EXHIBIT

Exhibit No.:	
Issue(s):	Capital Structure/ Return on Equity/ Cost of Capital
Witness/Type of Exhibit:	Schafer/Direct
Sponsoring Party:	Public Counsel
Case No.:	ER-2014-0258

DIRECT TESTIMONY

OF

LANCE SCHAFER

Submitted on Behalf of the Office of the Public Counsel

UNION ELECTRIC
D/B/A
AMEREN MISSOURI

CASE NO. ER-2014-0258

** **

Denotes Highly Confidential Information that has been Redacted

December 5, 2014

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BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariff to Increase Its Revenues for Electric Service	)))))	Case No. ER-2014-0258

AFFIDAVIT OF LANCE SCHAFER

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

Lance Schaefer, of lawful age and being first duly sworn, deposes and states:

1. My name is Lance Schafer. I am the Public Utility Financial Analyst for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my direct testimony.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Lance Schafer
Public Utility Financial Analyst

Subscribed and sworn to me this 5th day of December 2014.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

JERENE A. BUCKMAN
My Commission Expires
August 23, 2017
Cole County
Commission #13754037

Jerene A. Buckman
Notary Public

My Commission expires August 23, 2017.

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DIRECT TESTIMONY
OF
LANCE C. SCHAFER

UNION ELECTRIC
D/B/A
AMEREN MISSOURI

CASE NO. ER-2014-0258

SECTION 1: INTRODUCTION AND BACKGROUND

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Lance C. Schafer. My business address is 200 Madison St., P.O. Box 2230, Jefferson City, MO 65102.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by the Missouri Office of the Public Counsel (OPC or Public Counsel) as a Public Utility Financial Analyst.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND.

A. I earned a Bachelor of Arts in English from the University of Missouri, Columbia; a Master of Arts in French from the University of California, Irvine; and a Master of Business Administration with a specialization in Finance from the University of Missouri, Columbia.

Q. ARE YOU CURRENTLY WORKING TOWARD A PROFESSIONAL DESIGNATION?

Yes. I passed the CFA (Chartered Financial Analyst) level one exam in December, 2013. I am currently a candidate for the CFA level two exam, which I will take in June, 2015.

To achieve the full designation, candidates must pass three exams and have a minimum amount of applicable experience. The CFA designation is one of the most respected designations in finance and is considered by many to be the gold standard in the field of investment analysis.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION?

A. No.

Q. WHAT IS THE PURPOSE OF THIS TESTIMONY?

A. I will present a cost-of-capital analysis for Union Electric Company d/b/a Ameren Missouri (heretofore referred to as Ameren Missouri or Company). I will recommend and testify to the appropriate capital structure, embedded cost rates, fair return on common equity, and weighted average cost of capital that should be allowed in this proceeding.

Q. WHAT STEPS HAVE YOU TAKEN TO PREPARE AND PRESENT THIS ANALYSIS?

A. Please see Schedule LCS-1 for a list of materials I have reviewed in preparing the present analysis.

Q. HAVE YOU PREPARED SCHEDULES IN SUPPORT OF YOUR TESTIMONY?

A. Yes. I have prepared 10 Schedules in support of my analysis that are attached to this testimony (LCS-1 through LCS-10). These Schedules were prepared by me and are correct to the best of my knowledge and belief.

SECTION 2: EXECUTIVE SUMMARY

Q. WHAT IS YOUR RECOMMENDATION REGARDING AMEREN MISSOURI'S CAPITAL STRUCTURE?

A. After reviewing Company Witness Ryan J. Martin's direct testimony in the present case, I have accepted the Company's proposed capital structure at 12/31/2014.

Q. WHAT IS YOUR RECOMMENDATION OF AMEREN MISSOURI'S REQUIRED RETURN ON COMMON EQUITY?

A. My recommendation of Ameren Missouri's required return on common equity is **9.01%**. This recommendation is the average of the three estimates I derived from my CAPM, constant-growth DCF and three-stage DCF models. The range established by these estimates is 8.74% to 9.22%. My recommendation is summarized in the following table:

Summary of Recommended Return on Equity	
Method	**Result**
CAPM	8.74%
Constant-growth DCF	9.22%
Three-stage DCF	9.07%
Range of Estimates	8.74% to 9.22%
Final Recommendation	**9.01%**

Q. WHAT IS YOUR RECOMMENDATION OF AMEREN MISSOURI'S WEIGHTED AVERAGE COST OF CAPITAL?

A. Using my calculated return on equity as the cost of common equity and the Company's capital structure and embedded costs of long-term debt, short-term debt, and preferred equity, my recommendation of Ameren Missouri's weighted average cost of capital is **7.327%**. The following table summarizes the calculation: **

**

SECTION 3: CAPITAL STRUCTURE

Q. WHAT CAPITAL STRUCTURE ARE YOU USING FOR THE PRESENT ANALYSIS?

A. I have reviewed and accepted the Company's proposed capital structure at 12/31/2014, which is summarized in Mr. Martin's direct testimony in Schedule RJM-1. The following table reproduces the relevant information: **

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SECTION 4: RETURN ON EQUITY

Q. HOW DID YOU CALCULATE YOUR RECOMMENDED RETURN ON COMMON EQUITY FOR AMEREN MISSOURI?

A. In order to calculate my recommended return on common equity for Ameren Missouri, I relied on three models: the capital asset pricing model (CAPM), the constant-growth discounted cash flow (DCF) model, and the three-stage discounted cash flow (DCF) model, all of which I applied to a proxy group of ten publicly traded, regulated electric utility companies that are comparable to Ameren Missouri.

