliani-Miller theorem that choice of financing does not affect the firm's value. Franco Modigliani and Merton Miller eventually won Nobel Prizes in part for their work on the effects of debt.[20] Their 1958 paper made what is in retrospect a very simple point: if there are no taxes and no risk to the use of excessive debt, use of debt will have no effect on a company's operating cash flows (i.e., the cash flows to investors as a group, debt and equity combined). If the operating cash flows are the same regardless of whether the company finances mostly with debt or mostly with equity, then the value of the firm cannot be affected at

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18 As this is on an after-tax basis, the cost of debt reflects the tax value of interest deductibility. Note that the precise formulation of the weighted average formula representing the required return on the firm's *assets* independent of financing (sometimes called the *unlevered* cost of capital) depends on specific assumptions made regarding the value of tax shields from tax-deductible corporate debt, the role of personal income tax, and the cost of financial distress. See Taggart, Robert A., "Consistent Valuation and Cost of Capital Expressions with Corporate and Personal Taxes," *Financial Management*, 1991; 20(3) for a detailed discussion of these assumptions and formulations. Equation (7) represents the overall cost of capital to the firm, which can be assumed to be constant across a relatively broad range of capital structures.

19 Empirically, companies within the same industry tend to have similar capital structures, while typical capital structures may vary between industries, so whether a leverage ratio is "unusual" depends upon the company's line of business.

20 Franco Modigliani and Merton H. Miller (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment," *American Economic Review*, 48, pp. 261-297.

all by the debt ratio. In cost of capital terms, this means the overall cost of capital is constant regardless of the debt ratio, too.

Obviously, the simple and elegant Modigliani-Miller theorem makes some counterfactual assumptions: no taxes and no cost of financial distress from excessive debt. However, subsequent research, including some by Modigliani and Miller,[21] showed that while taxes and costs to financial distress affect a firm's incentives when choosing its capital structure as well as its overall cost of capital,[22] the latter can still be shown to be constant across a broad range of capital structures.[23]

This reasoning suggests that one could compute the overall cost of capital for each of the sample companies and then average to produce an estimate of the overall cost of capital associated with the underlying asset risk. Assuming that the overall cost of capital is constant, one can then re-arrange the overall cost of capital formula to estimate what the implied cost of equity is at the target company's capital structure on a book value basis.[24]

2. Unlevering and Relevering Betas in the CAPM (Hamada Adjustment)

An alternative approach to account for the impact of financial risk is to examine the impact of leverage on beta. Notice that this means working within the CAPM framework as the methodology cannot be applied directly to the DCF models.

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21 Franco Modigliani and Merton H. Miller (1963), "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review*, 53, pp. 433-443.

22 When a company uses a high level of debt financing, for example, there is significant risk of bankruptcy and all the costs associated with it. The so called costs of financial distress that occurs when a company is over-leveraged can increase its cost of capital. In contrast a company can generally decrease its cost of capital by taking on reasonable levels of debt, owing in part to the deductibility of interest from corporate taxes.

23 This is a simplified treatment of what is generally a complex and on-going area of academic investigation. The roles of taxes, market imperfections and constraints, etc. are areas of on-going research and differing assumptions can yield subtly different formulations for how to formulate the weighted average cost of capital that is constant over all (or most) capital structures.

24 Market value capital structures are used in estimating the overall cost of capital for the sample companies.

Recognizing that under general conditions, the value of a firm can be decomposed into its value with and without a tax shield, I obtain:[25]

$$V = V_U + PV(ITS) \tag{8}$$

where $V = E + D$ is the total value of the firm as in Equation (7),
V_U is the "unlevered" value of the firm—its value if financed entirely by equity
$PV(ITS)$ represents the present value of the interest tax shields associated with debt

For a company with a fixed book-value capital structure and no additional costs to leverage, it can be shown that the formula above implies:

$$r_E = r_U + \frac{D}{E}(1 - \tau_c)(r_U - r_D) \tag{9}$$

where r_U is the "unlevered cost of capital"—the required return on assets if the firm's assets were financed with 100% equity and zero debt—and the other parameters are defined as in Equation (7).

Replacing each of these returns by their CAPM representation and simplifying them gives the following relationship between the "levered" equity beta β_L for a firm (i.e., the one observed in market data as a consequence of the firm's actual market value capital structure) and the "unlevered" beta β_U that would be measured for the same firm if it had no debt in its capital structure:

$$\beta_L = \beta_U + \frac{D}{E}(1 - \tau_c)(\beta_U - \beta_D) \tag{10}$$

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[25] This follows development in Fernandez (2003). Other standard papers in this area include Hamada (1972), Miles and Ezzell (1985), Harris and Pringle (1985), Fernandez (2006). (See Fernandez, P., "Levered and Unlevered Beta," IESE Business School Working Paper WP-488, University of Navarra, Jan 2003 (rev. May 2006); Hamada, R.S., "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stock," *Journal of Finance*, 27, May 1972, pp. 435-452; Miles, J.A. and J.R. Ezzell, "Reformulating Tax Shield Valuation: A Note," *Journal of Finance*, XL5, Dec 1985, pp. 1485-1492; Harris, R.S. and J.J. Pringle, "Risk-Adjusted Discount Rates Extensions form the Average-Risk Case," *Journal of Financial Research*, Fall 1985, pp. 237-244; Fernandez, P., "The Value of Tax Shields Depends Only on the Net Increases of Debt," IESE Business School Working Paper WP-613, University of Navarra, 2006.) Additional discussion can be found in Brealey, Myers, and Allen (2014).

where β_D is the beta on the firm's debt. The unlevered beta is assumed to be constant with respect to capital structure, reflecting as it does the systematic risk of the firm's assets. Since the beta on an investment grade firm's debt is much lower than the beta of its assets (i.e., $\beta_D < \beta_U$), this equation embodies the fact that increasing financial leverage (and thereby increasing the debt to equity ratio) increases the systematic risk of *levered* equity (β_L).

An alternative formulation derived by Harris and Pringle (1985) provides the following equation that holds when the market value capital structures (rather than book value) are assumed to be held constant:

$$\beta_L = \beta_U + \frac{D}{E}(\beta_U - \beta_D) \qquad (11)$$

Unlike Equation (10), Equation (11) does not include an adjustment for the corporate tax deduction. However, both equations account for the fact that increased financial leverage increases the systematic risk of equity that will be measured by its market beta. And both equations allow an analyst to adjust for differences in financial risk by translating back and forth between β_L and β_U. In principal, Equation (10) is more appropriate for use with regulated utilities, which are typically deemed to maintain a fixed book value capital structure. However, I employ both formulations when adjusting my CAPM estimates for financial risk, and consider the results as sensitivities in my analysis.

It is clear that the beta of debt needs to be determined as an input to either Equation (10), or Equation (11). Rather than estimating debt betas, I rely on the standard financial textbook of Professors Berk & DeMarzo, who report a debt beta of 0.05 for A rated debt and a beta of 0.10 for BBB rated debt.[26]

Once a decision on debt betas is made, the levered equity beta of each sample company can be computed (in this case by Value Line) from market data and then translated to an unlevered beta at the company's market value capital structure. The unlevered betas for the sample companies are comparable on an "apples to apples" basis, since they reflect the systematic risk inherent in the assets of the sample companies, independent of their financing. The unlevered betas are averaged to produce an estimate of the industry's unlevered beta. To estimate the cost of equity for the regulated target company, this estimate of unlevered beta can be "re-levered" to the

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[26] Berk, J. & DeMarzo, P., *Corporate Finance, 2nd Edition.* 2011 Prentice Hall, p. 389.

regulated company's capital structure, and CAPM reapplied with this levered beta, which reflects both the business and financial risk of the target company.

Hamada adjustment procedures—so-named for Professor Robert S. Hamada who contributed to their development[27]—are ubiquitous among finance practitioners when using the CAPM to estimate discount rates.

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[27] Hamada, R.S., "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stock", *The Journal of Finance*, 27(2), 1971, pp. 435-452.

	Net Income for Common Shareholders	End-of-Year Common Equity (x/NCI)	Return on EOY Equity	Allowed ROE	Under Earning
2002	199,343	2,159,312	9.2%	11.25%	$43,580
2003	180,937	2,203,630	8.2%	11.25%	$66,971
2004	199,627	2,232,402	8.9%	11.25%	$51,518
2005	170,479	2,985,225	5.7%	10.25%	$135,507
2006	269,730	3,207,473	8.4%	10.25%	$59,036
2007	283,940	3,351,441	8.5%	10.75%	$76,340
2008	262,344	3,339,150	7.9%	10.75%	$96,615
2009	251,225	3,445,355	7.3%	10.75%	$119,151
2010	335,663	3,824,953	8.8%	11.00%	$85,082
2011	336,250	3,943,007	8.5%	11.00%	$97,481
2012	395,497	4,093,000	9.7%	10.00%	$13,803
2013	424,969	4,308,884	9.9%	10.00%	$5,919
2014	421,220	4,478,243	9.4%	10.00%	$26,604
2015	450,274	4,663,057	9.7%	10.00%	$16,032
				Total	$893,637.94
				Average	$63,831.28

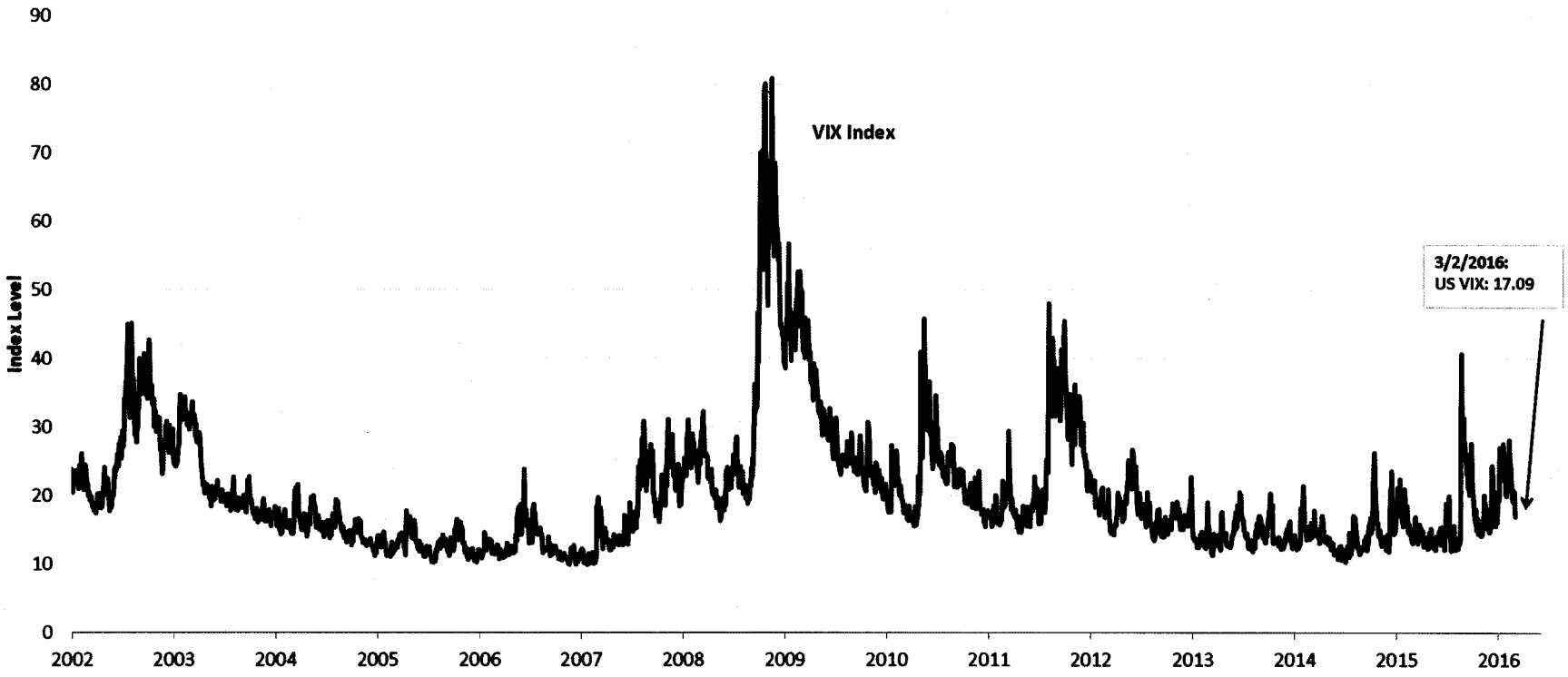
Spreads between U.S. Utility Bond (20 year maturity) and U.S. Government Bond (20 year maturity) - %

Periods	A-Rated Utility and Treasury	BBB-Rated Utility and Treasury	Notes
Period 1 - Average Apr-1991 - 2007	0.93	1.23	[1]
Period 2 - Average Aug-2008 - Feb-2016	1.54	2.00	[2]
Period 3 - Average Feb-2016	1.83	2.59	[3]
Period 4 - Average 15-Day (Mar 02, 2016 to Feb 10, 2016)	1.85	2.56	[4]
Spread Increase between Period 2 and Period 1	0.60	0.77	[5] = [2] - [1]
Spread Increase between Period 3 and Period 1	0.90	1.36	[6] = [3] - [1]
Spread Increase between Period 4 and Period 1	**0.92**	**1.33**	[7] = [4] - [1]

Sources and Notes:

Spreads for the periods are calculated from Bloomberg's yield data.

Average monthly yields for the indices were retrieved from Bloomberg as of March 2, 2016.



Source: Bloomberg.

Company Financials ($Millions)

Company	Integrated Electric Utility	Date of M&A Announcement	Overall Premium	Gross Acquisition Value ($M)
[1]		[2]	[3]	[4]
ITC Holdings Corp		2/9/2016	154%	$11,398
Empire District Electric Co/The	Yes	2/9/2016	97%	$2,399
Questar Corp		2/1/2016	146%	$6,110
Piedmont Natural Gas Co Inc		10/26/2015	138%	$6,854
TECO Energy Inc	Yes	9/4/2015	120%	$10,582
AGL Resources Inc		8/24/2015	93%	$12,801
Oncor Electric Delivery Co LLC		8/10/2015	NA	NA
Dominion Carolina Gas Transmission LLC (a)		4/1/2015	NA	$508
UIL Holdings Corp/Old		2/25/2015	95%	$4,863
New Hampshire Gas Corp		1/2/2015	NA	$3
Dominion Carolina Gas Transmission LLC (b)		12/16/2014	NA	$493
Hawaiian Electric Industries Inc	Yes	12/3/2014	46%	$4,913
Cleco Corp	Yes	10/20/2014	109%	$4,652
Integrys Energy Group Inc	Yes	6/23/2014	75%	$8,889
Upper Peninsula Power Co	Yes	1/20/2014	NA	$299
NV Energy Inc	Yes	5/29/2013	89%	$10,588
Average of Integrated Electic Utilities			**89%**	**$6,046**
Average of All Companies			**106%**	**$5,690**

Sources/Notes:

Company financials were taken from the most recent 10-K filed prior to the acquisition date.

[2],[4]: Bloomberg.

[3]: Calculated.

Company Financials ($Millions)

Company	Integrated Electric Utility	Date of M&A Announcement	Total Assets	Total Long-Term Assets	Net PP&E	Market Cap	Revenue	Net Income	Equity %	Book Equity	Shares Outstanding	Offer Price Per Share ($)	Book Equity per Share ($)	Premium on Equity	Overall Premium	Gross Acquisition Value ($M)
[1]		[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
ITC Holdings Corp		2/9/2016	$7,406	$7,187	$5,890	$5,882	$273	$66	23%	$1,682	152	$75	$11	678%	154%	$11,398
Empire District Electric Co/The	Yes	2/9/2016	$2,463	$2,262	$2,008	$1,235	$170	$25	33%	$802	44	$55	$18	299%	97%	$2,399
Questar Corp		2/1/2016	$4,187	$3,911	$3,816	$4,369	$142	$33	31%	$1,293	175	$35	$7	472%	146%	$6,110
Piedmont Natural Gas Co Inc		10/26/2015	$4,951	$4,729	$4,226	$4,580	$158	-$8	28%	$1,406	79	$87	$18	487%	138%	$6,854
TECO Energy Inc	Yes	9/4/2015	$8,838	$8,059	$7,242	$4,956	$681	$12	29%	$2,553	235	$45	$11	414%	120%	$10,582
AGL Resources Inc		8/24/2015	$13,835	$12,263	$9,379	$7,375	$674	$42	29%	$3,989	120	$107	$33	321%	93%	$12,801
Oncor Electric Delivery Co LLC		8/10/2015	$19,173	$18,331	$12,229	NA	$938	$98	39%	$7,551	NA	NA	NA	NA	NA	NA
Dominion Carolina Gas Transmission LLC (a)		4/1/2015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	$508
UIL Holdings Corp/Old		2/25/2015	$5,112	$4,442	$3,293	$2,394	$433	$32	27%	$1,368	57	$86	$24	355%	95%	$4,863
New Hampshire Gas Corp		1/2/2015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	$3
Dominion Carolina Gas Transmission LLC (b)		12/16/2014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	$493
Hawaiian Electric Industries Inc	Yes	12/3/2014	$10,670	$5,818	$4,048	$2,891	$867	$48	17%	$1,836	103	$48	$18	268%	46%	$4,913
Cleco Corp	Yes	10/20/2014	$4,256	$3,776	$3,144	$3,214	$371	$71	39%	$1,639	60	$77	$27	284%	109%	$4,652
Integrys Energy Group Inc	Yes	6/23/2014	$11,802	$9,085	$6,301	$5,436	$1,638	$152	29%	$3,406	80	$112	$43	261%	75%	$8,889
Upper Peninsula Power Co	Yes	1/20/2014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	$299
NV Energy Inc	Yes	5/29/2013	$11,879	$11,034	$9,429	$4,539	$577	$21	30%	$3,544	235	$45	$15	299%	89%	$10,588
Average of Integrated Electic Utilities			**$8,318**	**$6,672**	**$5,362**	**$3,712**	**$717**	**$55**	**29%**	**$2,297**	**$126**	**$64**	**$22**	**304%**	**89%**	**$6,046**

Sources/Notes:
Company financials were taken from the most recent 10-K filed prior to the acquisition date
[3]-[11]: Capital IQ,
[2],[16]: Bloomberg.