Q. HAS THE U.S. SUPREME COURT ESTABLISHED GUIDING PRINCIPLES FOR THE DETERMINATION OF THE APPROPRIATE RATE OF RETURN FOR A REGULATED UTILITY?

A. Yes. The general principles for determining the appropriate rate of return for a regulated utility are outlined in the following U.S. Supreme Court decisions: *Bluefield Water Works & Improvement Company v. Public Service Commission of the State of West Virginia et al.*, 262 U.S. 679 (U.S. 1923); and *Federal Power Commission et al. v. Hope Natural Gas Co.*, 320 U.S. 591, (U.S. 1944).

Together, these two seminal U.S. Supreme Court decisions have established the following principles, which I applied to guide my analysis:

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1) The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.[1]

2) A utility should be allowed to earn a return that promotes financial stability, allows the utility to maintain its credit, and enables it to attract capital.[2]

3) A utility's allowed rate of return may be reasonable at one time but become too high or too low based on changes that affect the business environment and investment opportunities.[3]

4) The utility has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures.[4]

PROXY GROUP SELECTION

Q. WHY IS IT APPROPRIATE TO ESTABLISH A PROXY GROUP FOR A COMPANY WHEN ATTEMPTING TO CALCULATE THE COST OF EQUITY?

A. Establishing a proxy group is appropriate for the following reasons:

First, the company under analysis may not be publicly traded—as is the case with Ameren Missouri. Certain methods of estimating the cost of equity require market-based inputs, such as current stock prices and dividend yields, that are not available for companies that do not offer stock. In order to obtain these inputs, an analyst can form a

[1] See: *Federal Power Commission et al. v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (U.S. 1944); and Bluefield Water Works & Improvement Company v. Public Service Commission of the State of West Virginia et al., 262 U.S. 679, 1183 (U.S. 1923)
[2] *Federal Power Commission et al. v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (U.S. 1944)
[3] *Bluefield Water Works & Improvement Company v. Public Service Commission of the State of West Virginia et al.*, 262 U.S. 679, 693 (U.S. 1923)
[4] Ibid.

proxy group of companies that are both publicly traded and comparable to the company being analyzed.

Second, analyzing a group of comparable companies is consistent with the determination of a fair cost of common equity as framed by the U.S. Supreme Court decisions *Bluefield* and *Hope* and as discussed earlier in this testimony. Specifically, a utility's cost of common equity should be commensurate with the return that investors could obtain by investing in alternative enterprises of comparable risk.[5] Determining the return on equity of a proxy group thus helps to establish the opportunity cost of investing in the company under analysis.

Third, using a proxy group increases the strength of the analysis by increasing the number of estimates of sensitive inputs, such as growth rates, that certain financial models require. Individual companies can go through periods of short-term fluctuation in performance which could potentially distort results of financial analyses; studying multiple companies reduces the risk of basing intrinsic value on temporary operating conditions. Moreover, using multiple estimates of these sensitive inputs increases the likelihood that an analyst is relying on the consensus of investors' expectations.

Q. HOW DID YOU ESTABLISH THE PROXY GROUP YOU USE IN YOUR ANALYSIS?

A. I began by creating a list of all publicly traded U.S. Electric Utility companies followed by the Value Line Investment Survey, which gave me an initial list of 49 companies. I

[5] See: *Federal Power Commission et al. v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (U.S. 1944); and Bluefield Water Works & Improvement Company v. Public Service Commission of the State of West Virginia et al., 262 U.S. 679, 1183 (U.S. 1923)

then applied the following selection criteria to the list, which I developed after reviewing previous Missouri rate cases (including Ameren Missouri's) from approximately 2004 to the present, as well as the materials listed in Schedule LCS-1:

1. The company must have a Value-Line Safety Rank of 3 or higher and a Financial Rank of 5 or higher. I chose these criteria because they are indicative of companies which have rankings of average or better. Value Line does not rank Ameren Missouri, but Ameren Corp. has a safety rank of 2 and a financial rank of 4, which is consistent with these criteria I have chosen. Moreover, Standard & Poor rates Ameren Missouri "BBB+", which is in the medium grade. This also supports the above criteria (two companies were eliminated);

2. The company must be followed by the AUS Utility Monthly Report and report a minimum of 70% of its total operating revenue from regulated electricity. AUS Utility Monthly reports that Ameren Corp. reports 81% of its total operating revenue from regulated electricity; therefore, it is important to remove companies from this list that are not primarily regulated electric companies (twenty-two companies were eliminated);

3. The company must have at least three years of dividend-paying history and not have reduced or suspended its dividend over the preceding three years. Although Ameren Missouri does not offer stock, this criteria will eliminate companies whose dividend histories have not been as stable as parent company Ameren Corp. (two companies were eliminated);