Financial Summary of Recent M&A Transactions

Company Name	Ticker	M&A Announce Date	Data from Latest Filing BEFORE Announcement											
			Filing Quarter	Total Long-Term Assets	Total Assets	Total Current Assets	Total PP&E	Market Cap (as of announce date)	Revenue	Operating Income	Net Income	Book Equity	Shares Outstanding	Equity %
ITC Holdings Corp	NYSE:ITC	2/9/2016	FQ3 2015	7,187	7,405.6	218.9	5,890.1	5,882.3	273.2	149.6	65.6	1,681.9	152.2	23%
Empire District Electric Co/The	NYSE:EDE	2/9/2016	FQ3 2015	2,262	2,462.8	200.8	2,008.3	1,235.2	169.7	51.6	25.3	802.5	43.8	33%
Questar Corp	NYSE:STR	2/1/2016	FQ3 2015	3,911	4,187.4	276.3	3,816.0	4,369.4	142.3	62.1	32.6	1,293.3	174.8	31%
Piedmont Natural Gas Co Inc	NYSE:PNY	10/26/2015	FQ3 2015	4,729	4,951.4	222.3	4,225.6	4,579.6	158.3	-1.9	-8.3	1,406.1	79.2	28%
TECO Energy Inc	NYSE:TE	9/4/2015	FQ2 2015	8,059	8,838.4	779.2	7,241.7	4,956.0	680.6	143.3	11.8	2,553.3	235.2	29%
AGL Resources Inc	NYSE:GAS	8/24/2015	FQ2 2015	12,263	13,835.0	1,572.0	9,379.0	7,374.6	674.0	107.0	42.0	3,989.0	120.1	29%
Oncor Electric Delivery Co LLC	IQ3062378	8/10/2015	FQ2 2015	18,331	19,173.0	842.0	12,229.0	NA	938.0	243.0	98.0	7,551.0	NA	39%
Dominion Carolina Gas Transmission LLC (a)	IQ4208869	4/1/2015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UIL Holdings Corp/Old	IQ310736	2/25/2015	FQ4 2014	4,442	5,111.9	670.1	3,292.7	2,393.6	433.0	73.8	32.3	1,368.3	56.5	27%
New Hampshire Gas Corp	IQ268216482	1/2/2015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dominion Carolina Gas Transmission LLC (b)	IQ4208869	12/16/2014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hawaiian Electric Industries Inc	NYSE:HE	12/3/2014	FQ3 2014	5,818	10,670.5	4,852.8	4,048.1	2,891.2	867.1	92.0	47.8	1,835.7	102.6	17%
Cleco Corp	NYSE:CNL	10/20/2014	FQ3 2014	3,776	4,256.3	480.1	3,144.2	3,214.4	371.4	108.4	70.8	1,638.9	60.4	39%
Integrys Energy Group Inc	IQ315149	6/23/2014	FQ1 2014	9,085	11,802.2	2,717.1	6,301.2	5,436.2	1,638.0	232.3	152.4	3,406.0	79.5	29%
Pepco Holdings Inc	NYSE:POM	4/30/2014	FQ1 2014	13,540	15,004.0	1,464.0	9,906.0	6,706.6	1,330.0	173.0	75.0	4,336.0	250.6	29%
Philadelphia Gas Works operations	IQ8032486	3/3/2014	FY 2013	1,366	1,711.0	345.0	1,155.0	NA	683.5	109.5	60.6	358.6	NA	21%
Upper Peninsula Power Co	IQ4762134	1/20/2014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NV Energy Inc	IQ109136	5/29/2013	FQ1 2013	11,034	11,878.6	844.8	9,428.8	4,539.4	577.0	99.0	21.0	3,543.9	235.4	30%
New Mexico Gas Co Inc	IQ40117829	5/28/2013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arizona Public Service	IQ388114	2/16/2016	FQ3 2015	13,788	14,838.1	1,050.2	11,327.5	NA	1,198.4	449.8	261.2	4,894.8	NA	33%

Sources/Notes:
Capital IQ.

Table No. BV-ELEC-1

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Table No. BV-ELEC-2

Classification of Companies by Assets

Company	Company Category
ALLETE	R
Alliant Energy	R
Amer. Elec. Power	R
Ameren Corp.	R
CenterPoint Energy	M
CMS Energy Corp.	R
Consol. Edison	R
Dominion Resources	M
DTE Energy	R
Edison Int'l	R
El Paso Electric	R
Entergy Corp.	R
G't Plains Energy	R
IDACORP Inc.	R
MGE Energy	M
NextEra Energy	M
OGE Energy	R
Otter Tail Corp.	R
PG&E Corp.	R
Pinnacle West Capital	R
Portland General	R
Public Serv. Enterprise	M
SCANA Corp.	M
Sempra Energy	M
Vectren Corp.	M
Westar Energy	R
Xcel Energy Inc.	R

Sources and Notes:
Percent regulated categories and company data are based on Edison Electric Institute: "Rate Case Summary - Q3 2015 Financial Update".
R = Regulated (greater than 80 percent of total assets are regulated).
M = Mostly Regulated (50 to 80 percent of total assets are regulated).
D = Diversified (less than 50 percent of total assets are regulated).

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel A: ALLETE

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$1,822	$1,822	$1,529	$1,288	$1,158	$1,051	$975	[a]
Shares Outstanding (in millions) - Common	49	49	45	41	39	37	36	[b]
Price per Share - Common	$52	$49	$46	$48	$42	$38	$36	[c]
Market Value of Common Equity	$2,540	$2,393	$2,048	$1,941	$1,616	$1,384	$1,286	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$2,540	$2,393	$2,048	$1,941	$1,616	$1,384	$1,286	[f]= [d]
Market to Book Value of Common Equity	1.39	1.31	1.34	1.51	1.40	1.32	1.32	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$403	$403	$358	$369	$278	$303	$294	[j]
Current Liabilities	$318	$318	$287	$224	$215	$122	$131	[k]
Current Portion of Long-Term Debt	$49	$49	$85	$38	$67	$13	$2	[l]
Net Working Capital	$135	$135	$156	$183	$131	$194	$165	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$3	$1	$0	$6	$1	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$1,549	$1,549	$1,289	$1,064	$948	$844	$784	[p]
Book Value of Long-Term Debt	$1,598	$1,598	$1,375	$1,102	$1,015	$857	$786	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,485	$1,485	$1,132	$1,144	$966	$797	$735	
Carrying Amount	$1,374	$1,374	$1,110	$1,018	$863	$785	$701	
Adjustment to Book Value of Long-Term Debt	$111	$111	$22	$126	$103	$12	$34	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,709	$1,709	$1,396	$1,228	$1,118	$869	$820	[s] = [q] + [r].
Market Value of Debt	$1,709	$1,709	$1,396	$1,228	$1,118	$869	$820	[t] = [s].
MARKET VALUE OF FIRM	$4,249	$4,102	$3,444	$3,169	$2,734	$2,253	$2,106	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	59.78%	58.33%	59.47%	61.26%	59.11%	61.43%	61.08%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	40.22%	41.67%	40.53%	38.74%	40.89%	38.57%	38.92%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel B: Alliant Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$3,745	$3,745	$3,436	$3,267	$3,116	$3,002	$2,888	[a]
Shares Outstanding (in millions) - Common	113.36	113	111	111	111	111	111	[b]
Price per Share - Common	65.26	$57	$57	$50	$44	$39	$36	[c]
Market Value of Common Equity	$7,398	$6,434	$6,291	$5,494	$4,871	$4,340	$4,001	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$7,398	$6,434	$6,291	$5,494	$4,871	$4,340	$4,001	[f]= [d]
Market to Book Value of Common Equity	1.98	1.72	1.83	1.68	1.56	1.45	1.39	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$200	$200	$200	$200	$205	$205	$244	[h]
Market Value of Preferred Equity	$200	$200	$200	$200	$205	$205	$244	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,088	$1,088	$962	$880	$1,029	$947	$1,168	[j]
Current Liabilities	$991	$991	$1,742	$1,053	$946	$774	$692	[k]
Current Portion of Long-Term Debt	$3	$3	$493	$48	$1	$1	$1	[l]
Net Working Capital	$100	$100	($287)	($124)	$84	$174	$477	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$109	$109	$354	$237	$70	$22	$0	[n]
Adjusted Short-Term Debt	$0	$0	$287	$124	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$3,856	$3,856	$2,800	$3,105	$2,828	$2,704	$2,704	[p]
Book Value of Long-Term Debt	$3,859	$3,859	$3,579	$3,278	$2,830	$2,705	$2,705	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$4,418	$4,418	$3,712	$3,861	$3,325	$2,959	$2,676	
Carrying Amount	$3,790	$3,790	$3,336	$3,138	$2,705	$2,705	$2,506	
Adjustment to Book Value of Long-Term Debt	$629	$629	$376	$722	$621	$254	$170	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$4,487	$4,487	$3,955	$4,000	$3,450	$2,959	$2,875	[s] = [q] + [r].
Market Value of Debt	$4,487	$4,487	$3,955	$4,000	$3,450	$2,959	$2,875	[t] = [s].
MARKET VALUE OF FIRM	$12,085	$11,121	$10,446	$9,694	$8,526	$7,504	$7,119	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	61.21%	57.85%	60.22%	56.68%	57.13%	57.84%	56.20%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	1.65%	1.80%	1.91%	2.06%	2.41%	2.73%	3.42%	[w] = [i] / [u].
Debt - Market Value Ratio	37.13%	40.35%	37.86%	41.26%	40.47%	39.43%	40.38%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel C: Amer. Elec. Power

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$17,699	$17,699	$16,868	$15,762	$15,306	$14,653	$13,656	[a]
Shares Outstanding (in millions) - Common	491	491	489	487	485	483	480	[b]
Price per Share - Common	$60	$55	$53	$43	$44	$38	$36	[c]
Market Value of Common Equity	$29,588	$27,037	$25,812	$21,167	$21,277	$18,174	$17,446	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$29,588	$27,037	$25,812	$21,167	$21,277	$18,174	$17,446	[f]= [d]
Market to Book Value of Common Equity	1.67	1.53	1.53	1.34	1.39	1.24	1.28	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$60	$60	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$60	$60	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,548	$4,548	$4,111	$4,317	$4,648	$4,374	$5,421	[j]
Current Liabilities	$7,058	$7,058	$7,457	$5,692	$6,795	$5,684	$6,148	[k]
Current Portion of Long-Term Debt	$1,826	$1,826	$2,381	$1,366	$2,272	$1,267	$1,286	[l]
Net Working Capital	($684)	($684)	($965)	($9)	$125	($43)	$559	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$782	$782	$1,282	$1,218	$1,216	$1,279	$1,466	[n]
Adjusted Short-Term Debt	$684	$684	$965	$9	$0	$43	$0	[o] = See Sources and Notes.
Long-Term Debt	$17,600	$17,600	$15,677	$16,202	$14,955	$15,183	$15,995	[p]
Book Value of Long-Term Debt	$20,110	$20,110	$19,023	$17,577	$17,227	$16,493	$17,281	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$21,075	$21,075	$19,672	$20,907	$19,259	$18,285	$18,479	
Carrying Amount	$18,684	$18,684	$18,377	$17,757	$16,516	$16,811	$17,498	
Adjustment to Book Value of Long-Term Debt	$2,391	$2,391	$1,295	$3,150	$2,743	$1,474	$981	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$22,501	$22,501	$20,318	$20,727	$19,970	$17,967	$18,262	[s] = [q] + [r].
Market Value of Debt	$22,501	$22,501	$20,318	$20,727	$19,970	$17,967	$18,262	[t] = [s].
MARKET VALUE OF FIRM	$52,089	$49,538	$46,130	$41,894	$41,247	$36,201	$35,768	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	56.80%	54.58%	55.95%	50.53%	51.58%	50.20%	48.78%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	0.17%	0.17%	[w] = [i] / [u].
Debt - Market Value Ratio	43.20%	45.42%	44.05%	49.47%	48.42%	49.63%	51.06%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel D: Ameren Corp.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$7,014	$7,014	$6,774	$6,574	$7,874	$7,997	$7,754	[a]
Shares Outstanding (in millions) - Common	243	243	243	243	243	242	240	[b]
Price per Share - Common	$45	$40	$38	$34	$33	$30	$28	[c]
Market Value of Common Equity	$10,890	$9,802	$9,318	$8,311	$7,920	$7,286	$6,689	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$10,890	$9,802	$9,318	$8,311	$7,920	$7,286	$6,689	[f]= [d]
Market to Book Value of Common Equity	1.55	1.40	1.38	1.26	1.01	0.91	0.86	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,983	$1,983	$1,942	$3,273	$2,406	$2,680	$3,120	[j]
Current Liabilities	$2,489	$2,489	$2,119	$3,228	$1,546	$1,848	$1,914	[k]
Current Portion of Long-Term Debt	$395	$395	$119	$884	$206	$178	$354	[l]
Net Working Capital	($111)	($111)	($58)	$929	$1,066	$1,010	$1,560	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$783	$783	$753	$0	$5	$350	$125	[n]
Adjusted Short-Term Debt	$111	$111	$58	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$5,981	$5,981	$5,825	$5,274	$6,781	$6,682	$7,259	[p]
Book Value of Long-Term Debt	$6,487	$6,487	$6,002	$6,158	$6,987	$6,860	$7,613	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$7,135	$7,135	$6,584	$7,110	$7,800	$7,661	$7,717	
Carrying Amount	$6,240	$6,240	$6,038	$6,157	$6,856	$7,008	$7,315	
Adjustment to Book Value of Long-Term Debt	$895	$895	$546	$953	$944	$653	$402	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$7,382	$7,382	$6,548	$7,111	$7,931	$7,513	$8,015	[s] = [q] + [r].
Market Value of Debt	$7,382	$7,382	$6,548	$7,111	$7,931	$7,513	$8,015	[t] = [s].
MARKET VALUE OF FIRM	$18,272	$17,184	$15,866	$15,422	$15,851	$14,799	$14,704	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	59.60%	57.04%	58.73%	53.89%	49.97%	49.23%	45.49%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	40.40%	42.96%	41.27%	46.11%	50.03%	50.77%	54.51%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel E: CenterPoint Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$4,058	$4,058	$4,473	$4,261	$4,257	$4,207	$3,129	[a]
Shares Outstanding (in millions) - Common	430	430	430	429	427	426	423	[b]
Price per Share - Common	$18	$18	$24	$24	$21	$20	$15	[c]
Market Value of Common Equity	$7,687	$7,692	$10,424	$10,139	$8,997	$8,331	$6,514	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$7,687	$7,692	$10,424	$10,139	$8,997	$8,331	$6,514	[f]= [d]
Market to Book Value of Common Equity	1.89	1.90	2.33	2.38	2.11	1.98	2.08	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$2,400	$2,400	$2,576	$2,319	$2,752	$1,982	$2,143	[j]
Current Liabilities	$3,191	$3,191	$3,008	$2,595	$3,364	$2,319	$2,881	[k]
Current Portion of Long-Term Debt	$938	$938	$722	$553	$1,402	$483	$978	[l]
Net Working Capital	$147	$147	$290	$277	$790	$146	$240	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$49	$49	$80	$70	$53	$84	$73	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$7,662	$7,662	$7,797	$7,758	$8,415	$8,497	$8,267	[p]
Book Value of Long-Term Debt	$8,600	$8,600	$8,519	$8,311	$9,817	$8,980	$9,245	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$9,427	$9,427	$8,670	$10,807	$10,049	$10,071	$10,413	
Carrying Amount	$8,652	$8,652	$8,171	$9,619	$8,994	$9,303	$9,900	
Adjustment to Book Value of Long-Term Debt	$775	$775	$499	$1,188	$1,055	$768	$513	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$9,375	$9,375	$9,018	$9,499	$10,872	$9,748	$9,758	[s] = [q] + [r].
Market Value of Debt	$9,375	$9,375	$9,018	$9,499	$10,872	$9,748	$9,758	[t] = [s].
MARKET VALUE OF FIRM	$17,062	$17,067	$19,442	$19,638	$19,869	$18,079	$16,272	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	45.05%	45.07%	53.62%	51.63%	45.28%	46.08%	40.03%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	54.95%	54.93%	46.38%	48.37%	54.72%	53.92%	59.97%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
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Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel F: CMS Energy Corp.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$3,902	$3,902	$3,670	$3,396	$3,196	$3,043	$2,821	[a]
Shares Outstanding (in millions) - Common	277	277	275	266	264	252	230	[b]
Price per Share - Common	$38	$34	$30	$26	$23	$20	$18	[c]
Market Value of Common Equity	$10,597	$9,338	$8,161	$7,018	$6,141	$4,997	$4,116	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$10,597	$9,338	$8,161	$7,018	$6,141	$4,997	$4,116	[f]= [d]
Market to Book Value of Common Equity	2.72	2.39	2.22	2.07	1.92	1.64	1.46	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$239	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$239	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$2,123	$2,123	$2,734	$2,401	$2,360	$2,860	$3,086	[j]
Current Liabilities	$1,788	$1,788	$1,648	$1,464	$1,485	$2,214	$2,297	[k]
Current Portion of Long-Term Debt	$741	$741	$690	$532	$510	$1,140	$1,031	[l]
Net Working Capital	$1,076	$1,076	$1,776	$1,469	$1,385	$1,786	$1,820	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$68	$68	$0	$0	$0	$0	$0	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$8,014	$8,014	$8,171	$7,229	$6,866	$6,208	$6,203	[p]
Book Value of Long-Term Debt	$8,755	$8,755	$8,861	$7,761	$7,376	$7,348	$7,234	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$9,285	$9,285	$8,368	$8,347	$8,025	$7,861	$7,013	
Carrying Amount	$8,535	$8,535	$7,642	$7,229	$7,073	$7,174	$6,567	
Adjustment to Book Value of Long-Term Debt	$750	$750	$726	$1,118	$952	$687	$446	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$9,505	$9,505	$9,587	$8,879	$8,328	$8,035	$7,680	[s] = [q] + [r].
Market Value of Debt	$9,505	$9,505	$9,587	$8,879	$8,328	$8,035	$7,680	[t] = [s].
MARKET VALUE OF FIRM	$20,102	$18,843	$17,748	$15,897	$14,469	$13,032	$12,035	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	52.72%	49.56%	45.98%	44.15%	42.44%	38.34%	34.20%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	1.99%	[w] = [i] / [u].
Debt - Market Value Ratio	47.28%	50.44%	54.02%	55.85%	57.56%	61.66%	63.82%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
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Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel G: Consol. Edison

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$13,040	$13,040	$12,707	$12,166	$11,842	$11,454	$10,630	[a]
Shares Outstanding (in millions) - Common	293	293	293	293	293	293	284	[b]
Price per Share - Common	$70	$65	$57	$56	$60	$57	$48	[c]
Market Value of Common Equity	$20,617	$18,927	$16,614	$16,301	$17,522	$16,659	$13,687	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$20,617	$18,927	$16,614	$16,301	$17,522	$16,659	$13,687	[f]= [d]
Market to Book Value of Common Equity	1.58	1.45	1.31	1.34	1.48	1.45	1.29	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$213	$213	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$213	$213	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$3,505	$3,505	$3,519	$3,704	$3,240	$3,458	$3,890	[j]
Current Liabilities	$4,429	$4,429	$3,873	$4,373	$3,724	$2,959	$3,147	[k]
Current Portion of Long-Term Debt	$761	$761	$210	$483	$930	$305	$5	[l]
Net Working Capital	($163)	($163)	($144)	($186)	$446	$804	$748	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,160	$1,160	$1,425	$1,220	$340	$0	$846	[n]
Adjusted Short-Term Debt	$163	$163	$144	$186	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$11,521	$11,521	$10,986	$10,495	$9,841	$10,371	$10,675	[p]
Book Value of Long-Term Debt	$12,445	$12,445	$11,340	$11,164	$10,771	$10,676	$10,680	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$13,998	$13,998	$12,082	$12,935	$12,744	$11,761	$10,585	
Carrying Amount	$12,191	$12,191	$10,974	$10,768	$10,673	$10,676	$10,585	
Adjustment to Book Value of Long-Term Debt	$1,807	$1,807	$1,108	$2,167	$2,071	$1,085	$0	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$14,252	$14,252	$12,448	$13,331	$12,842	$11,761	$10,680	[s] = [q] + [r].
Market Value of Debt	$14,252	$14,252	$12,448	$13,331	$12,842	$11,761	$10,680	[t] = [s].
MARKET VALUE OF FIRM	$34,869	$33,179	$29,062	$29,632	$30,364	$28,633	$24,580	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	59.13%	57.05%	57.17%	55.01%	57.71%	58.18%	55.68%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	0.74%	0.87%	[w] = [i] / [u].
Debt - Market Value Ratio	40.87%	42.95%	42.83%	44.99%	42.29%	41.07%	43.45%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel H: Dominion Resources

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$12,592	$12,592	$11,573	$11,242	$11,818	$11,632	$12,095	[a]
Shares Outstanding (in millions) - Common	595	595	584	580	575	570	581	[b]
Price per Share - Common	$70	$69	$69	$62	$53	$50	$44	[c]
Market Value of Common Equity	$41,731	$41,040	$40,119	$35,768	$30,376	$28,377	$25,488	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$41,731	$41,040	$40,119	$35,768	$30,376	$28,377	$25,488	[f]= [d]
Market to Book Value of Common Equity	3.31	3.26	3.47	3.18	2.57	2.44	2.11	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$134	$257	$257	$257	$257	[h]
Market Value of Preferred Equity	$0	$0	$134	$257	$257	$257	$257	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,123	$4,123	$5,446	$5,210	$4,653	$5,267	$5,995	[j]
Current Liabilities	$6,746	$6,746	$7,579	$6,453	$6,562	$5,496	$4,927	[k]
Current Portion of Long-Term Debt	$1,528	$1,528	$1,591	$1,132	$2,175	$1,327	$776	[l]
Net Working Capital	($1,095)	($1,095)	($542)	($111)	$266	$1,098	$1,844	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$2,555	$2,555	$2,629	$2,145	$1,382	$783	$100	[n]
Adjusted Short-Term Debt	$1,095	$1,095	$542	$111	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$23,245	$23,245	$20,666	$18,548	$17,144	$17,153	$16,023	[p]
Book Value of Long-Term Debt	$25,868	$25,868	$22,799	$19,791	$19,319	$18,480	$16,799	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$21,881	$21,881	$19,887	$19,898	$18,936	$16,112	$15,970	
Carrying Amount	$19,723	$19,723	$18,396	$16,841	$16,264	$14,520	$14,867	
Adjustment to Book Value of Long-Term Debt	$2,158	$2,158	$1,491	$3,057	$2,672	$1,592	$1,103	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$28,026	$28,026	$24,290	$22,848	$21,991	$20,072	$17,902	[s] = [q] + [r].
Market Value of Debt	$28,026	$28,026	$24,290	$22,848	$21,991	$20,072	$17,902	[t] = [s].
MARKET VALUE OF FIRM	$69,757	$69,066	$64,543	$58,873	$52,624	$48,706	$43,647	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	59.82%	59.42%	62.16%	60.75%	57.72%	58.26%	58.40%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	0.21%	0.44%	0.49%	0.53%	0.59%	[w] = [i] / [u].
Debt - Market Value Ratio	40.18%	40.58%	37.63%	38.81%	41.79%	41.21%	41.01%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel I: DTE Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$8,812	$8,812	$8,169	$7,876	$7,389	$6,970	$6,646	[a]
Shares Outstanding (in millions) - Common	179	179	177	177	172	169	169	[b]
Price per Share - Common	$84	$78	$76	$67	$59	$49	$47	[c]
Market Value of Common Equity	$15,122	$13,951	$13,475	$11,792	$10,192	$8,372	$7,879	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$15,122	$13,951	$13,475	$11,792	$10,192	$8,372	$7,879	[f]= [d]
Market to Book Value of Common Equity	1.72	1.58	1.65	1.50	1.38	1.20	1.19	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$2,700	$2,700	$2,755	$2,549	$2,730	$2,911	$2,741	[j]
Current Liabilities	$2,273	$2,273	$2,805	$3,008	$2,309	$2,100	$2,513	[k]
Current Portion of Long-Term Debt	$468	$468	$274	$896	$633	$247	$923	[l]
Net Working Capital	$895	$895	$224	$437	$1,054	$1,058	$1,151	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$185	$185	$653	$271	$98	$275	$20	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$8,856	$8,856	$7,909	$6,846	$7,120	$7,497	$7,074	[p]
Book Value of Long-Term Debt	$9,324	$9,324	$8,183	$7,742	$7,753	$7,744	$7,997	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$9,503	$9,503	$8,475	$8,893	$8,757	$8,500	$8,300	
Carrying Amount	$8,606	$8,606	$8,094	$7,813	$7,682	$8,000	$8,000	
Adjustment to Book Value of Long-Term Debt	$897	$897	$381	$1,080	$1,075	$500	$300	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$10,221	$10,221	$8,564	$8,822	$8,828	$8,244	$8,297	[s] = [q] + [r].
Market Value of Debt	$10,221	$10,221	$8,564	$8,822	$8,828	$8,244	$8,297	[t] = [s].
MARKET VALUE OF FIRM	$25,343	$24,172	$22,039	$20,614	$19,020	$16,616	$16,176	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	59.67%	57.71%	61.14%	57.20%	53.59%	50.38%	48.71%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	40.33%	42.29%	38.86%	42.80%	46.41%	49.62%	51.29%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel J: Edison Int'l

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$11,600	$11,600	$10,736	$9,689	$10,023	$11,015	$10,634	[a]
Shares Outstanding (in millions) - Common	326	326	326	326	326	326	326	[b]
Price per Share - Common	$62	$61	$57	$46	$45	$37	$34	[c]
Market Value of Common Equity	$20,159	$19,740	$18,584	$14,938	$14,719	$12,158	$11,206	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$20,159	$19,740	$18,584	$14,938	$14,719	$12,158	$11,206	[f]= [d]
Market to Book Value of Common Equity	1.74	1.70	1.73	1.54	1.47	1.10	1.05	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$2,020	$2,020	$2,022	$1,753	$1,759	$1,029	$907	[h]
Market Value of Preferred Equity	$2,020	$2,020	$2,022	$1,753	$1,759	$1,029	$907	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$3,792	$3,792	$4,498	$3,603	$4,494	$4,751	$5,041	[j]
Current Liabilities	$5,239	$5,239	$5,849	$5,389	$4,274	$4,161	$3,887	[k]
Current Portion of Long-Term Debt	$295	$295	$704	$401	$565	$51	$43	[l]
Net Working Capital	($1,152)	($1,152)	($647)	($1,385)	$785	$641	$1,197	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,154	$1,154	$1,349	$1,528	$429	$560	$98	[n]
Adjusted Short-Term Debt	$1,152	$1,152	$647	$1,385	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$10,957	$10,957	$10,133	$9,232	$13,708	$13,010	$12,117	[p]
Book Value of Long-Term Debt	$12,404	$12,404	$11,484	$11,018	$14,273	$13,061	$12,160	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$12,319	$12,319	$11,084	$10,944	$10,548	$12,360	$10,452	
Carrying Amount	$10,738	$10,738	$10,426	$9,231	$8,834	$12,419	$10,814	
Adjustment to Book Value of Long-Term Debt	$1,581	$1,581	$658	$1,713	$1,714	($59)	($362)	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$13,985	$13,985	$12,142	$12,731	$15,987	$13,002	$11,798	[s] = [q] + [r].
Market Value of Debt	$13,985	$13,985	$12,142	$12,731	$15,987	$13,002	$11,798	[t] = [s].
MARKET VALUE OF FIRM	$36,164	$35,745	$32,748	$29,422	$32,465	$26,189	$23,911	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	55.74%	55.22%	56.75%	50.77%	45.34%	46.42%	46.86%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	5.59%	5.65%	6.17%	5.96%	5.42%	3.93%	3.79%	[w] = [i] / [u].
Debt - Market Value Ratio	38.67%	39.12%	37.08%	43.27%	49.24%	49.65%	49.34%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel K: El Paso Electric