4. The company must own generating assets. Ameren Missouri has a generating capacity of 10,300 megawatts. This criteria, therefore,

screens out companies that are not similar in this respect (no additional eliminations);

5. The company must not have been or be involved in a significant merger or acquisition announced within the last three years. Synergies and or changes in operations from recent mergers or acquisitions cause abrupt changes in operating conditions that require time to stabilize (seven companies were eliminated);

6. The company must not face significant unregulated business risk. This criteria helps to assure that Ameren Missouri will not be compared to a company that is exposed to risks associated with an industry unrelated to Ameren Missouri's (two companies were eliminated);

7. The company must not have had a large expense within the last three years due to natural phenomena or non-recurring event. This criteria was established to insure that the financial data under consideration reflects a company's operations rather than factors outside its control (two companies were eliminated);

8. The company must not have significant operating differences (e.g., significant differences in fuel mixes) from the company under analysis. Although no two companies are perfectly similar, Ameren Missouri's majority use of coal as a fuel source presents a significant difference from a company such as Hawaiian Electric, which relies primarily on low-sulfur fuel oil, and burns sugar-cane waste, among others. (one company was eliminated);

9. The company must not be the parent company of the company under analysis. Ameren Corp.'s performance is partly based on a previous

Missouri rate case. Eliminating it from the group thus eliminates the issue of circularity which would arise were we to base the current cost of capital in part on the results of a previous Missouri rate case (one company was eliminated).

After applying each of these criteria to my initial list of 49 companies, 10 companies remained to form my proxy group.

Q. PLEASE PRESENT YOUR FINAL PROXY GROUP.

A. The following table lists the ten companies that form my proxy group:

Company Name	Ticker
Alliant Energy Corp	LNT
American Electric Power Company Inc	AEP
Great Plains Energy Inc	GXP
IDACORP Inc	IDA
Pinnacle West Capital Corp	PNW
PNM Resources Inc	PNM
Portland General Electric Company	POR
Southern Co	SO
Westar Energy Inc	WR
Xcel Energy Inc	XEL

DISCOUNTED CASH FLOW (DCF) ANALYSIS

Q. PLEASE EXPLAIN THE GENERAL PRINCIPLE BEHIND CONDUCTING VALUATION BY MEANS OF THE DISCOUNTED CASH FLOW (DCF) METHOD.

A. The DCF methodology is based on the idea that the current value of a security is equal to the expected value of its future cash flows, discounted back to present value at the investor's discount rate, or cost of capital. The following equation expresses the preceding idea:

$$V_0 = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}$$

Where:

V_0 = the value of the asset at time t = 0 (the present)

$\sum$ = the mathematical notation for summation

n = the number of cash flows in the life of the asset

t = 1 = indicates that the summation is to begin at time 1

CF_t = the cash flow at time t

r = the discount rate or required return

Q. WHICH DCF MODELS HAVE YOU EMPLOYED IN YOUR ANALYSIS?

A. I have employed two DCF models in my analysis: the constant-growth (or Gordon growth) DCF model, and the three-stage DCF model.

CONSTANT-GROWTH DCF MODEL

Q. PLEASE DESCRIBE THE CONSTANT-GROWTH DCF MODEL USED IN YOUR ANALYSIS.

A. The constant-growth DCF model is used to value a stock under the assumption that the future dividends will grow at a constant rate into perpetuity. It is therefore most appropriately applied to the stock of mature companies that exhibit stable, low to moderate growth rates. The model is represented by the following equation, which has been arranged here in order to solve for the cost of equity:

$$k = \frac{D_1}{P_o} + g$$

Where:

k = the discount rate (cost of equity)

D_1 = the expected dividend per share for period 1

P_0 = the current price of the stock

D_1/P_o = the dividend yield

g = the expected constant growth rate

Q. PLEASE EXPLAIN HOW YOU DERIVE THE "K" (DISCOUNT RATE) INPUT YOU USE IN THE CONSTANT-GROWTH MODEL.

A. "K" is the unknown variable in the equation, which is solved for iteratively after all estimations of the other inputs are included in the model.

Q. PLEASE EXPLAIN HOW YOU DERIVE THE "D_1" INPUT YOU USE IN THE CONSTANT-GROWTH MODEL.

A. "D_1", the expected dividend per share for year 1, is found by taking the most recent quarterly dividend paid by the company in question, annualizing it (multiplying it by four), and then adjusting it to account for the fact that dividends are paid on a quarterly basis. The adjustment is made by multiplying the annualized dividend by the adjustment factor of 1 + half the growth rate, which is a method accepted by the Federal Energy Regulatory Commission.[6]

Q. PLEASE EXPLAIN HOW YOU DERIVE THE "P_0" INPUT YOU USE IN THE CONSTANT-GROWTH MODEL.

A. "P_0", the current price of the stock, is calculated by averaging the stock's weekly high and low prices over a 13-week period. The use of a 13-week period rather than the most recent price of the stock is appropriate in order to derive a price that is not only recent enough to be considered representative of investors' current sentiments, but also relatively free from short-term fluctuations that may cause the price to deviate temporarily from investors' expectations.