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$1,021	$1,021	$1,016	$894	$830	$813	$791	[a]
Shares Outstanding (in millions) - Common	40	40	40	40	40	40	42	[b]
Price per Share - Common	$40	$36	$37	$33	$34	$32	$23	[c]
Market Value of Common Equity	$1,624	$1,432	$1,481	$1,328	$1,356	$1,285	$987	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$1,624	$1,432	$1,481	$1,328	$1,356	$1,285	$987	[f]= [d]
Market to Book Value of Common Equity	1.59	1.40	1.46	1.49	1.63	1.58	1.25	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$202	$202	$207	$237	$176	$200	$252	[j]
Current Liabilities	$251	$251	$242	$141	$174	$187	$143	[k]
Current Portion of Long-Term Debt	$0	$0	$15	$0	$33	$33	$14	[l]
Net Working Capital	($48)	($48)	($19)	$96	$35	$46	$123	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$119	$119	$90	$15	$62	$18	$0	[n]
Adjusted Short-Term Debt	$48	$48	$19	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$1,134	$1,134	$985	$1,000	$850	$816	$850	[p]
Book Value of Long-Term Debt	$1,182	$1,182	$1,019	$1,000	$883	$850	$864	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,314	$1,314	$1,059	$1,182	$1,057	$883	$850	
Carrying Amount	$1,164	$1,164	$1,014	$1,022	$883	$854	$847	
Adjustment to Book Value of Long-Term Debt	$150	$150	$45	$160	$174	$28	$3	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,332	$1,332	$1,064	$1,160	$1,057	$878	$867	[s] = [q] + [r].
Market Value of Debt	$1,332	$1,332	$1,064	$1,160	$1,057	$878	$867	[t] = [s].
MARKET VALUE OF FIRM	$2,957	$2,764	$2,544	$2,487	$2,414	$2,163	$1,854	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	54.94%	51.80%	58.19%	53.38%	56.19%	59.41%	53.23%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	45.06%	48.20%	41.81%	46.62%	43.81%	40.59%	46.77%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel L: Entergy Corp.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$9,157	$9,157	$10,149	$9,408	$9,191	$8,965	$8,732	[a]
Shares Outstanding (in millions) - Common	178	178	180	178	178	176	182	[b]
Price per Share - Common	$70	$64	$76	$64	$69	$65	$78	[c]
Market Value of Common Equity	$12,443	$11,376	$13,736	$11,359	$12,194	$11,495	$14,071	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$12,443	$11,376	$13,736	$11,359	$12,194	$11,495	$14,071	[f]= [d]
Market to Book Value of Common Equity	1.36	1.24	1.35	1.21	1.33	1.28	1.61	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$211	$211	$305	$281	$281	$311	$311	[h]
Market Value of Preferred Equity	$211	$211	$305	$281	$281	$311	$311	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,117	$4,117	$4,265	$3,490	$3,808	$4,154	$5,047	[j]
Current Liabilities	$3,454	$3,454	$4,454	$3,439	$3,924	$4,161	$2,914	[k]
Current Portion of Long-Term Debt	$281	$281	$1,117	$209	$792	$2,026	$592	[l]
Net Working Capital	$945	$945	$927	$260	$675	$2,019	$2,725	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$782	$782	$891	$1,106	$356	$145	$168	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$13,080	$13,080	$11,665	$12,308	$11,784	$10,281	$11,487	[p]
Book Value of Long-Term Debt	$13,362	$13,362	$12,782	$12,517	$12,575	$12,307	$12,080	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$13,607	$13,607	$12,440	$12,849	$12,176	$10,989	$10,728	
Carrying Amount	$13,399	$13,399	$12,596	$12,639	$12,236	$11,617	$11,418	
Adjustment to Book Value of Long-Term Debt	$208	$208	($156)	$210	($60)	($628)	($690)	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$13,569	$13,569	$12,625	$12,728	$12,515	$11,679	$11,390	[s] = [q] + [r].
Market Value of Debt	$13,569	$13,569	$12,625	$12,728	$12,515	$11,679	$11,390	[t] = [s].
MARKET VALUE OF FIRM	$26,224	$25,156	$26,665	$24,367	$24,989	$23,485	$25,772	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	47.45%	45.22%	51.51%	46.62%	48.80%	48.95%	54.60%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.80%	0.84%	1.14%	1.15%	1.12%	1.32%	1.21%	[w] = [i] / [u].
Debt - Market Value Ratio	51.74%	53.94%	47.35%	52.23%	50.08%	49.73%	44.20%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel M: G't Plains Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$3,671	$3,671	$3,603	$3,487	$3,365	$2,983	$2,914	[a]
Shares Outstanding (in millions) - Common	154	154	154	154	153	136	136	[b]
Price per Share - Common	$28	$26	$25	$22	$22	$20	$19	[c]
Market Value of Common Equity	$4,321	$3,964	$3,813	$3,406	$3,399	$2,656	$2,561	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$4,321	$3,964	$3,813	$3,406	$3,399	$2,656	$2,561	[f]= [d]
Market to Book Value of Common Equity	1.18	1.08	1.06	0.98	1.01	0.89	0.88	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$39	$39	$39	$39	$39	$39	$39	[h]
Market Value of Preferred Equity	$39	$39	$39	$39	$39	$39	$39	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$824	$824	$753	$762	$821	$665	$693	[j]
Current Liabilities	$823	$823	$937	$689	$1,357	$1,511	$1,101	[k]
Current Portion of Long-Term Debt	$1	$1	$15	$7	$257	$951	$336	[l]
Net Working Capital	$2	$2	($169)	$80	($278)	$105	($72)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$341	$341	$396	$249	$648	$134	$327	[n]
Adjusted Short-Term Debt	$0	$0	$169	$0	$278	$0	$72	[o] = See Sources and Notes.
Long-Term Debt	$3,764	$3,764	$3,488	$3,516	$2,763	$2,750	$3,101	[p]
Book Value of Long-Term Debt	$3,765	$3,765	$3,672	$3,523	$3,298	$3,702	$3,509	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$3,800	$3,800	$3,700	$3,500	$3,900	$3,700	$3,400	
Carrying Amount	$3,500	$3,500	$3,500	$3,000	$3,500	$3,400	$3,200	
Adjustment to Book Value of Long-Term Debt	$300	$300	$200	$500	$400	$300	$200	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$4,065	$4,065	$3,872	$4,023	$3,698	$4,002	$3,709	[s] = [q] + [r].
Market Value of Debt	$4,065	$4,065	$3,872	$4,023	$3,698	$4,002	$3,709	[t] = [s].
MARKET VALUE OF FIRM	$8,424	$8,068	$7,725	$7,467	$7,136	$6,697	$6,309	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	51.29%	49.14%	49.37%	45.61%	47.63%	39.66%	40.59%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.46%	0.48%	0.50%	0.52%	0.55%	0.58%	0.62%	[w] = [i] / [u].
Debt - Market Value Ratio	48.25%	50.38%	50.13%	53.87%	51.83%	59.75%	58.79%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel N: IDACORP Inc.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$2,050	$2,050	$1,949	$1,860	$1,770	$1,657	$1,517	[a]
Shares Outstanding (in millions) - Common	50	50	50	50	50	50	49	[b]
Price per Share - Common	$68	$61	$55	$48	$43	$38	$35	[c]
Market Value of Common Equity	$3,440	$3,087	$2,753	$2,403	$2,151	$1,881	$1,730	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$3,440	$3,087	$2,753	$2,403	$2,151	$1,881	$1,730	[f]= [d]
Market to Book Value of Common Equity	1.68	1.51	1.41	1.29	1.21	1.14	1.14	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$494	$494	$475	$567	$366	$309	$468	[j]
Current Liabilities	$205	$205	$240	$335	$268	$254	$382	[k]
Current Portion of Long-Term Debt	$1	$1	$1	$71	$1	$2	$127	[l]
Net Working Capital	$290	$290	$237	$303	$99	$56	$212	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$4	$4	$32	$53	$51	$52	$4	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$1,742	$1,742	$1,614	$1,615	$1,537	$1,487	$1,488	[p]
Book Value of Long-Term Debt	$1,743	$1,743	$1,615	$1,686	$1,538	$1,489	$1,615	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,788	$1,788	$1,600	$1,819	$1,738	$1,623	$1,407	
Carrying Amount	$1,616	$1,616	$1,616	$1,538	$1,492	$1,614	$1,422	
Adjustment to Book Value of Long-Term Debt	$173	$173	($16)	$282	$246	$9	($15)	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,916	$1,916	$1,599	$1,968	$1,784	$1,498	$1,600	[s] = [q] + [r].
Market Value of Debt	$1,916	$1,916	$1,599	$1,968	$1,784	$1,498	$1,600	[t] = [s].
MARKET VALUE OF FIRM	$5,356	$5,003	$4,353	$4,370	$3,934	$3,379	$3,329	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	64.23%	61.71%	63.26%	54.97%	54.66%	55.68%	51.95%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	35.77%	38.29%	36.74%	45.03%	45.34%	44.32%	48.05%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel O: MGE Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$689	$689	$654	$613	$578	$550	$522	[a]
Shares Outstanding (in millions) - Common	35	35	35	35	35	35	35	[b]
Price per Share - Common	$49	$40	$39	$36	$35	$27	$26	[c]
Market Value of Common Equity	$1,689	$1,396	$1,340	$1,244	$1,223	$950	$902	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$1,689	$1,396	$1,340	$1,244	$1,223	$950	$902	[f]= [d]
Market to Book Value of Common Equity	2.45	2.03	2.05	2.03	2.11	1.73	1.73	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$242	$242	$225	$214	$220	$174	$150	[j]
Current Liabilities	$74	$74	$82	$79	$60	$52	$102	[k]
Current Portion of Long-Term Debt	$4	$4	$4	$4	$3	$3	$2	[l]
Net Working Capital	$172	$172	$147	$139	$162	$124	$50	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$0	$0	$49	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$392	$392	$396	$400	$359	$362	$320	[p]
Book Value of Long-Term Debt	$396	$396	$400	$405	$362	$364	$321	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$457	$457	$432	$427	$433	$356	$340	
Carrying Amount	$400	$400	$404	$362	$364	$337	$324	
Adjustment to Book Value of Long-Term Debt	$58	$58	$28	$66	$68	$19	$16	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$454	$454	$429	$470	$430	$384	$337	[s] = [q] + [r].
Market Value of Debt	$454	$454	$429	$470	$430	$384	$337	[t] = [s].
MARKET VALUE OF FIRM	$2,143	$1,850	$1,769	$1,714	$1,653	$1,333	$1,240	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	78.81%	75.46%	75.77%	72.56%	73.97%	71.23%	72.78%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	21.19%	24.54%	24.23%	27.44%	26.03%	28.77%	27.22%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel P: NextEra Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$22,318	$22,318	$18,810	$17,409	$15,886	$14,887	$14,151	[a]
Shares Outstanding (in millions) - Common	461	461	436	431	423	423	418	[b]
Price per Share - Common	$111	$97	$95	$80	$69	$54	$54	[c]
Market Value of Common Equity	$51,122	$44,783	$41,205	$34,660	$28,988	$22,955	$22,782	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$51,122	$44,783	$41,205	$34,660	$28,988	$22,955	$22,782	[f]= [d]
Market to Book Value of Common Equity	2.29	2.01	2.19	1.99	1.82	1.54	1.61	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$6,657	$6,657	$5,633	$5,472	$4,437	$6,252	$5,776	[j]
Current Liabilities	$10,371	$10,371	$9,572	$9,213	$7,875	$7,419	$7,187	[k]
Current Portion of Long-Term Debt	$2,497	$2,497	$3,385	$3,933	$2,062	$597	$1,703	[l]
Net Working Capital	($1,217)	($1,217)	($554)	$192	($1,376)	($570)	$292	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$2,163	$2,163	$1,185	$915	$1,574	$1,835	$1,085	[n]
Adjusted Short-Term Debt	$1,217	$1,217	$554	$0	$1,376	$570	$0	[o] = See Sources and Notes.
Long-Term Debt	$25,604	$25,604	$24,853	$23,862	$22,714	$20,039	$17,680	[p]
Book Value of Long-Term Debt	$29,318	$29,318	$28,792	$27,795	$26,152	$21,206	$19,383	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$30,337	$30,337	$28,612	$28,874	$23,699	$20,756	$17,256	
Carrying Amount	$27,876	$27,876	$27,728	$26,647	$21,614	$19,929	$16,869	
Adjustment to Book Value of Long-Term Debt	$2,461	$2,461	$884	$2,227	$2,085	$827	$387	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$31,779	$31,779	$29,676	$30,022	$28,237	$22,033	$19,770	[s] = [q] + [r].
Market Value of Debt	$31,779	$31,779	$29,676	$30,022	$28,237	$22,033	$19,770	[t] = [s].
MARKET VALUE OF FIRM	$82,901	$76,562	$70,881	$64,682	$57,225	$44,988	$42,552	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	61.67%	58.49%	58.13%	53.59%	50.66%	51.02%	53.54%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	38.33%	41.51%	41.87%	46.41%	49.34%	48.98%	46.46%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel Q: OGE Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$3,353	$3,353	$3,243	$2,995	$2,769	$2,541	$2,226	[a]
Shares Outstanding (in millions) - Common	200	200	199	198	197	196	195	[b]
Price per Share - Common	$26	$27	$36	$36	$28	$24	$20	[c]
Market Value of Common Equity	$5,171	$5,399	$7,266	$7,104	$5,440	$4,709	$3,899	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$5,171	$5,399	$7,266	$7,104	$5,440	$4,709	$3,899	[f]= [d]
Market to Book Value of Common Equity	1.54	1.61	2.24	2.37	1.96	1.85	1.75	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$753	$753	$740	$758	$857	$727	$709	[j]
Current Liabilities	$587	$587	$869	$942	$1,196	$934	$872	[k]
Current Portion of Long-Term Debt	$110	$110	$0	$0	$0	$0	$0	[l]
Net Working Capital	$276	$276	($129)	($184)	($339)	($208)	($163)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$411	$447	$456	$289	$224	[n]
Adjusted Short-Term Debt	$0	$0	$129	$184	$339	$208	$163	[o] = See Sources and Notes.
Long-Term Debt	$2,646	$2,646	$2,510	$2,400	$2,848	$2,587	$2,373	[p]
Book Value of Long-Term Debt	$2,756	$2,756	$2,639	$2,584	$3,188	$2,795	$2,536	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$2,550	$2,550	$2,653	$3,397	$3,276	$2,579	$2,477	
Carrying Amount	$2,755	$2,755	$2,400	$2,849	$2,737	$2,363	$2,378	
Adjustment to Book Value of Long-Term Debt	($206)	($206)	$253	$548	$539	$216	$99	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,550	$2,550	$2,891	$3,132	$3,726	$3,011	$2,634	[s] = [q] + [r].
Market Value of Debt	$2,550	$2,550	$2,891	$3,132	$3,726	$3,011	$2,634	[t] = [s].
MARKET VALUE OF FIRM	$7,720	$7,949	$10,157	$10,236	$9,166	$7,720	$6,533	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	66.97%	67.92%	71.54%	69.41%	59.35%	61.00%	59.68%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	33.03%	32.08%	28.46%	30.59%	40.65%	39.00%	40.32%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel R: Otter Tail Corp.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$598	$598	$563	$530	$531	$626	$637	[a]
Shares Outstanding (in millions) - Common	38	38	37	36	36	36	36	[b]
Price per Share - Common	$27	$26	$27	$28	$24	$19	$20	[c]
Market Value of Common Equity	$1,027	$972	$1,007	$1,006	$859	$703	$720	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$1,027	$972	$1,007	$1,006	$859	$703	$720	[f]= [d]
Market to Book Value of Common Equity	1.72	1.63	1.79	1.90	1.62	1.12	1.13	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$16	$16	$16	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$16	$16	$16	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$274	$274	$298	$310	$299	$372	$361	[j]
Current Liabilities	$237	$237	$200	$220	$176	$216	$246	[k]
Current Portion of Long-Term Debt	$0	$0	$0	$0	$0	$3	$1	[l]
Net Working Capital	$37	$37	$98	$91	$123	$159	$116	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$87	$87	$39	$40	$12	$39	$94	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$498	$498	$499	$437	$422	$433	$436	[p]
Book Value of Long-Term Debt	$499	$499	$499	$437	$422	$437	$436	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$601	$601	$428	$491	$525	$473	$458	
Carrying Amount	$499	$499	$390	$422	$472	$434	$436	
Adjustment to Book Value of Long-Term Debt	$102	$102	$38	$69	$53	$39	$22	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$601	$601	$537	$507	$475	$476	$458	[s] = [q] + [r].
Market Value of Debt	$601	$601	$537	$507	$475	$476	$458	[t] = [s].
MARKET VALUE OF FIRM	$1,628	$1,573	$1,544	$1,513	$1,350	$1,195	$1,193	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	63.09%	61.81%	65.24%	66.49%	63.66%	58.84%	60.32%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	1.15%	1.30%	1.30%	[w] = [i] / [u].
Debt - Market Value Ratio	36.91%	38.19%	34.76%	33.51%	35.19%	39.86%	38.38%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel S: PG&E Corp.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$16,568	$16,568	$15,779	$14,008	$13,133	$11,959	$11,023	[a]
Shares Outstanding (in millions) - Common	490	490	475	449	429	405	392	[b]
Price per Share - Common	$55	$51	$46	$41	$43	$42	$45	[c]
Market Value of Common Equity	$26,781	$24,840	$21,682	$18,575	$18,401	$17,105	$17,699	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$26,781	$24,840	$21,682	$18,575	$18,401	$17,105	$17,699	[f]= [d]
Market to Book Value of Common Equity	1.62	1.50	1.37	1.33	1.40	1.43	1.61	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$252	$252	$252	$252	$252	$252	$252	[h]
Market Value of Preferred Equity	$252	$252	$252	$252	$252	$252	$252	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$6,131	$6,131	$6,071	$5,522	$5,593	$5,877	$5,751	[j]
Current Liabilities	$6,108	$6,108	$5,726	$7,644	$5,436	$6,818	$7,184	[k]
Current Portion of Long-Term Debt	$0	$0	$0	$1,288	$110	$468	$899	[l]
Net Working Capital	$23	$23	$345	($834)	$267	($473)	($534)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$881	$881	$426	$953	$397	$1,137	$1,076	[n]
Adjusted Short-Term Debt	$0	$0	$0	$834	$0	$473	$534	[o] = See Sources and Notes.
Long-Term Debt	$15,545	$15,545	$14,555	$11,918	$12,915	$11,626	$11,255	[p]
Book Value of Long-Term Debt	$15,545	$15,545	$14,555	$14,040	$13,025	$12,567	$12,688	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$16,203	$16,203	$13,798	$14,317	$13,356	$12,559	$12,189	
Carrying Amount	$14,128	$14,128	$12,684	$11,994	$11,317	$11,620	$11,050	
Adjustment to Book Value of Long-Term Debt	$2,075	$2,075	$1,114	$2,323	$2,039	$939	$1,139	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$17,620	$17,620	$15,669	$16,363	$15,064	$13,506	$13,827	[s] = [q] + [r].
Market Value of Debt	$17,620	$17,620	$15,669	$16,363	$15,064	$13,506	$13,827	[t] = [s].
MARKET VALUE OF FIRM	$44,653	$42,712	$37,603	$35,190	$33,717	$30,863	$31,778	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	59.98%	58.16%	57.66%	52.78%	54.57%	55.42%	55.70%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.56%	0.59%	0.67%	0.72%	0.75%	0.82%	0.79%	[w] = [i] / [u].
Debt - Market Value Ratio	39.46%	41.25%	41.67%	46.50%	44.68%	43.76%	43.51%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel T: Pinnacle West Capital

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$4,654	$4,654	$4,492	$4,276	$4,056	$3,894	$3,717	[a]
Shares Outstanding (in millions) - Common	111	111	110	110	110	109	109	[b]
Price per Share - Common	$66	$62	$56	$55	$53	$43	$41	[c]
Market Value of Common Equity	$7,355	$6,850	$6,196	$6,003	$5,792	$4,719	$4,456	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$7,355	$6,850	$6,196	$6,003	$5,792	$4,719	$4,456	[f]= [d]
Market to Book Value of Common Equity	1.58	1.47	1.38	1.40	1.43	1.21	1.20	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,062	$1,062	$1,041	$1,350	$1,099	$1,591	$1,243	[j]
Current Liabilities	$1,523	$1,523	$1,449	$1,447	$949	$1,783	$968	[k]
Current Portion of Long-Term Debt	$411	$411	$369	$566	$90	$876	$239	[l]
Net Working Capital	($50)	($50)	($39)	$470	$240	$684	$514	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$57	$57	$19	$0	$0	$0	$0	[n]
Adjusted Short-Term Debt	$50	$50	$19	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$3,257	$3,257	$3,038	$2,820	$3,339	$3,047	$3,463	[p]
Book Value of Long-Term Debt	$3,719	$3,719	$3,426	$3,387	$3,429	$3,923	$3,702	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$3,839	$3,839	$3,579	$3,875	$3,926	$3,913	$3,774	
Carrying Amount	$3,415	$3,415	$3,337	$3,322	$3,496	$3,678	$3,648	
Adjustment to Book Value of Long-Term Debt	$424	$424	$242	$553	$430	$235	$126	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$4,143	$4,143	$3,668	$3,940	$3,859	$4,158	$3,828	[s] = [q] + [r].
Market Value of Debt	$4,143	$4,143	$3,668	$3,940	$3,859	$4,158	$3,828	[t] = [s].
MARKET VALUE OF FIRM	$11,498	$10,993	$9,864	$9,943	$9,651	$8,877	$8,284	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	63.97%	62.31%	62.81%	60.38%	60.01%	53.16%	53.79%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	36.03%	37.69%	37.19%	39.62%	39.99%	46.84%	46.21%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel U: Portland General

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$2,232	$2,232	$1,889	$1,792	$1,717	$1,653	$1,585	[a]
Shares Outstanding (in millions) - Common	89	89	78	78	76	75	75	[b]
Price per Share - Common	$39	$36	$33	$28	$27	$24	$20	[c]
Market Value of Common Equity	$3,447	$3,155	$2,567	$2,212	$2,059	$1,798	$1,525	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$3,447	$3,155	$2,567	$2,212	$2,059	$1,798	$1,525	[f]= [d]
Market to Book Value of Common Equity	1.54	1.41	1.36	1.23	1.20	1.09	0.96	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$605	$605	$542	$565	$784	$740	$750	[j]
Current Liabilities	$465	$465	$482	$380	$648	$511	$520	[k]
Current Portion of Long-Term Debt	$0	$0	$70	$50	$200	$0	$0	[l]
Net Working Capital	$140	$140	$130	$235	$336	$229	$230	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$0	$0	$20	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$2,204	$2,204	$2,251	$1,761	$1,536	$1,798	$1,808	[p]
Book Value of Long-Term Debt	$2,204	$2,204	$2,321	$1,811	$1,736	$1,798	$1,808	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$2,901	$2,901	$2,074	$1,949	$2,091	$1,968	$1,818	
Carrying Amount	$2,501	$2,501	$1,916	$1,636	$1,735	$1,808	$1,744	
Adjustment to Book Value of Long-Term Debt	$400	$400	$158	$313	$356	$160	$74	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,604	$2,604	$2,479	$2,124	$2,092	$1,958	$1,882	[s] = [q] + [r].
Market Value of Debt	$2,604	$2,604	$2,479	$2,124	$2,092	$1,958	$1,882	[t] = [s].
MARKET VALUE OF FIRM	$6,051	$5,759	$5,046	$4,336	$4,151	$3,756	$3,407	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	56.97%	54.79%	50.87%	51.02%	49.60%	47.87%	44.76%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	43.03%	45.21%	49.13%	48.98%	50.40%	52.13%	55.24%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel V: Public Serv. Enterprise