Q. PLEASE EXPLAIN HOW YOU DERIVE THE "G" INPUT YOU USE IN THE CONSTANT-GROWTH MODEL.

A. "G", the expected constant growth rate, is an average of analysts' three- to five-year earnings forecasts. I have employed the average of estimates from three sources: Value

[6] See FERC Opinion No. 531, Order on Initial Decision, p.35. Docket No. EL11-66-001, June 19, 2014

Line, Zacks, and I/B/E/S. The use of these estimates is appropriate because of the well-documented superiority of analysts' estimates over historical averages.[7] These estimates and the average of the estimates are listed in Schedule LCS-2.

Q. HOW DID YOU APPLY THIS MODEL IN ORDER TO ARRIVE AT AN ESTIMATE OF AMEREN MISSOURI'S REQUIRED RETURN ON EQUITY?

A. I used the constant-growth DCF model as described above to estimate the return on equity for each of the ten companies that comprise my proxy group. I then calculated the average of the ten return-on-equity estimates, which resulted in 8.77%. However, before recommending this estimate, I found it necessary to conduct a further study to insure that the inputs to the model were not unduly influenced by short-term economic conditions.

Q. WHAT ADDITIONAL STUDY DID YOU UNDERTAKE?

A. In order to insure that the inputs to the model were not unduly influenced by short-term economic conditions, I conducted a study of my proxy group's historical and projected dividend yields. The dividend yield component of the constant-growth DCF model is represented in the equation presented above by D_1/P_0.

Q. WHY DID YOU UNDERTAKE A STUDY OF YOUR PROXY GROUP'S HISTORICAL AND PROJECTED DIVIDEND YIELDS?

[7] *See*, for example, Vander Weide, James H. & Carleton, Willard T. (1988). Investor Growth Expectations: Analysts vs. History. *The Journal of Portfolio Management*, (Spring), pp. 78-82; *and also* Brown, Lawrence D. & Rozeff, Michael S. (1978). The Superiority of Analyst Forecasts as Measures of Expectations: Evidence From Earnings. *The Journal of Finance*, (March, Vol. XXXIII No.1), pp. 1-16.

A. The reason for an additional study can be seen in recent Value Line Electric Utility Industry Reports, which state that public utility stock prices have increased dramatically in 2014.[8] Value Line's Electric Utility (East) Industry Report dated November 21, 2014 states:

> Almost every electric utility stock under our coverage is trading within its 2017-2019 Target Price Range--many near the upper end of this range--and a few are trading *above* the upper bound. [...] On average, electric utility stocks yield 3.5% and offer 3- to 5-year total return prospects of just 2%.

This pronounced stock price increase has important implications for the DCF model. This is due to the fact that the DCF model projects cash flows (dividends) into perpetuity based on current inputs. If an input appears to reflect only short-term conditions, then an analyst should be concerned about using it to forecast into perpetuity because of the possibility that the short-term conditions will differ from long-term conditions and thus cause an inaccurate estimate of the return on equity.

Q. WHAT DID THE STUDY OF YOUR PROXY GROUP'S HISTORICAL AND FORECASTED DIVIDEND YIELD REVEAL?

A. First, I determined that the current average dividend yield (as of 11/23/2014) of the ten companies in my proxy group is 3.5%, which corresponds to the electric utility industry average reported by Value Line.[9] Second, to find the historical average dividend yield of my proxy group, I collected dividend-yield data for each company from 2004 to 2013 and calculated the average (for Portland General Electric, the average was calculated from

[8] *See*, for example, the Value Line Electric Utility (Central) Industry Report of September 19th 2014; the Value Line Electric Utility (East) Report of November 21st, 2014; and the Value Line Electric Utility (West) Report of October 31st, 2014.
[9] See the Value Line Electric Utility (East) Report of November 21st, 2014

2006 to 2013, as the company had no dividend yield in 2004 and 2005). Based on this, the average of the ten proxy group companies' historical dividend yields was calculated to be 4.37%. Third, I determined my proxy group's forecasted dividend yield by calculating the average of Value Line's three- to five-year estimated dividend yields for each company. Based on this, the average of the ten proxy group companies' forecasted dividend yields was calculated to be 4.44%. See Schedule LCS-3 for a summary of the above-mentioned proxy group dividend yields.

Q. WHAT CONCLUSION DID YOU DRAW FROM THE STUDY OF YOUR PROXY GROUP'S DIVIDEND YIELDS?

A. The dividend yields used in my constant growth DCF model are lower than both the historical and forecasted averages.

PROPOSED CONSTANT-GROWTH DCF MODEL ADJUSTMENT

Q. ARE YOU RECOMMENDING ANY ACTION BASED ON YOUR ANALYSIS?

A. I am recommending an adjustment to the result of my constant-growth DCF model based on the evidence that my proxy group's dividend yield is both currently lower than it is expected to be within three to five years and also lower than it has historically been. In this circumstance, the adjustment, which I will detail below, will insure that the Company's allowed return on equity going forward is not unduly low due to current economic conditions which are very likely to change in 2015.

Q. IS SUCH AN ADJUSTMENT COMMON PRACTICE WHEN EMPLOYING DCF MODELS?

A. No. The dividend-yield component (D_1/P_0) of the constant-growth DCF model provides valuable information about current investor return requirements and should normally, therefore, not be supplemented.