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$12,933	$12,933	$12,083	$11,338	$10,806	$10,159	$9,557	[a]
Shares Outstanding (in millions) - Common	505	505	506	506	506	506	506	[b]
Price per Share - Common	$41	$40	$38	$33	$32	$34	$32	[c]
Market Value of Common Equity	$20,749	$20,317	$18,979	$16,702	$16,052	$17,084	$16,359	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$20,749	$20,317	$18,979	$16,702	$16,052	$17,084	$16,359	[f]= [d]
Market to Book Value of Common Equity	1.60	1.57	1.57	1.47	1.49	1.68	1.71	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$3,204	$3,204	$3,846	$3,741	$3,978	$4,970	$3,671	[j]
Current Liabilities	$3,604	$3,604	$3,136	$3,235	$3,039	$3,692	$3,018	[k]
Current Portion of Long-Term Debt	$1,106	$1,106	$574	$1,010	$975	$1,489	$1,004	[l]
Net Working Capital	$706	$706	$1,284	$1,516	$1,914	$2,767	$1,657	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$20	$20	$0	$0	$16	$298	$390	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$8,132	$8,132	$8,389	$7,476	$7,334	$7,480	$8,152	[p]
Book Value of Long-Term Debt	$9,238	$9,238	$8,963	$8,486	$8,309	$8,969	$9,156	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$10,149	$10,149	$9,061	$9,324	$9,283	$9,836	$8,973	
Carrying Amount	$9,144	$9,144	$8,643	$7,939	$8,094	$8,940	$8,166	
Adjustment to Book Value of Long-Term Debt	$1,005	$1,005	$418	$1,385	$1,189	$896	$807	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$10,243	$10,243	$9,381	$9,871	$9,498	$9,865	$9,963	[s] = [q] + [r].
Market Value of Debt	$10,243	$10,243	$9,381	$9,871	$9,498	$9,865	$9,963	[t] = [s].
MARKET VALUE OF FIRM	$30,992	$30,560	$28,360	$26,573	$25,550	$26,949	$26,322	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	66.95%	66.48%	66.92%	62.85%	62.83%	63.39%	62.15%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	33.05%	33.52%	33.08%	37.15%	37.17%	36.61%	37.85%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
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Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel W: SCANA Corp.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$5,419	$5,419	$4,948	$4,598	$4,095	$3,838	$3,584	[a]
Shares Outstanding (in millions) - Common	143	143	142	140	132	130	127	[b]
Price per Share - Common	$63	$53	$50	$47	$48	$40	$40	[c]
Market Value of Common Equity	$9,019	$7,565	$7,105	$6,527	$6,379	$5,168	$5,109	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$9,019	$7,565	$7,105	$6,527	$6,379	$5,168	$5,109	[f]= [d]
Market to Book Value of Common Equity	1.66	1.40	1.44	1.42	1.56	1.35	1.43	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,221	$1,221	$1,359	$1,351	$1,361	$1,421	$1,476	[j]
Current Liabilities	$1,294	$1,294	$1,536	$1,203	$1,411	$1,686	$1,968	[k]
Current Portion of Long-Term Debt	$16	$16	$52	$19	$176	$285	$631	[l]
Net Working Capital	($57)	($57)	($125)	$167	$126	$20	$139	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$264	$264	$487	$378	$394	$581	$335	[n]
Adjusted Short-Term Debt	$57	$57	$125	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$6,018	$6,018	$5,681	$5,431	$4,976	$4,376	$3,865	[p]
Book Value of Long-Term Debt	$6,091	$6,091	$5,858	$5,450	$5,152	$4,661	$4,496	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$6,592	$6,592	$5,916	$6,115	$5,479	$4,841	$4,726	
Carrying Amount	$5,697	$5,697	$5,449	$5,121	$4,653	$4,488	$4,511	
Adjustment to Book Value of Long-Term Debt	$895	$895	$467	$994	$826	$352	$215	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$6,986	$6,986	$6,325	$6,444	$5,978	$5,013	$4,711	[s] = [q] + [r].
Market Value of Debt	$6,986	$6,986	$6,325	$6,444	$5,978	$5,013	$4,711	[t] = [s].
MARKET VALUE OF FIRM	$16,005	$14,551	$13,430	$12,971	$12,358	$10,181	$9,821	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	56.35%	51.99%	52.90%	50.32%	51.62%	50.76%	52.03%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	43.65%	48.01%	47.10%	49.68%	48.38%	49.24%	47.97%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
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Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel X: Sempra Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$11,625	$11,625	$11,333	$10,909	$10,082	$9,630	$8,802	[a]
Shares Outstanding (in millions) - Common	248	248	246	244	242	240	242	[b]
Price per Share - Common	$94	$93	$105	$86	$65	$51	$53	[c]
Market Value of Common Equity	$23,364	$22,956	$25,772	$21,032	$15,801	$12,326	$12,924	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$23,364	$22,956	$25,772	$21,032	$15,801	$12,326	$12,924	[f]= [d]
Market to Book Value of Common Equity	2.01	1.97	2.27	1.93	1.57	1.28	1.47	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$20	$20	$20	$20	$99	$99	$179	[h]
Market Value of Preferred Equity	$20	$20	$20	$20	$99	$99	$179	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$3,606	$3,606	$4,414	$3,712	$3,078	$2,938	$2,495	[j]
Current Liabilities	$5,118	$5,118	$4,292	$4,530	$4,349	$3,995	$3,777	[k]
Current Portion of Long-Term Debt	$1,168	$1,168	$188	$1,441	$709	$137	$313	[l]
Net Working Capital	($344)	($344)	$310	$623	($562)	($920)	($969)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,097	$1,097	$1,309	$522	$584	$641	$574	[n]
Adjusted Short-Term Debt	$344	$344	$0	$0	$562	$641	$574	[o] = See Sources and Notes.
Long-Term Debt	$12,527	$12,527	$12,437	$10,478	$11,193	$10,033	$8,032	[p]
Book Value of Long-Term Debt	$14,039	$14,039	$12,625	$11,919	$12,464	$10,811	$8,919	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$13,699	$13,699	$12,676	$13,243	$11,047	$8,883	$8,572	
Carrying Amount	$12,347	$12,347	$12,022	$11,873	$9,826	$8,330	$8,004	
Adjustment to Book Value of Long-Term Debt	$1,352	$1,352	$654	$1,370	$1,221	$553	$568	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$15,391	$15,391	$13,279	$13,289	$13,685	$11,364	$9,487	[s] = [q] + [r].
Market Value of Debt	$15,391	$15,391	$13,279	$13,289	$13,685	$11,364	$9,487	[t] = [s].
MARKET VALUE OF FIRM	$38,775	$38,367	$39,071	$34,341	$29,585	$23,789	$22,590	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	60.26%	59.83%	65.96%	61.25%	53.41%	51.81%	57.21%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.05%	0.05%	0.05%	0.06%	0.33%	0.42%	0.79%	[w] = [i] / [u].
Debt - Market Value Ratio	39.69%	40.12%	33.99%	38.70%	46.26%	47.77%	42.00%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel Y: Vectren Corp.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$1,650	$1,650	$1,581	$1,532	$1,506	$1,452	$1,411	[a]
Shares Outstanding (in millions) - Common	83	83	83	82	82	82	81	[b]
Price per Share - Common	$42	$40	$40	$33	$28	$27	$25	[c]
Market Value of Common Equity	$3,475	$3,324	$3,336	$2,736	$2,334	$2,222	$2,061	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$3,475	$3,324	$3,336	$2,736	$2,334	$2,222	$2,061	[f]= [d]
Market to Book Value of Common Equity	2.11	2.02	2.11	1.79	1.55	1.53	1.46	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$539	$539	$493	$608	$569	$623	$506	[j]
Current Liabilities	$619	$619	$427	$607	$783	$699	$545	[k]
Current Portion of Long-Term Debt	$88	$88	$5	$30	$132	$138	$48	[l]
Net Working Capital	$8	$8	$71	$31	($82)	$62	$9	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$111	$111	$62	$249	$316	$216	$157	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$82	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$1,523	$1,523	$1,572	$1,627	$1,454	$1,581	$1,590	[p]
Book Value of Long-Term Debt	$1,611	$1,611	$1,577	$1,657	$1,667	$1,719	$1,639	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,755	$1,755	$1,895	$1,873	$1,804	$1,841	$1,720	
Carrying Amount	$1,577	$1,577	$1,807	$1,660	$1,622	$1,716	$1,640	
Adjustment to Book Value of Long-Term Debt	$177	$177	$88	$214	$182	$125	$80	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,788	$1,788	$1,665	$1,871	$1,850	$1,844	$1,719	[s] = [q] + [r].
Market Value of Debt	$1,788	$1,788	$1,665	$1,871	$1,850	$1,844	$1,719	[t] = [s].
MARKET VALUE OF FIRM	$5,263	$5,112	$5,001	$4,606	$4,184	$4,066	$3,780	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	66.03%	65.03%	66.70%	59.39%	55.80%	54.64%	54.52%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	33.97%	34.97%	33.30%	40.61%	44.20%	45.36%	45.48%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel Z: Westar Energy

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$3,663	$3,663	$3,265	$3,033	$2,887	$2,588	$2,385	[a]
Shares Outstanding (in millions) - Common	141	141	131	127	126	117	111	[b]
Price per Share - Common	$44	$37	$35	$31	$29	$26	$24	[c]
Market Value of Common Equity	$6,146	$5,239	$4,550	$3,885	$3,718	$3,076	$2,667	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$6,146	$5,239	$4,550	$3,885	$3,718	$3,076	$2,667	[f]= [d]
Market to Book Value of Common Equity	1.68	1.43	1.39	1.28	1.29	1.19	1.12	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$21	$21	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$21	$21	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$758	$758	$749	$694	$678	$605	$586	[j]
Current Liabilities	$879	$879	$801	$854	$741	$888	$634	[k]
Current Portion of Long-Term Debt	$28	$28	$28	$278	$27	$28	$30	[l]
Net Working Capital	($93)	($93)	($24)	$118	($36)	($255)	($17)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$304	$304	$202	$52	$215	$392	$163	[n]
Adjusted Short-Term Debt	$93	$93	$24	$0	$36	$255	$17	[o] = See Sources and Notes.
Long-Term Debt	$3,080	$3,080	$3,382	$3,164	$3,062	$2,742	$2,779	[p]
Book Value of Long-Term Debt	$3,201	$3,201	$3,434	$3,442	$3,124	$3,025	$2,826	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$3,488	$3,488	$3,294	$3,179	$2,624	$2,571	$2,528	
Carrying Amount	$3,105	$3,105	$3,103	$2,703	$2,373	$2,373	$2,374	
Adjustment to Book Value of Long-Term Debt	$383	$383	$192	$476	$251	$197	$155	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$3,584	$3,584	$3,625	$3,918	$3,375	$3,222	$2,981	[s] = [q] + [r].
Market Value of Debt	$3,584	$3,584	$3,625	$3,918	$3,375	$3,222	$2,981	[t] = [s].
MARKET VALUE OF FIRM	$9,730	$8,824	$8,175	$7,803	$7,093	$6,319	$5,669	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	63.16%	59.38%	55.65%	49.79%	52.42%	48.67%	47.04%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	0.34%	0.38%	[w] = [i] / [u].
Debt - Market Value Ratio	36.84%	40.62%	44.35%	50.21%	47.58%	50.99%	52.58%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-3

Market Value of the U.S. Electric Sample

Panel AA: Xcel Energy Inc.

($MM)

	DCF Capital Structure	3rd Quarter, 2015	3rd Quarter, 2014	3rd Quarter, 2013	3rd Quarter, 2012	3rd Quarter, 2011	3rd Quarter, 2010	Notes
MARKET VALUE OF COMMON EQUITY								
Book Value, Common Shareholder's Equity	$10,545	$10,545	$10,155	$9,547	$8,850	$8,431	$7,606	[a]
Shares Outstanding (in millions) - Common	507	507	505	498	488	485	460	[b]
Price per Share - Common	$38	$34	$31	$28	$28	$25	$23	[c]
Market Value of Common Equity	$19,349	$17,219	$15,664	$13,799	$13,528	$12,021	$10,539	[d] = [b] x [c].
Market Value of GP Equity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	[e]
Total Market Value of Equity	$19,349	$17,219	$15,664	$13,799	$13,528	$12,021	$10,539	[f]= [d]
Market to Book Value of Common Equity	1.83	1.63	1.54	1.45	1.53	1.43	1.39	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$105	$105	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$105	$105	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$3,344	$3,344	$3,197	$3,121	$3,371	$2,861	$2,530	[j]
Current Liabilities	$3,085	$3,085	$3,471	$2,839	$3,161	$2,653	$2,199	[k]
Current Portion of Long-Term Debt	$457	$457	$258	$281	$859	$462	$414	[l]
Net Working Capital	$717	$717	($17)	$562	$1,070	$671	$744	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$64	$64	$697	$302	$304	$50	$40	[n]
Adjusted Short-Term Debt	$0	$0	$17	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$12,691	$12,691	$11,502	$10,914	$10,106	$9,450	$8,865	[p]
Book Value of Long-Term Debt	$13,148	$13,148	$11,776	$11,195	$10,965	$9,913	$9,279	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$13,360	$13,360	$11,879	$12,208	$11,735	$10,225	$9,026	
Carrying Amount	$11,757	$11,757	$11,192	$10,402	$9,908	$9,319	$8,432	
Adjustment to Book Value of Long-Term Debt	$1,603	$1,603	$687	$1,806	$1,826	$906	$594	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$14,751	$14,751	$12,463	$13,001	$12,792	$10,819	$9,873	[s] = [q] + [r].
Market Value of Debt	$14,751	$14,751	$12,463	$13,001	$12,792	$10,819	$9,873	[t] = [s].
MARKET VALUE OF FIRM	$34,100	$31,970	$28,128	$26,800	$26,319	$22,945	$20,517	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	56.74%	53.86%	55.69%	51.49%	51.40%	52.39%	51.37%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	0.46%	0.51%	[w] = [i] / [u].
Debt - Market Value Ratio	43.26%	46.14%	44.31%	48.51%	48.60%	47.15%	48.12%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of February 10, 2016
Capital structure from 3rd Quarter, 2015 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 3rd Quarter, 2015 balance sheet information and a 15-trading day average closing price ending on 2/10/2016.
Prices are reported in Supporting Schedule #1 to Table No. BV-ELEC-6.
[o] =
(1): 0 if [m] > 0.
(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2014 10-K.

Table No. BV-ELEC-4

Capital Structure Summary

Company	DCF Capital Structure			5-Year Average Capital Structure		
	Common Equity - Value Ratio [1]	Preferred Equity - Value Ratio [2]	Debt - Value Ratio [3]	Common Equity - Value Ratio [4]	Preferred Equity - Value Ratio [5]	Debt - Value Ratio [6]
ALLETE	59.8%	0.0%	40.2%	60.2%	0.0%	39.8%
Alliant Energy	61.2%	1.7%	37.1%	57.8%	2.3%	39.9%
Amer. Elec. Power	56.8%	0.0%	43.2%	52.0%	0.0%	48.0%
Ameren Corp.	59.6%	0.0%	40.4%	52.6%	0.0%	47.4%
CenterPoint Energy	45.1%	0.0%	54.9%	47.8%	0.0%	52.2%
CMS Energy Corp.	52.7%	0.0%	47.3%	42.6%	0.2%	57.2%
Consol. Edison	59.1%	0.0%	40.9%	56.9%	0.2%	42.9%
Dominion Resources	59.8%	0.0%	40.2%	59.6%	0.4%	40.0%
DTE Energy	59.7%	0.0%	40.3%	55.1%	0.0%	44.9%
Edison Int'l	55.7%	5.6%	38.7%	50.1%	5.2%	44.7%
El Paso Electric	54.9%	0.0%	45.1%	55.9%	0.0%	44.1%
Entergy Corp.	47.5%	0.8%	51.7%	49.2%	1.2%	49.7%
G't Plains Energy	51.3%	0.5%	48.2%	45.4%	0.5%	54.0%
IDACORP Inc.	64.2%	0.0%	35.8%	57.1%	0.0%	42.9%
MGE Energy	78.8%	0.0%	21.2%	73.5%	0.0%	26.5%
NextEra Energy	61.7%	0.0%	38.3%	53.9%	0.0%	46.1%
OGE Energy	67.0%	0.0%	33.0%	65.0%	0.0%	35.0%
Otter Tail Corp.	63.1%	0.0%	36.9%	63.1%	0.6%	36.3%
PG&E Corp.	60.0%	0.6%	39.5%	55.5%	0.7%	43.8%
Pinnacle West Capital	64.0%	0.0%	36.0%	58.9%	0.0%	41.1%
Portland General	57.0%	0.0%	43.0%	49.8%	0.0%	50.2%
Public Serv. Enterprise	66.9%	0.0%	33.1%	64.1%	0.0%	35.9%
SCANA Corp.	56.4%	0.0%	43.6%	51.5%	0.0%	48.5%
Sempra Energy	60.3%	0.1%	39.7%	58.2%	0.3%	41.6%
Vectren Corp.	66.0%	0.0%	34.0%	59.3%	0.0%	40.7%
Westar Energy	63.2%	0.0%	36.8%	51.9%	0.1%	47.9%
Xcel Energy Inc.	56.7%	0.0%	43.3%	52.7%	0.1%	47.1%
Average	59.6%	0.3%	40.1%	55.5%	0.4%	44.0%
Nuclear Subsample Average	59.7%	0.3%	40.0%	55.8%	0.5%	43.7%

Sources and Notes:
[1], [4]: Supporting Schedule #1 to Table No. BV-ELEC-4.
[2], [5]: Supporting Schedule #2 to Table No. BV-ELEC-4.
[3], [6]: Supporting Schedule #3 to Table No. BV-ELEC-4.
Values in this table may not add up exactly to 100% because of rounding.

Table No. BV-ELEC-5

Estimated Growth Rates

Company	ThomsonOne IBES Estimate		Value Line			Combined Growth Rate
	Long-Term Growth Rate	Number of Estimates	EPS Year 2015 Estimate	EPS Year 2018-2020 Estimate	Annualized Growth Rate	
	[1]	[2]	[3]	[4]	[5]	[6]
ALLETE	5.0%	1	$3.50	$4.00	3.4%	4.2%
Alliant Energy	5.6%	2	$3.65	$4.55	5.7%	5.6%
Amer. Elec. Power	4.6%	5	$3.70	$4.25	3.5%	4.4%
Ameren Corp.	6.0%	2	$2.45	$3.50	9.3%	7.1%
CenterPoint Energy	0.4%	3	$1.10	$1.35	5.3%	1.6%
CMS Energy Corp.	6.7%	4	$1.88	$2.25	4.6%	6.3%
Consol. Edison	2.9%	5	$3.95	$4.50	3.3%	3.0%
Dominion Resources	5.5%	6	$3.50	$4.75	7.9%	5.8%
DTE Energy	5.0%	5	$4.60	$5.75	5.7%	5.1%
Edison Int'l	-0.5%	5	$4.40	$5.25	4.5%	0.3%
El Paso Electric	7.0%	1	$1.95	$2.75	9.0%	8.0%
Entergy Corp.	-2.5%	5	$6.00	$5.25	-3.3%	-2.6%
G't Plains Energy	4.8%	3	$1.35	$2.00	10.3%	6.2%
IDACORP Inc.	4.0%	1	$3.90	$4.25	2.2%	3.1%
MGE Energy	4.0%	1	$2.25	$3.15	8.8%	6.4%
NextEra Energy	7.1%	5	$6.05	$7.75	6.4%	7.0%
OGE Energy	2.2%	3	$1.75	$2.25	6.5%	3.2%
Otter Tail Corp.	6.0%	1	$1.60	$2.25	8.9%	7.4%
PG&E Corp.	5.8%	6	$1.90	$4.25	22.3%	8.2%
Pinnacle West Capital	4.9%	4	$3.85	$4.50	4.0%	4.8%
Portland General	4.1%	4	$2.15	$2.75	6.3%	4.6%
Public Serv. Enterprise	1.4%	3	$3.15	$3.50	2.7%	1.7%
SCANA Corp.	4.5%	2	$3.85	$4.50	4.0%	4.3%
Sempra Energy	9.4%	2	$4.80	$7.25	10.9%	9.9%
Vectren Corp.	5.0%	2	$2.35	$3.25	8.4%	6.1%
Westar Energy	3.5%	3	$2.25	$3.10	8.3%	4.7%
Xcel Energy Inc.	4.7%	3	$2.05	$2.50	5.1%	4.8%

Sources and Notes:

[1] - [2]: Updated from ThomsonOne as of Feb 10, 2016.

[3] - [4]: From Valueline Investment Analyzer as of Feb 09, 2016.

[5]: ([4]/[3])^(1/4) - 1, where 4 is the number of years between 2019, the middle year of Value Line's 3-5 year forecast, and our study year 2015.

[6]: Weighted average growth rate.

Table No. BV-ELEC-6

DCF Cost of Equity of the U.S. Electric Sample

Panel A: Simple DCF Method (Quarterly)

Company	Stock Price [1]	Most Recent Dividend [2]	Quarterly Dividend Yield (t+1) [3]	Combined Long-Term Growth Rate [4]	Quarterly Growth Rate [5]	DCF Cost of Equity [6]
ALLETE	$51.84	$0.51	0.98%	4.2%	1.0%	8.3%
Alliant Energy	$65.26	$0.59	0.91%	5.6%	1.4%	9.4%
Amer. Elec. Power	$60.29	$0.56	0.94%	4.4%	1.1%	8.3%
Ameren Corp.	$44.89	$0.43	0.96%	7.1%	1.7%	11.2%
CenterPoint Energy	$17.87	$0.25	1.39%	1.6%	0.4%	7.4%
CMS Energy Corp.	$38.24	$0.31	0.82%	6.3%	1.5%	9.8%
Consol. Edison	$70.35	$0.65	0.93%	3.0%	0.7%	6.9%
Dominion Resources	$70.14	$0.65	0.94%	5.8%	1.4%	9.8%
DTE Energy	$84.26	$0.73	0.88%	5.1%	1.3%	8.8%
Edison Int'l	$61.87	$0.48	0.78%	0.3%	0.1%	3.5%
El Paso Electric	$40.31	$0.30	0.75%	8.0%	1.9%	11.2%
Entergy Corp.	$69.76	$0.85	1.21%	-2.6%	-0.7%	2.2%
G't Plains Energy	$27.99	$0.26	0.95%	6.2%	1.5%	10.2%
IDACORP Inc.	$68.34	$0.51	0.75%	3.1%	0.8%	6.2%
MGE Energy	$48.72	$0.30	0.61%	6.4%	1.6%	9.0%
NextEra Energy	$110.89	$0.77	0.71%	7.0%	1.7%	10.0%
OGE Energy	$25.89	$0.28	1.07%	3.2%	0.8%	7.7%
Otter Tail Corp.	$27.22	$0.31	1.17%	7.4%	1.8%	12.5%
PG&E Corp.	$54.64	$0.46	0.85%	8.2%	2.0%	11.8%
Pinnacle West Capital	$66.36	$0.63	0.95%	4.8%	1.2%	8.8%
Portland General	$38.83	$0.30	0.78%	4.6%	1.1%	7.8%
Public Serv. Enterprise	$41.06	$0.39	0.95%	1.7%	0.4%	5.6%
SCANA Corp.	$63.12	$0.55	0.87%	4.3%	1.1%	7.9%
Sempra Energy	$94.21	$0.70	0.76%	9.9%	2.4%	13.2%
Vectren Corp.	$42.02	$0.40	0.97%	6.1%	1.5%	10.2%
Westar Energy	$43.50	$0.36	0.84%	4.7%	1.2%	8.2%
Xcel Energy Inc.	$38.14	$0.32	0.85%	4.8%	1.2%	8.3%

Sources and Notes:
[1]: Supporting Schedule #1 to Table No. BV-ELEC-6.
[2]: Supporting Schedule #2 to Table No. BV-ELEC-6.
[3]: ([2] / [1]) x (1 + [5]).
[4]: Table No. BV-ELEC-5, [6].
[5]: {(1 + [4]) ^ (1/4)} - 1.
[6]: {([3] + [5] + 1) ^ 4} - 1.

Table No. BV-ELEC-7

Overall After-Tax DCF Cost of Capital of the U.S. Electric Sample

Panel A: Simple DCF Method (Quarterly)

Company	3rd Quarter, 2015 Bond Rating [1]	3rd Quarter, 2015 Preferred Equity Rating [2]	DCF Cost of Equity [3]	DCF Common Equity to Market Value Ratio [4]	Cost of Preferred Equity [5]	DCF Preferred Equity to Market Value Ratio [6]	DCF Cost of Debt [7]	DCF Debt to Market Value Ratio [8]	APS Representative Income Tax Rate [9]	Overall After-Tax Cost of Capital [10]
ALLETE	BBB	-	8.3%	59.8%	-	0.0%	4.7%	40.2%	39.5%	6.10%
Alliant Energy	A	A	9.4%	61.2%	4.1%	1.7%	4.1%	37.1%	39.5%	6.77%
Amer. Elec. Power	BBB	-	8.3%	56.8%	-	0.0%	4.7%	43.2%	39.5%	5.94%
Ameren Corp.	BBB	-	11.2%	59.6%	-	0.0%	4.7%	40.4%	39.5%	7.83%
CenterPoint Energy	A	-	7.4%	45.1%	-	0.0%	4.1%	54.9%	39.5%	4.69%
CMS Energy Corp.	BBB	-	9.8%	52.7%	-	0.0%	4.7%	47.3%	39.5%	6.49%
Consol. Edison	A	-	6.9%	59.1%	-	0.0%	4.1%	40.9%	39.5%	5.08%
Dominion Resources	A	-	9.8%	59.8%	-	0.0%	4.1%	40.2%	39.5%	6.86%
DTE Energy	BBB	-	8.8%	59.7%	-	0.0%	4.7%	40.3%	39.5%	6.39%
Edison Int'l	BBB	BBB	3.5%	55.7%	4.7%	5.6%	4.7%	38.7%	39.5%	~~2.3%~~
El Paso Electric	BBB	-	11.2%	54.9%	-	0.0%	4.7%	45.1%	39.5%	7.41%
Entergy Corp.	BBB	BBB	2.2%	47.5%	4.7%	0.8%	4.7%	51.7%	39.5%	~~2.6%~~
G't Plains Energy	BBB	BBB	10.2%	51.3%	4.7%	0.5%	4.7%	48.2%	39.5%	6.62%
IDACORP Inc.	BBB	-	6.2%	64.2%	-	0.0%	4.7%	35.8%	39.5%	4.99%
MGE Energy	AA	-	9.0%	78.8%	-	0.0%	3.9%	21.2%	39.5%	7.58%
NextEra Energy	A	-	10.0%	61.7%	-	0.0%	4.1%	38.3%	39.5%	7.10%
OGE Energy	A	-	7.7%	67.0%	-	0.0%	4.1%	33.0%	39.5%	5.98%
Otter Tail Corp.	BBB	-	12.5%	63.1%	-	0.0%	4.7%	36.9%	39.5%	8.91%
PG&E Corp.	BBB	BBB	11.8%	60.0%	4.7%	0.6%	4.7%	39.5%	39.5%	8.22%
Pinnacle West Capital	A	-	8.8%	64.0%	-	0.0%	4.1%	36.0%	39.5%	6.50%
Portland General	BBB	-	7.8%	57.0%	-	0.0%	4.7%	43.0%	39.5%	5.67%
Public Serv. Enterprise	BBB	-	5.6%	66.9%	-	0.0%	4.7%	33.1%	39.5%	~~4.69%~~
SCANA Corp.	BBB	-	7.9%	56.4%	-	0.0%	4.7%	43.6%	39.5%	5.70%
Sempra Energy	BBB	BBB	13.2%	60.3%	4.7%	0.1%	4.7%	39.7%	39.5%	9.05%
Vectren Corp.	A	-	10.2%	66.0%	-	0.0%	4.1%	34.0%	39.5%	7.61%
Westar Energy	BBB	-	8.2%	63.2%	-	0.0%	4.7%	36.8%	39.5%	6.23%
Xcel Energy Inc.	A	-	8.3%	56.7%	-	0.0%	4.1%	43.3%	39.5%	5.81%
Simple Full Sample Average			9.3%	59.9%	4.5%	0.1%	4.4%	40.0%	39.5%	6.65%
Simple Nuclear Subsample Average			9.7%	60.3%	4.4%	0.3%	4.4%	39.4%	39.5%	6.92%

Sources and Notes:

[1]: S&P Credit Ratings from Research Insight.

[2]: Preferred ratings were assumed equal to debt ratings.

[3]: Table No. BV-ELEC-6; Panel A, [6].

[4]: Table No. BV-ELEC-4, [1].

[5]: Supporting Schedule #2 to Table No. BV-ELEC-11, Panel C.

[6]: Table No. BV-ELEC-4, [2].

[7]: Supporting Schedule #2 to Table No. BV-ELEC-11, Panel B.

[8]: Table No. BV-ELEC-4, [3].

[9]: APS Effective Corporate Tax Rate.

[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}. A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 100 basis points.

Table No. BV-ELEC-8

DCF Cost of Equity at Representative Deemed Capital Structure

	Overall After -Tax Cost of Capital [1]	APS Representative Base Deemed % Debt [2]	Representative Cost of A Rated Utility Debt [3]	APS Representative Income Tax Rate [4]	APS Representative Base Deemed % Equity [5]	Estimated Return on Equity [6]
Full Sample						
Simple DCF Quarterly	6.6%	44.0%	4.1%	39.5%	56.0%	9.9%
Nuclear Subsample						
Simple DCF Quarterly	6.9%	44.0%	4.1%	39.5%	56.0%	10.4%

Sources and Notes:
[1]: Table No. BV-ELEC-7; Panels A-B, [10].
[2]: APS Assumed Capital Structure.
[3]: Based on an A rating. Yield from Bloomberg as of February 10, 2016.
[4]: APS Effective Corporate Tax Rate.
[5]: APS Assumed Capital Structure.
[6]: {[1] - ([2] x [3] x (1 - [4]))} / [5].

Table No. BV-ELEC-9

Risk Free Rate

[1]	Consensus 10-Year Forecast	3.40%
	U.S. Government Bond Yields	
[2]	20-Year	5.21%
[3]	10-Year	4.68%
[4]	Maturity Premium	0.53%
[5]	Consensus 10-Year Forecast Adjusted to 20-year Horizon	3.93%

Sources and Notes:

[1]: Bluechip Consensus Forecast in January 2016.

[2]-[3]: Supporting Schedule # 1 to Table No. BV-ELEC-9. Averages of monthly bond yields from January 1991 through January 2016.

[4]: [2] - [3].

[5]: [1] + [4].

Table No. BV-ELEC-10

Risk Positioning Cost of Equity of the U.S. Electric Sample

Panel A: Scenario 1 - Long-Term Risk Free Rate of 4.73%, Long-Term Market Risk Premium of 7.00%

Company	Long-Term Risk-Free Rate [1]	Value Line Betas [2]	Long-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (1.5%) Cost of Equity [5]
ALLETE	4.73%	0.80	7.00%	10.3%	10.6%
Alliant Energy	4.73%	0.80	7.00%	10.3%	10.6%
Amer. Elec. Power	4.73%	0.70	7.00%	9.6%	10.1%
Ameren Corp.	4.73%	0.75	7.00%	10.0%	10.4%
CenterPoint Energy	4.73%	0.85	7.00%	10.7%	10.9%
CMS Energy Corp.	4.73%	0.75	7.00%	10.0%	10.4%
Consol. Edison	4.73%	0.60	7.00%	8.9%	9.5%
Dominion Resources	4.73%	0.70	7.00%	9.6%	10.1%
DTE Energy	4.73%	0.75	7.00%	10.0%	10.4%
Edison Int'l	4.73%	0.70	7.00%	9.6%	10.1%
El Paso Electric	4.73%	0.75	7.00%	10.0%	10.4%
Entergy Corp.	4.73%	0.70	7.00%	9.6%	10.1%
G't Plains Energy	4.73%	0.85	7.00%	10.7%	10.9%
IDACORP Inc.	4.73%	0.80	7.00%	10.3%	10.6%
MGE Energy	4.73%	0.75	7.00%	10.0%	10.4%
NextEra Energy	4.73%	0.75	7.00%	10.0%	10.4%
OGE Energy	4.73%	0.95	7.00%	11.4%	11.5%
Otter Tail Corp.	4.73%	0.85	7.00%	10.7%	10.9%
PG&E Corp.	4.73%	0.70	7.00%	9.6%	10.1%
Pinnacle West Capital	4.73%	0.75	7.00%	10.0%	10.4%
Portland General	4.73%	0.80	7.00%	10.3%	10.6%
Public Serv. Enterprise	4.73%	0.75	7.00%	10.0%	10.4%
SCANA Corp.	4.73%	0.75	7.00%	10.0%	10.4%
Sempra Energy	4.73%	0.80	7.00%	10.3%	10.6%
Vectren Corp.	4.73%	0.75	7.00%	10.0%	10.4%
Westar Energy	4.73%	0.75	7.00%	10.0%	10.4%
Xcel Energy Inc.	4.73%	0.65	7.00%	9.3%	9.8%
Average				10.0%	10.4%
Nuclear Subsample Average				9.9%	10.3%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Bloomberg as of February 10, 2016.
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Table No. BV-ELEC-10

Risk Positioning Cost of Equity of the U.S. Electric Sample

Panel B: Scenario 2 - Long-Term Risk Free Rate of 3.93%, Long-Term Market Risk Premium of 8.00%