Q. WHY ARE YOU PROPOSING AN ADJUSTMENT NOW IF YOU BELIEVE THAT AN ANALYST SHOULD NORMALLY NOT MAKE SUCH AN ADJUSTMENT?

A. The Federal Reserve ended round three of its extraordinary Quantitative Easing (QE3) program in October, and Federal Reserve Bank of New York President and Chief Executive Officer William C. Dudley recently affirmed his belief that the Federal Reserve will raise interest rates by mid-2015.[10] As Value Line notes in its Electric Utility (East) Industry Report[11] the yield on the 10-year Treasury is estimated to rise to 4.3% by 2017-2019, which is one of the reasons why Value Line is not optimistic about the long-term return potential for electric utility stocks. Briefly, one potential scenario is that if the yield on Treasury securities, which are considered risk free, rises above the yield offered by owning electric utility stocks, investors will sell the utility stocks and buy the Treasury securities, thereby causing the prices of the utility stocks to fall. The falling prices of the utility stocks cause their corresponding dividend yields to rise until they once again reach

[10] *See*: Federal Reserve Bank of New York President and Chief Executive Officer William C. Dudley's speech given December 1, 2014: http://www.ny.frb.org/newsevents/speeches/2014/dud141201.html
[11] Value Line Electric Utility (East) Report of November 21st, 2014

a level that investors require. Because of these unusual circumstances, I believe the return on equity result produced by my constant-growth DCF model requires an adjustment.

Again, this is normally not an adjustment I would recommend. Interest-rate risk is one of many risk factors that investors must routinely consider when making investment decisions, and the sum of their sentiments about risk and return requirements is reflected in figures such as security prices and yield. However, the strong likelihood that the Federal Reserve will soon raise interest rates has been stated publicly, and multiple organizations have factored this raise of interest rates into their forecasts of the yield on Treasury securities.[12]

Q. ARE ADJUSTMENTS TO FINANCIAL MODELS BASED ON UNUSUAL CIRCUMSTANCES CONSISTENT WITH ACCEPTED PRACTICE?

A. Yes. In their book *The Cost of Capital, Estimating the Rate of Return for Public Utilities,*[13] authors Kolbe and Read state the following during their discussion of the relative merits of the major methods of estimating the cost of capital:

> We have demonstrated that no single method is best according to every criterion. Some do well on the theoretical criteria and poorly on the practical criteria. This not unexpected result leads to one important conclusion: choice of a method depends heavily on the relative importance of the different criteria to the person doing the choosing. *It also depends on the state of financial markets; problems with one or another method that can be swept under the rug in quiet times may cause serious biases when financial markets are in flux unless corrective actions are taken* (124-5) [Emphasis added].

[12] See, for example, the Congressional Budget Office "An Update to the Budget and Economic Outlook: 2014 to 2024" (http://www.cbo.gov/publication/45653), retrieved 11/21/2014; and the Federal Reserve of Philadelphia's Livingston Survey of June 4th, 2014 (http://www.philadelphiafed.org/results.cfm?sort=rel&start=0&text=treasury+forecast)

[13] Kolbe, Lawrence and Read, James A. Jr., *The Cost of Capital, Estimating the Rate of Return for Public Utilities.* Cambridge, Massachusetts: The MIT Press, 1984.

Q. HAVE OTHER ANALYSTS RECENTLY TAKEN INTO ACCOUNT THE POSSIBILITY OF SIGNIFICANT INCREASES IN TREASURY YIELDS WHEN ESTIMATING REQUIRED RETURNS ON EQUITY FOR PUBLIC UTILITY COMPANIES?

A. Yes. Analysts such as Robert B. Hevert[14] and Michael P. Gorman[15] have included the use of forecasted Treasury yields in their Capital Asset Pricing Model (CAPM) analyses. Moreover, Mr. Hevert states in his direct testimony to the current case that "[...] higher growth and the absence of Federal market intervention could provide the opportunity for interest rates to increase, thereby increasing the dividend yield portion of the DCF model." Mr. Hevert is currently testifying on behalf of the Company, and Mr. Gorman was testifying on behalf of the Missouri Office of the Public Counsel at the time he made his recommendation. I believe the fact that witnesses for both the utility and the consumer advocate used the forecasted treasury yields in their analysis provides evidence that the current consideration of interest-rate risk is not a biased one.

Q. HOW DID YOU CALCULATE YOUR PROPOSED ADJUSTMENT TO YOUR CONSTANT-GROWTH DCF MODEL?

A. Using the data from my study of the proxy group's historical and forecasted dividend yields, I started with the current (2014) dividend yields for each proxy group company. I used Value Line's three- to five-year estimated dividend yields for each proxy group company as the forecasted dividend yields for year 2019. I then calculated equal

[14] See Mr. Hevert's Direct Testimony in the present case, ER-2014-0258
[15] See Mr. Gorman's Direct Testimony submitted on behalf of the Missouri Office of the Public Counsel during the Missouri Gas Energy Case No. GR-2014-0007

incremental shifts to apply to each year in between (2015-2018) to get the forecasted dividend yields for each year from 2014 to 2019. I then calculated the average of the forecasted dividend yields for each proxy group company from 2014 to 2019, from which I subtracted the current dividend yield in order to ascertain the necessary adjustment. I then go through the same process again, but using the historical dividend yields instead of the forecasted ones (see Schedule LCS-4 for a summary of the calculation). The average of the two results is my final adjustment.