Company	Long-Term Risk-Free Rate [1]	Value Line Betas [2]	Long-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (1.5%) Cost of Equity [5]
ALLETE	3.93%	0.80	8.00%	10.3%	10.6%
Alliant Energy	3.93%	0.80	8.00%	10.3%	10.6%
Amer. Elec. Power	3.93%	0.70	8.00%	9.5%	10.0%
Ameren Corp.	3.93%	0.75	8.00%	9.9%	10.3%
CenterPoint Energy	3.93%	0.85	8.00%	10.7%	11.0%
CMS Energy Corp.	3.93%	0.75	8.00%	9.9%	10.3%
Consol. Edison	3.93%	0.60	8.00%	8.7%	9.3%
Dominion Resources	3.93%	0.70	8.00%	9.5%	10.0%
DTE Energy	3.93%	0.75	8.00%	9.9%	10.3%
Edison Int'l	3.93%	0.70	8.00%	9.5%	10.0%
El Paso Electric	3.93%	0.75	8.00%	9.9%	10.3%
Entergy Corp.	3.93%	0.70	8.00%	9.5%	10.0%
G't Plains Energy	3.93%	0.85	8.00%	10.7%	11.0%
IDACORP Inc.	3.93%	0.80	8.00%	10.3%	10.6%
MGE Energy	3.93%	0.75	8.00%	9.9%	10.3%
NextEra Energy	3.93%	0.75	8.00%	9.9%	10.3%
OGE Energy	3.93%	0.95	8.00%	11.5%	11.6%
Otter Tail Corp.	3.93%	0.85	8.00%	10.7%	11.0%
PG&E Corp.	3.93%	0.70	8.00%	9.5%	10.0%
Pinnacle West Capital	3.93%	0.75	8.00%	9.9%	10.3%
Portland General	3.93%	0.80	8.00%	10.3%	10.6%
Public Serv. Enterprise	3.93%	0.75	8.00%	9.9%	10.3%
SCANA Corp.	3.93%	0.75	8.00%	9.9%	10.3%
Sempra Energy	3.93%	0.80	8.00%	10.3%	10.6%
Vectren Corp.	3.93%	0.75	8.00%	9.9%	10.3%
Westar Energy	3.93%	0.75	8.00%	9.9%	10.3%
Xcel Energy Inc.	3.93%	0.65	8.00%	9.1%	9.7%
Average				10.0%	10.4%
Nuclear Subsample Average				9.9%	10.2%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Bloomberg as of February 10, 2016.
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Table No. BV-ELEC-11

Overall After-Tax Cost of Capital of the U.S. Electric Sample

Panel A: CAPM Cost of Equity Scenario 1 - Long-Term Risk Free Rate of 4.73%, Long-Term Market Risk Premium of 7.00%

Company	CAPM Cost of Equity [1]	ECAPM (1.5%) Cost of Equity [2]	5-Year Average Common Equity to Market Value Ratio [3]	Weighted - Average Cost of Preferred Equity [4]	5-Year Average Preferred Equity to Market Value Ratio [5]	Weighted-Average Cost of Debt [6]	5-Year Average Debt to Market Value Ratio [7]	APS Representative Income Tax Rate [8]	Overall After-Tax Cost of Capital (CAPM) [9]	Overall After-Tax Cost of Capital (ECAPM 1.5%) [10]
ALLETE	10.3%	10.6%	60.2%	-	0.0%	4.65%	39.8%	39.5%	7.3%	7.5%
Alliant Energy	10.3%	10.6%	57.8%	4.34%	2.3%	4.34%	39.9%	39.5%	7.1%	7.3%
Amer. Elec. Power	9.6%	10.1%	52.0%	4.65%	0.0%	4.65%	48.0%	39.5%	6.4%	6.6%
Ameren Corp.	10.0%	10.4%	52.6%	-	0.0%	4.65%	47.4%	39.5%	6.6%	6.8%
CenterPoint Energy	10.7%	10.9%	47.8%	-	0.0%	4.34%	52.2%	39.5%	6.5%	6.6%
CMS Energy Corp.	10.0%	10.4%	42.6%	-	0.2%	4.65%	57.2%	39.5%	5.9%	6.0%
Consol. Edison	8.9%	9.5%	56.9%	4.13%	0.2%	4.13%	42.9%	39.5%	6.2%	6.5%
Dominion Resources	9.6%	10.1%	59.6%	4.13%	0.4%	4.13%	40.0%	39.5%	6.8%	7.0%
DTE Energy	10.0%	10.4%	55.1%	-	0.0%	4.65%	44.9%	39.5%	6.8%	7.0%
Edison Int'l	9.6%	10.1%	50.1%	4.65%	5.2%	4.65%	44.7%	39.5%	6.3%	6.5%
El Paso Electric	10.0%	10.4%	55.9%	-	0.0%	4.65%	44.1%	39.5%	6.8%	7.0%
Entergy Corp.	9.6%	10.1%	49.2%	4.65%	1.2%	4.65%	49.7%	39.5%	6.2%	6.4%
G't Plains Energy	10.7%	10.9%	45.4%	4.65%	0.5%	4.65%	54.0%	39.5%	6.4%	6.5%
IDACORP Inc.	10.3%	10.6%	57.1%	-	0.0%	4.65%	42.9%	39.5%	7.1%	7.3%
MGE Energy	10.0%	10.4%	73.5%	-	0.0%	3.86%	26.5%	39.5%	8.0%	8.2%
NextEra Energy	10.0%	10.4%	53.9%	-	0.0%	4.13%	46.1%	39.5%	6.5%	6.7%
OGE Energy	11.4%	11.5%	65.0%	-	0.0%	4.34%	35.0%	39.5%	8.3%	8.4%
Otter Tail Corp.	10.7%	10.9%	63.1%	4.65%	0.6%	4.65%	36.3%	39.5%	7.8%	7.9%
PG&E Corp.	9.6%	10.1%	55.5%	4.65%	0.7%	4.65%	43.8%	39.5%	6.6%	6.9%
Pinnacle West Capital	10.0%	10.4%	58.9%	-	0.0%	4.44%	41.1%	39.5%	7.0%	7.2%
Portland General	10.3%	10.6%	49.8%	-	0.0%	4.65%	50.2%	39.5%	6.6%	6.7%
Public Serv. Enterprise	10.0%	10.4%	64.1%	-	0.0%	4.65%	35.9%	39.5%	7.4%	7.6%
SCANA Corp.	10.0%	10.4%	51.5%	-	0.0%	4.65%	48.5%	39.5%	6.5%	6.7%
Sempra Energy	10.3%	10.6%	58.2%	4.65%	0.3%	4.65%	41.6%	39.5%	7.2%	7.4%
Vectren Corp.	10.0%	10.4%	59.3%	-	0.0%	4.13%	40.7%	39.5%	6.9%	7.2%
Westar Energy	10.0%	10.4%	51.9%	4.65%	0.1%	4.65%	47.9%	39.5%	6.5%	6.7%
Xcel Energy Inc.	9.3%	9.8%	52.7%	4.13%	0.1%	4.13%	47.1%	39.5%	6.1%	6.4%
Full Sample Average	10.0%	10.4%	55.5%	4.5%	0.4%	4.5%	44.0%	39.5%	6.8%	7.0%
Nuclear Subsample Average	9.9%	10.3%	55.8%	4.4%	0.5%	4.5%	43.7%	39.5%	6.7%	7.0%

Sources and Notes:

[1]: Table No. BV-ELEC-10; Panel A, [4].
[2]: Table No. BV-ELEC-10; Panel A, [5].
[3]: Table No. BV-ELEC-4, [4].
[4]: Supporting Schedule #2 to Table No. BV-ELEC
[5]: Table No. BV-ELEC-4, [5].
[6]: Supporting Schedule #2 to Table No. BV-ELEC-11, P
[7]: Table No. BV-ELEC-4, [6].
[8]: APS Effective Corporate Tax Rate
[9]: ([1] x [3]) + ([4] x [5]) + {[6] x [7] x (1 - [8])}.
[10]: ([2] x [3]) + ([4] x [5]) + {[6] x [7] x (1 - [8])}.

[9]-[10] A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 100 basis points

Table No. BV-ELEC-11

Overall After-Tax Cost of Capital of the U.S. Electric Sample

Panel B: CAPM Cost of Equity Scenario 2 - Long-Term Risk Free Rate of 3.93%, Long-Term Market Risk Premium of 8.00%

Company	CAPM Cost of Equity [1]	ECAPM (1.5%) Cost of Equity [2]	5-Year Average Common Equity to Market Value Ratio [3]	Weighted - Average Cost of Preferred Equity [4]	5-Year Average Preferred Equity to Market Value Ratio [5]	Weighted-Average Cost of Debt [6]	5-Year Average Debt to Market Value Ratio [7]	APS Representative Income Tax Rate [8]	Overall After-Tax Cost of Capital (CAPM) [9]	Overall After-Tax Cost of Capital (ECAPM 1.5%) [10]
ALLETE	10.3%	10.6%	60.2%	-	0.0%	4.65%	39.8%	39.5%	7.3%	7.5%
Alliant Energy	10.3%	10.6%	57.8%	4.34%	2.3%	4.34%	39.9%	39.5%	7.1%	7.3%
Amer. Elec. Power	9.5%	10.0%	52.0%	4.65%	0.0%	4.65%	48.0%	39.5%	6.3%	6.5%
Ameren Corp.	9.9%	10.3%	52.6%	-	0.0%	4.65%	47.4%	39.5%	6.6%	6.8%
CenterPoint Energy	10.7%	11.0%	47.8%	-	0.0%	4.34%	52.2%	39.5%	6.5%	6.6%
CMS Energy Corp.	9.9%	10.3%	42.6%	-	0.2%	4.65%	57.2%	39.5%	5.8%	6.0%
Consol. Edison	8.7%	9.3%	56.9%	4.13%	0.2%	4.13%	42.9%	39.5%	6.0%	6.4%
Dominion Resources	9.5%	10.0%	59.6%	4.13%	0.4%	4.13%	40.0%	39.5%	6.7%	7.0%
DTE Energy	9.9%	10.3%	55.1%	-	0.0%	4.65%	44.9%	39.5%	6.7%	6.9%
Edison Int'l	9.5%	10.0%	50.1%	4.65%	5.2%	4.65%	44.7%	39.5%	6.3%	6.5%
El Paso Electric	9.9%	10.3%	55.9%	-	0.0%	4.65%	44.1%	39.5%	6.8%	7.0%
Entergy Corp.	9.5%	10.0%	49.2%	4.65%	1.2%	4.65%	49.7%	39.5%	6.1%	6.4%
G't Plains Energy	10.7%	11.0%	45.4%	4.65%	0.5%	4.65%	54.0%	39.5%	6.4%	6.5%
IDACORP Inc.	10.3%	10.6%	57.1%	-	0.0%	4.65%	42.9%	39.5%	7.1%	7.3%
MGE Energy	9.9%	10.3%	73.5%	-	0.0%	3.86%	26.5%	39.5%	7.9%	8.2%
NextEra Energy	9.9%	10.3%	53.9%	-	0.0%	4.13%	46.1%	39.5%	6.5%	6.7%
OGE Energy	11.5%	11.6%	65.0%	-	0.0%	4.34%	35.0%	39.5%	8.4%	8.5%
Otter Tail Corp.	10.7%	11.0%	63.1%	4.65%	0.6%	4.65%	36.3%	39.5%	7.8%	8.0%
PG&E Corp.	9.5%	10.0%	55.5%	4.65%	0.7%	4.65%	43.8%	39.5%	6.6%	6.8%
Pinnacle West Capital	9.9%	10.3%	58.9%	-	0.0%	4.44%	41.1%	39.5%	7.0%	7.2%
Portland General	10.3%	10.6%	49.8%	-	0.0%	4.65%	50.2%	39.5%	6.6%	6.7%
Public Serv. Enterprise	9.9%	10.3%	64.1%	-	0.0%	4.65%	35.9%	39.5%	7.4%	7.6%
SCANA Corp.	9.9%	10.3%	51.5%	-	0.0%	4.65%	48.5%	39.5%	6.5%	6.7%
Sempra Energy	10.3%	10.6%	58.2%	4.65%	0.3%	4.65%	41.6%	39.5%	7.2%	7.4%
Vectren Corp.	9.9%	10.3%	59.3%	-	0.0%	4.13%	40.7%	39.5%	6.9%	7.1%
Westar Energy	9.9%	10.3%	51.9%	4.65%	0.1%	4.65%	47.9%	39.5%	6.5%	6.7%
Xcel Energy Inc.	9.1%	9.7%	52.7%	4.13%	0.1%	4.13%	47.1%	39.5%	6.0%	6.3%
Full Sample Average	10.0%	10.4%	55.5%	4.5%	0.4%	4.5%	44.0%	39.5%	6.8%	7.0%
Nuclear Subsample Average	9.9%	10.2%	55.8%	4.4%	0.5%	4.5%	43.7%	39.5%	6.7%	6.9%

Sources and Notes:

[1]: Table No. BV-ELEC-10; Panel B, [4].
[2]: Table No. BV-ELEC-10; Panel B, [5].
[3]: Table No. BV-ELEC-4, [4].
[4]: Supporting Schedule #2 to Table No. BV-ELEC
[5]: Table No. BV-ELEC-4, [5].
[6]: Supporting Schedule #2 to Table No. BV-ELEC-11, P
[7]: Table No. BV-ELEC-4, [6].
[8]: APS Effective Corporate Tax Rate
[9]: ([1] x [3]) + ([4] x [5]) + {[6] x [7] x (1 - [8])}.
[10]: ([2] x [3]) + ([4] x [5]) + {[6] x [7] x (1 - [8])}.

[9]-[10] A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 100 basis points

Table No. BV-ELEC-12

Risk Positioning Cost of Equity at Representative Deemed Capital Structure

	Overall After-Tax Cost of Capital (Scenario 1) [1]	Overall After-Tax Cost of Capital (Scenario 2) [2]	APS Representative Base Deemed % Debt [3]	Representative Cost of A-Rated Utility Debt [4]	APS Representative Income Tax Rate [5]	APS Representative Base Deemed % Equity [6]	Estimated Return on Equity (Scenario 1) [7]	Estimated Return on Equity (Scenario 2) [8]
Full Sample:								
CAPM	6.8%	6.8%	44.0%	4.1%	39.5%	56.0%	10.2%	10.1%
ECAPM (1.50%)	7.0%	7.0%	44.0%	4.1%	39.5%	56.0%	10.5%	10.5%
Nuclear Subsample:								
CAPM	6.7%	6.7%	44.0%	4.1%	39.5%	56.0%	10.1%	10.0%
ECAPM (1.50%)	7.0%	6.9%	44.0%	4.1%	39.5%	56.0%	10.5%	10.4%

Sources and Notes:

[1]: Table No. BV-ELEC-11; Panel A, [9] - [10].

[2]: Table No. BV-ELEC-11; Panel B, [9] - [10].

Scenario 1: Long-Term Risk Free Rate of 4.73%, Long-Term Market Risk Premium of 7.00%.

Scenario 2: Long-Term Risk Free Rate of 3.93%, Long-Term Market Risk Premium of 8.00%.

[3]: APS Assumed Capital Structure.

[4]: Based on a A rating. Yield from Bloomberg as of February 10, 2016.

[5]: APS Effective Corporate Tax Rate.

[6]: APS Assumed Capital Structure.

[7]: {[1] - ([3] x [4] x (1 - [5])}/ [6].

[8]: {[2] - ([3] x [4] x (1 - [5]))}/ [6].

Table No. BV-ELEC-13

Hamada Adjustment to Obtain Unlevered Asset Beta

Company	Value Line Betas [1]	Debt Beta [2]	5-Year Average Common Equity to Market Value Ratio [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	5-Year Average Debt to Market Value Ratio [5]	APS Representative Income Tax Rate [6]	Asset Beta: Without Taxes [7]	Asset Beta: With Taxes [8]
ALLETE	0.80	0.10	60.2%	0.0%	39.8%	39.5%	0.52	0.60
Alliant Energy	0.80	0.07	57.8%	2.3%	39.9%	39.5%	0.49	0.57
Amer. Elec. Power	0.70	0.10	52.0%	0.0%	48.0%	39.5%	0.41	0.48
Ameren Corp.	0.75	0.10	52.6%	0.0%	47.4%	39.5%	0.44	0.52
CenterPoint Energy	0.85	0.07	47.8%	0.0%	52.2%	39.5%	0.44	0.54
CMS Energy Corp.	0.75	0.10	42.6%	0.2%	57.2%	39.5%	0.38	0.46
Consol. Edison	0.60	0.05	56.9%	0.2%	42.9%	39.5%	0.36	0.43
Dominion Resources	0.70	0.05	59.6%	0.4%	40.0%	39.5%	0.44	0.51
DTE Energy	0.75	0.10	55.1%	0.0%	44.9%	39.5%	0.46	0.54
Edison Int'l	0.70	0.10	50.1%	5.2%	44.7%	39.5%	0.40	0.46
El Paso Electric	0.75	0.10	55.9%	0.0%	44.1%	39.5%	0.46	0.54
Entergy Corp.	0.70	0.10	49.2%	1.2%	49.7%	39.5%	0.39	0.47
G't Plains Energy	0.85	0.10	45.4%	0.5%	54.0%	39.5%	0.44	0.53
IDACORP Inc.	0.80	0.10	57.1%	0.0%	42.9%	39.5%	0.50	0.58
MGE Energy	0.75	0.05	73.5%	0.0%	26.5%	39.5%	0.56	0.62
NextEra Energy	0.75	0.05	53.9%	0.0%	46.1%	39.5%	0.43	0.51
OGE Energy	0.95	0.07	65.0%	0.0%	35.0%	39.5%	0.64	0.73
Otter Tail Corp.	0.85	0.10	63.1%	0.6%	36.3%	39.5%	0.57	0.65
PG&E Corp.	0.70	0.10	55.5%	0.7%	43.8%	39.5%	0.43	0.50
Pinnacle West Capital	0.75	0.08	58.9%	0.0%	41.1%	39.5%	0.47	0.55
Portland General	0.80	0.10	49.8%	0.0%	50.2%	39.5%	0.45	0.54
Public Serv. Enterprise	0.75	0.10	64.1%	0.0%	35.9%	39.5%	0.52	0.59
SCANA Corp.	0.75	0.10	51.5%	0.0%	48.5%	39.5%	0.43	0.51
Sempra Energy	0.80	0.10	58.2%	0.3%	41.6%	39.5%	0.51	0.59
Vectren Corp.	0.75	0.05	59.3%	0.0%	40.7%	39.5%	0.46	0.54
Westar Energy	0.75	0.10	51.9%	0.1%	47.9%	39.5%	0.44	0.52
Xcel Energy Inc.	0.65	0.05	52.7%	0.1%	47.1%	39.5%	0.37	0.44
Full Sample Average	0.76	0.08	55.5%	0.4%	44.0%	39.5%	0.46	0.54
Nuclear Subsample Average	0.74	0.09	55.8%	0.5%	43.7%	39.5%	0.45	0.53

Sources and Notes:

[1]: Supporting Schedule # 1 to Table No. BV-ELEC-10, [1].
[2]: Supporting Schedule #1 to Table No. BV-ELEC-13, [7].
[3]: Table No. BV-ELEC-4, [4].
[4]: Table No. BV-ELEC-4, [5].
[5]: Table No. BV-ELEC-4, [6].
[6]: APS Effective Corporate Tax Rate
[7]: [1]*[3] + [2]*([4] + [5]).
[8]: {[1]*[3] + [2]*([4]+[5]*(1-[6]))} / {[3] + [4] + [5]*(1 -[6])}.