Q. WHY DID YOU NOT SIMPLY USE THE AVERAGE OF THE FULL FORECASTED AND HISTORICAL DIVIDEND YIELDS?

A. Using the average of the full forecasted and historical dividend yields directly would not have taken into account that the dividend yields are estimated to change within three to five years. My method accounts for a five-year transition period between current dividend yields and forecasted ones.

Q. WHAT ADJUSTMENT ARE YOU RECOMMENDING BASED ON THE ABOVE-DESCRIBED METHOD?

A. I am recommending a 45 basis-point increase to the return on equity from my constant growth DCF model.

Q. WHAT WAS THE ORIGINAL RESULT OF YOUR CONSTANT-GROWTH DCF MODEL, AND WHAT IS YOUR RESULT AFTER THE ADJUSTMENT?

A. The original result was 8.77%. With the 45 basis-point adjustment, the result is **9.22%**. See Schedule LCS-5 for a summary of the model.

THREE-STAGE DCF MODEL

Q. YOU STATED THAT YOU HAVE ALSO CONDUCTED A THREE-STAGE DCF MODEL. WHY IS IT USEFUL TO CONDUCT A THREE-STAGE DCF MODEL IN ADDITION TO THE CONSTANT-GROWTH DCF MODEL?

A. The three-stage DCF model allows an analyst to account for multiple stages of growth.

Q. WHY IS IT IMPORTANT TO CONSIDER MULTIPLE STAGES OF GROWTH?

A. The constant-growth DCF model assumes that dividends will grow at a constant rate into perpetuity. However, the growth input for the constant-growth DCF model is typically derived from the consensus of analysts' three- to five-year earnings estimates. The appropriateness of using three- to five-year earnings estimates as estimates of growth into perpetuity is questionable. For example, if a company is going through a period of unusually high or low earnings due to a temporary condition (e.g., unusual growth in the economy or a recession), using earnings estimates influenced by that temporary condition as inputs to the constant-growth DCF model would essentially lock in the unusually high or low earnings growth into perpetuity. This would cause an inaccurate estimation of the return on equity.

Q. PLEASE DESCRIBE THE THREE-STAGE DCF MODEL USED IN YOUR ANALYSIS.

A. The three-stage DCF model is based on the same general DCF principle I described earlier. It is specifically characterized by the assumption that the company being analyzed will go through three distinct stages of growth. Stage one lasts five years. Stage two lasts five years and serves as a transition period from stage-one growth rates to stage-three growth rates. Stage three is very similar to the constant-growth DCF model in that the assumptions used in stage three extend into perpetuity. The price (P_0) and first-period dividend (D_1) inputs are calculated exactly as in the previous model. The growth rates, however, require additional consideration.

Q. HOW DID YOU CALCULATE THE GROWTH RATES USED IN YOUR THREE-STAGE DCF MODEL?

A. The first-stage growth rates of the three-stage DCF model are the same growth rates used for the constant growth DCF model. As these rates are averages of analysts' estimated three- to five-year earnings growth rates, they correspond chronologically to the first stage of the model, which covers the first five years of cash flows.

The second-stage growth rates are transition growth rates. They change incrementally in equal proportion over the period of five years from the first-stage growth rates to the third-stage growth rates.

The third-stage growth rate is the same for all companies and is based on long-term growth in GDP, which should serve as the absolute maximum rate when establishing a long-term growth rate.

Q. WHAT EVIDENCE DO YOU HAVE THAT GDP SHOULD BE USED AS THE MAXIMUM RATE WHEN ESTABLISHING A LONG-TERM GROWTH RATE?

A. There is reason to conclude that a company will not grow faster in the long term than the overall economy of which it is a component. Professor Aswath Damodaran of New York University's Stern School of Business states that "this 'constant' growth rate is called a stable growth rate and cannot be higher than the growth rate of the economy in which the firm operates."[16] Furthermore, Professor Damodaran states "if you assume that the economy is composed of high growth and stable growth firms, the growth rate of the latter will probably be lower than the growth rate of the economy."[17] Koller, Goedhart and Wessels, in their book *Valuation, Measuring and Managing the Value of Companies*, [18] confirm this idea. Analyzing industry revenue-growth data from 1997-2007, they conclude "[...] some sectors (including health-care equipment, software, movies and entertainment, and integrated telecom) had annual growth rates in excess of 9 percent, vastly outgrowing others (food products, department stores, paper and forest products, and electric utilities) with growth rates of 3 percent or less"[19] (the preceding growth rates are inflation adjusted).