Table No. BV-ELEC-14

Sample Average Asset Beta Relevered at Representative Deemed Capital Structure

	Asset Beta [1]	Assumed Debt Beta [2]	APS Representative Base Deemed % Debt [3]	APS Representative Income Tax Rate [4]	APS Representative Base Deemed % Equity [5]	Estimated Equity Beta [6]
Full Sample:						
Asset Beta Without Taxes	0.46	0.05	44.0%	39.5%	56.0%	0.78
Asset Beta With Taxes	0.54	0.05	44.0%	39.5%	56.0%	0.77
Nuclear Subsample:						
Asset Beta Without Taxes	0.45	0.05	44.0%	39.5%	56.0%	0.77
Asset Beta With Taxes	0.53	0.05	44.0%	39.5%	56.0%	0.75

Sources and Notes:

[1]: Table No. BV-ELEC-13, [7] - [8].

[2]: Debt Beta estimate for A-rated entities.Corporate Finance, Berk and Demarzo, Second Edition, p. 389.

[3]: APS Assumed Capital Structure.

[4]: APS Effective Corporate Tax Rate.

[5]: APS Assumed Capital Structure.

[6]: [1] + [3]/[5]*([1] - [2]) without taxes, [1] + [3]*(1 - [4])/[5]*([1] - [2]) with taxes.

Table No. BV-ELEC-15

Risk-Positioning Cost of Equity using Hamada-Adjusted Betas

Panel A: Scenario 1 - Long-Term Risk Free Rate of 4.73%, Long-Term Market Risk Premium of 7.00%

Company	Long-Term Risk-Free Rate [1]	Hamada Adjusted Equity Betas [2]	Long-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (1.5%) Cost of Equity [5]
Full Sample:				capmlt	ecapmlt2
Asset Beta Without Taxes	4.73%	0.78	7.00%	10.2%	10.5%
Asset Beta With Taxes	4.73%	0.77	7.00%	10.1%	10.5%
Nuclear Subsample:					
Asset Beta Without Taxes	4.73%	0.77	7.00%	10.1%	10.4%
Asset Beta With Taxes	4.73%	0.75	7.00%	10.0%	10.4%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Table No. BV-ELEC-14, [6].
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Table No. BV-ELEC-15

Risk-Positioning Cost of Equity using Hamada-Adjusted Betas

Panel B: Scenario 2 - Long-Term Risk Free Rate of 3.93%, Long-Term Market Risk Premium of 8.00%

Company	Long-Term Risk-Free Rate [1]	Hamada Adjusted Equity Betas [2]	Long-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (1.5%) Cost of Equity [5]
Full Sample:				capmlt	ecapmlt2
Asset Beta Without Taxes	3.93%	0.78	8.00%	10.2%	10.5%
Asset Beta With Taxes	3.93%	0.77	8.00%	10.1%	10.4%
Nuclear Subsample:					
Asset Beta Without Taxes	3.93%	0.77	8.00%	10.1%	10.4%
Asset Beta With Taxes	3.93%	0.75	8.00%	10.0%	10.3%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Table No. BV-ELEC-14, [6].
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Breakdown of Generation Capacity

Ticker	Company		Nuclear	Coal	Natural Gas	Other	Source
ALE	ALLETE	[a]	0%	56%	0%	44%	Value Line
LNT	Alliant Energy	[b]	17%	47%	4%	32%	Value Line
AEP	Amer. Elec. Power	[c]	0%	83%	13%	4%	2014 10-K, p. 48
AEE	Ameren Corp.	[d]	21%	74%	0%	5%	Value Line
CNP	CenterPoint Energy	[e]	-	-	-	-	2014 10-K
CMS	CMS Energy Corp.	[f]	0%	44%	6%	50%	Value Line
ED	Consol. Edison	[g]	-	-	-	-	Value Line
D	Dominion Resources	[h]	33%	30%	15%	22%	Value Line
DTE	DTE Energy	[i]	17%	67%	1%	15%	Value Line
EIX	Edison Int'l	[j]	6%	0%	8%	86%	Value Line
EE	El Paso Electric	[k]	47%	5%	35%	13%	Value Line
ETR	Entergy Corp.	[l]	33%	11%	28%	28%	Value Line
GXP	G't Plains Energy	[m]	13%	64%	1%	22%	Value Line
IDA	IDACORP Inc.	[n]	0%	34%	7%	59%	Value Line
MGEE	MGE Energy	[o]	0%	48%	6%	46%	Value Line
NEE	NextEra Energy	[p]	23%	5%	67%	5%	Value Line
OGE	OGE Energy	[q]	0%	44%	23%	33%	Value Line
OTTR	Otter Tail Corp.	[r]	0%	69%	13%	17%	2014 10-K, p. 6
PCG	PG&E Corp.	[s]	21%	0%	7%	72%	Value Line
PNW	Pinnacle West Capital	[t]	27%	34%	17%	22%	Value Line
POR	Portland General	[u]	0%	21%	16%	63%	Value Line
PEG	Public Serv. Enterprise	[v]	28%	18%	46%	8%	2014 10-K, p. 6
SCG	SCANA Corp.	[w]	19%	48%	28%	5%	Value Line
SRE	Sempra Energy	[x]	0%	0%	100%	0%	2014 10-K, p.14
VVC	Vectren Corp.	[y]	0%	77%	23%	0%	2014 10-K, p.7
WR	Westar Energy	[z]	8%	48%	44%	0%	Value Line
XEL	Xcel Energy Inc.	[aa]	12%	46%	21%	21%	2014 10-K, p. 30

Sources/Notes:

Value Line and 10-K reports.

[e]: According to their 2014 10-K, CNP does not own or operate any power generation facilities.

[g],[j],[n],[s],[u]: Purchase most of their power as reported by Value Line in 2015.

[x]: According to page 12 of their 2014 10-K, Sempra Energy purchases most of its power. However, all owned generation consists of gas-fired power plants.

[aa]: Percentages are based on total 2014 generation reported in Xcel Energy's 2014 10k as a proxy for generation capacity.

Companies with 17%-37% Nuclear Generation	
Ticker	Company
LNT	Alliant Energy
AEE	Ameren Corp.
D	Dominion Resources
DTE	DTE Energy
ETR	Entergy Corp.
NEE	NextEra Energy
PCG	PG&E Corp.
PNW	Pinnacle West Capital
PEG	Public Serv. Enterprise
SCG	SCANA Corp.

Risk Premiums Determined by Relationship Between Authorized ROEs[1] and Long-term Treasury Bond Rates During the Period 1990-2015 - Electric Vertically Integrated Only

Formula: Risk Premium = A_0 + (A_1 x Treasury bond Rate)

R Squared	0.79
Estimate of intercept (A_0)	8.8860%
Estimate of slope (A_1)	-0.593

Equity Cost Estimate for Vertically Integrated Electric		Predicted Risk Premium		Expected Treasury Bond Rate[2]
10.8%	=	6.08%	+	4.73%

Sources and Notes:

[1]: Source of ROE Data: SNL Financia

[2]: 2016 Consensus Forecast Risk-Free Rate + Expected Maturity Premium

See regression results on [Regressions] tab

Amount of Distributed PV Generation by State in 2014

Abbr.	State	Total Distributed PV Generation (GWh)	Total Utility-Scale Generation (GWh)	Percent of Total Utility-Scale Generation (%)
[1]	[2]	[3]	[4]	[5]=[3]/[4]
AL	Alabama	0	149,339	0.00%
AK	Alaska	0	6,042	0.00%
AZ	Arizona	916	112,257	0.82%
AR	Arkansas	2	61,591	0.00%
CA	California	3,862	198,808	1.94%
CO	Colorado	353	53,848	0.66%
CT	Connecticut	103	33,677	0.31%
DE	Delaware	60	7,704	0.78%
FL	Florida	102	230,014	0.04%
GA	Georgia	85	125,838	0.07%
HI	Hawaii	532	10,205	5.21%
ID	Idaho	1	15,185	0.01%
IL	Illinois	19	202,145	0.01%
IN	Indiana	10	115,396	0.01%
IA	Iowa	20	56,853	0.04%
KS	Kansas	0	49,728	0.00%
KY	Kentucky	12	90,897	0.01%
LA	Louisiana	101	104,231	0.10%
ME	Maine	12	13,249	0.09%
MD	Maryland	207	37,834	0.55%
MA	Massachusetts	503	31,118	1.62%
MI	Michigan	34	106,817	0.03%
MN	Minnesota	18	56,998	0.03%
MS	Mississippi	0	55,127	0.00%
MO	Montana	11	30,257	0.04%
MT	Missouri	112	87,836	0.13%
NE	Nebraska	0	39,431	0.00%
NV	Nevada	85	36,001	0.24%
NH	New Hampshire	12	19,539	0.06%
NJ	New Jersey	1,106	68,052	1.63%
NM	New Mexico	117	32,307	0.36%
NY	New York	291	137,123	0.21%
NC	North Carolina	73	128,144	0.06%
ND	North Dakota	0	36,464	0.00%
OH	Ohio	71	134,478	0.05%
OK	Oklahoma	0	70,158	0.00%
OR	Oregon	78	60,119	0.13%
PA	Pennsylvania	211	221,060	0.10%
RI	Rhode Island	12	6,283	0.19%
SC	South Carolina	0	97,159	0.00%
SD	South Dakota	0	10,994	0.00%
TN	Tennessee	60	79,507	0.08%
TX	Texas	140	437,631	0.03%
UT	Utah	39	43,785	0.09%
VT	Vermont	33	7,032	0.47%
VA	Virginia	22	77,138	0.03%
WA	Washington	32	116,335	0.03%
WV	West Virginia	0	81,059	0.00%
WI	Wisconsin	23	61,065	0.04%
WY	Wyoming	0	49,695	0.00%
	United States	**9,536**	**4,093,607**	**0.23%**

Sources/Notes:

EIA Electric Power Monthly, Jan. 2016.

Highlighted states have significant amounts of distributed PV generation relative to total utility-scale generation in the state.

Sample Companies
Amount of Distributed PV Generation
in States with Decoupling

Company	States with Decoupling	Total Dist. PV Generation as a % of Total Utility-Scale Generation within State
[1]	[2]	[3]
ALLETE		
Alliant Energy		-
Amer. Elec. Power	AR*	0.00%
	IN*	0.01%
	KY*	0.01%
	LA*	0.10%
	OH*	0.05%
	OK*	0.00%
Ameren Corp.	MO*	0.04%
CenterPoint Energy	(AR)	0.00%
	(LA)*	0.10%
	(MN)	0.03%
	(OK)*	0.00%
CMS Energy Corp.		-
Consol. Edison	NY, (NY)	0.21%
Dominion Resources		-
DTE Energy	(MI)*	0.03%
Edison Int'l	CA	1.94%
El Paso Electric		-
Entergy Corp.	AR*	0.00%
	LA*, (LA)	0.10%
	MS*	0.00%
G't Plains Energy	MO*	0.04%
IDACORP Inc.	ID*	0.01%
MGE Energy		-
NextEra Energy		-
OGE Energy	AR*	0.00%
	OK*	0.00%
Otter Tail Corp.		-
PG&E Corp.	CA, (CA)	1.94%
Pinnacle West Capital	AZ*	0.82%
Portland General	OR*	0.13%
Public Serv. Enterprise	(NJ)*	1.63%
SCANA Corp.	(NC)	0.06%
	(SC)*	0.00%
Sempra Energy	(AL)*	0.00%
	CA, (CA)	1.94%
Vectren Corp.	IN*, (IN)	0.01%
Westar Energy	KS*	0.00%
Xcel Energy Inc.	(CO)*	0.66%
	SD*	0.00%

Sources/Notes:
Regulatory Research Associates, "Adjustment Clauses," October 2, 2015.
Highlighted companies are included in our subsample of utilities with 17% to 37% nuclear generation.
"*" indicates partial decoupling.
"( )" indicates decoupling status for associated gas operations.

Regression Output: PE Ratio vs. 20-Year Treasury Rate

	20-Year Treasury				Constant					
	Coef	Std. Error	T-Stat	P-Value	Coef	Std. Error	T-Stat	P-Value	N	R-Squared
Group Results										
Electric (Average)	(1.55)	0.36	(4.26)	0.00	26.40	2.03	13.01	0.000	104	15%
Electric (Median)	(0.89)	0.24	(3.76)	0.00	19.23	1.32	14.52	0.000	104	12%
Nuclear (Average)	(1.31)	0.44	(3.00)	0.00	24.80	2.44	10.18	0.000	104	8%
Nuclear (Median)	(1.04)	0.29	(3.65)	0.00	20.42	1.59	12.82	0.000	104	12%
Individual Results										
Ameren Corp.	(2.47)	2.43	(1.02)	0.312	34.53	11.34	3.04	0.003	66	2%
Amer. Elec. Power	(2.27)	1.31	(1.74)	0.086	29.34	7.31	4.01	0.000	96	3%
ALLETE	(2.78)	0.62	(4.47)	0.000	26.70	3.48	7.68	0.000	103	16%
CMS Energy Corp.	(1.24)	0.96	(1.30)	0.197	23.39	5.25	4.45	0.000	83	2%
CenterPoint Energy	0.42	0.80	0.53	0.599	13.09	4.50	2.91	0.005	88	0%
Dominion Resources	(1.92)	0.63	(3.06)	0.003	29.32	3.53	8.31	0.000	93	9%
DTE Energy	(1.89)	0.59	(3.21)	0.002	24.50	3.30	7.43	0.000	100	10%
Consol. Edison	(0.60)	0.62	(0.96)	0.337	20.68	3.48	5.95	0.000	104	1%
El Paso Electric	(6.71)	1.92	(3.49)	0.001	54.05	9.34	5.79	0.000	72	15%
Edison Int'l	(0.93)	0.56	(1.67)	0.099	19.24	3.17	6.06	0.000	93	3%
Entergy Corp.	(0.53)	0.82	(0.64)	0.522	18.99	4.59	4.14	0.000	95	0%
G't Plains Energy	(2.99)	1.29	(2.31)	0.023	37.99	7.31	5.20	0.000	94	5%
IDACORP Inc.	(1.12)	0.72	(1.56)	0.122	23.53	4.02	5.86	0.000	101	2%
Alliant Energy	(0.69)	0.78	(0.87)	0.384	21.52	4.42	4.86	0.000	96	1%
MGE Energy	(0.71)	0.44	(1.59)	0.114	21.76	2.48	8.78	0.000	103	2%
NextEra Energy	0.00	0.47	0.01	0.994	16.95	2.60	6.52	0.000	101	0%
OGE Energy	(1.07)	1.38	(0.78)	0.439	30.41	7.54	4.03	0.000	90	1%
Otter Tail Corp.	(4.29)	1.05	(4.09)	0.000	44.81	5.92	7.57	0.000	101	14%
PG&E Corp.	(4.08)	1.35	(3.02)	0.003	39.74	7.57	5.25	0.000	98	9%
Public Serv. Enterprise	(0.31)	0.36	(0.87)	0.386	15.12	2.00	7.57	0.000	99	1%
Pinnacle West Capital	(2.15)	2.04	(1.05)	0.295	37.87	11.61	3.26	0.002	92	1%
Portland General	0.20	1.40	0.14	0.888	15.27	5.31	2.88	0.007	37	0%
SCANA Corp.	0.17	0.45	0.38	0.707	14.68	2.47	5.93	0.000	98	0%
Sempra Energy	(2.76)	0.93	(2.97)	0.004	27.32	4.28	6.38	0.000	71	11%
Vectren Corp.	6.15	3.70	1.66	0.102	2.73	16.21	0.17	0.867	60	5%
Westar Energy	(2.04)	1.26	(1.62)	0.109	30.84	7.02	4.39	0.000	95	3%
Xcel Energy Inc.	(0.06)	0.67	(0.09)	0.931	17.36	3.76	4.62	0.000	101	0%

Significant at 5% Level.