Koller, Goedhart and Wessels also studied industry growth over a four-decade period starting in 1967 and ending in 2007, and found the following inflation-adjusted growth rates: for the decade of 1967-1977, electric utilities grew at a rate of 7%; from

[16]Damodaran, Aswath. "Growth Rates and Terminal Value, DCF Valuation." New York University's Stern School of Business. Web. (http://www.stern.nyu.edu/~adamodar/pdfiles/ovhds/dam2ed/growthandtermvalue.pdf)
[17] Ibid.
[18] Koller, Tim; Goedhart, Marc; & Wessels, David. *Valuation, Measuring and Managing the Value of Companies.* Hoboken, New Jersey: John Wiley & Sons, Inc., 2010.
[19] Ibid. p. 93

1977-1987, they grew at a rate of 2%; from 1987-1997, 1%; and from 1997-2007, 1%.[20] The four-decade average electric utility industry growth was 2.75%, while the average growth in real GDP for the same period was 3.1%.[21] Average electric utility industry revenue growth for the four decades was thus 89% of real GDP.

Q. ARE YOU RECOMMENDING THAT A RATE LOWER THAN GDP BE USED AS THE LONG-TERM GROWTH RATE?

A. No, I am not. While full GDP may not be appropriate in every instance, at this time I believe it is reasonable to use full GDP. However, it is important to note the effect that using full GDP has on my three-stage DCF model. Using 100% GDP of nominal GDP as the stage-three growth rate instead of 89% increases the estimated return on equity by 43 basis points.

Q. HAS THE USE OF FULL GDP AS A TERMINAL GROWTH RATE BEEN ACCEPTED BY THE FEDERAL ENERGY REGULATORY COMMISSION?

A. Yes. The Federal Energy Regulatory Commission, in Opinion No. 531, stated the following:

> Given the absence of an electric industry-specific long-term growth projection that reasonably reflects investor expectations, the long-term growth estimate will be based on an average of the GDP growth rates that have been relied on in gas and oil pipeline cases.

[20] Ibid. p.94
[21] Historical data on real GDP was retrieved from the St. Louis Federal Reserve (http://research.stlouisfed.org/fred2/series/GDPC1/?utm_source=fred-glance-widget&utm_medium=widget&utm_campaign=fred-glance-widget)

> We also find that it is reasonable to expect that public utilities, which transmit electricity to supply energy to the national economy, will sustain growth consistent with the growth of the economy as a whole.[22]

Q. HOW DID YOU OBTAIN THE ESTIMATE OF GDP THAT YOU USED FOR THE THIRD STAGE OF YOUR THREE-STAGE DCF MODEL?

A. I first obtained forecasts of real GDP from the U.S. Energy Information Administration (EIA),[23] the Congressional Budget Office (CBO),[24] and the Organisation for Economic Co-operation and Development (OECD).[25] I then used forecasts of the GDP deflator that I obtained from the Social Security Administration[26] and the OECD[27] to calculate the forecasted nominal GDP using the following formula: real GDP x (1/GDP deflator) = nominal GDP. Where there was a lack of multiple estimates for real GDP, I used the historical average (see discussion below). Schedule LCS-6 lists the estimates of real GDP and the GDP deflator used in my analysis.

Since stage one and stage two of the three-stage DCF model cover a period of 10 years, the relevant forecast period for the estimate of long-term nominal GDP used in stage three of the three-stage DCF model begins 11 years from the present. Furthermore, since roughly 93.9% of the value from the terminal value calculation (i.e., the stage three calculation) is accounted for in the

[22] Federal Energy Regulatory Commission Opinion No. 531, Order on Initial Decision, Docket No. EL11-66-001, Issued June 19, 2014 (39-40, p.20)
[23] Source: the U.S. Energy Information Administration, *Annual Energy Outlook 2014*. http://www.eia.gov/forecasts/aeo/pdf/0383(2014).pdf
[24] Source: The Congressional Budget Office, https://www.cbo.gov/publication/45066
[25] Source: http://knoema.com/qhswwkc/us-gdp-growth-forecast-2014-2015-and-up-to-2060-data-and-charts, retrieved 11/20/2014.
[26] Source: http://www.socialsecurity.gov/OACT/tr/2014/lr5b1.html. Data retrieved 11/20/2014
[27] Source:http://knoema.com/kyaewad/us-inflation-forecast-2013-2015-and-up-to-2060-data-and-charts, retrieved 11/14/2014

20 years that follow the period for which that calculation is done,[28] it is reasonable to use a forecasted nominal GDP that covers the period that begins at stage three (11 years from the present) and ends 20 years later (31 years from the present). Therefore, I have used forecasted nominal GDP from 2025-2045 as the third-stage growth rate. Multiple estimates of real GDP were not available, however, for 2041-2045. I therefore reverted to the historical average growth in real GDP for these estimates, which I calculated from data obtained from the St. Louis Federal Reserve.[29] This calculation results in a 2025-2045 forecasted nominal GDP of 4.86%. Schedule LCS-7 lists the forecasted nominal GDP.

Q. ARE YOU RECOMMENDING THAT THE SAME DIVIDEND-YIELD ADJUSTMENT YOU MADE TO YOUR CONSTANT GROWTH DCF MODEL BE MADE TO YOUR THREE-STAGE DCF MODEL?

A. Yes, for the same reasons presented above.

Q. WHAT WAS THE ORIGINAL RESULT OF YOUR THREE-STAGE DCF MODEL, AND WHAT IS YOUR RESULT AFTER THE ADJUSTMENT?

A. The original result was 8.62%. With the 45-basis-point adjustment, the result is **9.07%**. This estimate not only takes into account the current interest rate risk that investors in the Company face, but also uses a terminal growth rate that has been shown to be the

[28] See Rotkowski, Aaron & Clough, Evan (2013). "How to Estimate the Long-Term Growth Rate in the Discounted Cash Flow Method". *Insights*. Spring, pp. 9-20.
[29] Source: http://research.stlouisfed.org/fred2/series/GDPC1/?utm_source=fred-glance-widget&utm_medium=widget&utm_campaign=fred-glance-widget

maximum that should be allowed. Schedule LCS-8 summarizes my three-stage DCF model.

CAPITAL ASSET PRICING MODEL (CAPM) ANALYSIS

Q. PLEASE EXPLAIN THE GENERAL PRINCIPLE BEHIND THE CAPITAL ASSET PRICING MODEL (CAPM).

A. The capital asset pricing model (CAPM) is based on the idea that an investor's required rate of return on a security can be calculated with three factors: the risk-free rate of return, the market-risk premium, and a measure of the security's returns in relation to the market portfolio. The CAPM posits that investors take a portfolio perspective when evaluating the risk of an asset and thus consider the asset's contribution to the systematic risk of their total portfolio. The measure of an asset's systematic risk (that risk that cannot be diversified away) is known as beta. The CAPM is represented by the following formula:

$$E(R_i) = r_f + B_i + [E(R_m) - r_f]$$

Where:

$E(R_i)$ = The expected return of security *i*

r_f = The risk-free rate

β_i = Beta, the measure of the sensitivity of security *i*'s returns to the returns on the market portfolio. Specifically, beta is the

covariance of asset *i*'s returns with the returns on the market portfolio, divided by the variance of the returns of the market portfolio.

$E(R_m)$ = The expected return of the market portfolio

$[E(R_m) - r_f]$ = The market-risk premium

Q. PLEASE EXPLAIN HOW YOU OBTAINED THE RISK-FREE RATE (r_f) INPUT FOR YOUR CAPM ANALYSIS.

A. The risk-free rate (r_f) in developed economies should be estimated by taking the yield on highly liquid, long-term government securities.[30] These securities are essentially devoid of default risk. Furthermore, in order to avoid reinvestment risk (the risk of not being able to reinvest future cash flows from the security at the expected rate), STRIPS (separate trading of registered interest and principal securities) should be used.[31] I have chosen the 30-year Treasury zero-coupon STRIPS rate, which as of November 20th, 2014, was 3.20%.[32]

The CAPM requires a *current* risk-free rate.[33] Earlier in this testimony, I cited two analysts who used forecasted values of the risk-free rate. When an analyst chooses to change one of the fundamental characteristics of an input, he or she must acknowledge the change, give a justification for the change, and, finally, discuss the impact that the proposed change has on the model. I will also be adopting a forecasted risk-free rate for

[30] Koller, Tim; Goedhart, Marc; & Wessels, David. *Valuation, Measuring and Managing the Value of Companies.* Hoboken, New Jersey: John Wiley & Sons, Inc., 2010. pp. 236-7.
[31] Ibid, p.237
[32] The 30-year U.S. Treasury zero-coupon STRIPS rate (maturing 2044 Aug 15) as of 11/20/2014. Source: The Wall Street Journal Market Data Center (http://online.wsj.com/mdc/public/page/2_3020-tstrips.html)
[33] Pinto, Jerald E.; Henry, Elaine; Robinson, Thomas R.; Stowe, John D. *Equity Asset Valuation.* Hoboken, New Jersey: John Wiley & Sons, Inc., 2010. p. 57.

the present analysis. I will use this forecasted rate because of the interest-rate risk discussed in the DCF section of my testimony. As I will discuss at the end of this section, the result of the CAPM model using the current risk-free rate is 7.44%, and the result using the forecasted risk-free rate is 8.74%. The difference in the two results (1.3%) is the difference between the current risk-free rate and the forecasted risk-free rate.

The source of my forecasted rate is the Congressional Budget Office, whose 2018-2024 estimated 10-year Treasury note yield is 4.7%.[34] Using the current 10-year Treasury note yield of 2.34%,[35] I incrementally adjusted the yield from 2014 to 2018 in order to account for the transition period, which resulted in a 2014-2024 average yield of 4.18%. Then, in order to find the yield spread between 10-year and 30-year Treasury securities, I calculated the historical yield spread using data from the St. Louis Federal Reserve.[36] The calculated yield spread from 1977 to 2014 was 33 basis points, which I added to my forecasted 10-year treasury yield to get a final forecasted 30-year Treasury Yield of 4.5%. I used the 30-year Treasury bond for the forecasted Treasury yield because the Federal Reserve does not offer historical information on the STRIPS yield.

Q. PLEASE EXPLAIN HOW YOU OBTAINED THE BETA (β_i) INPUT FOR YOUR CAPM ANALYSIS.

A. Betas (β) for the companies in my proxy group were obtained from Value Line. Value Line calculates beta from a regression analysis of the relationship between weekly percentage changes in the price of the stock in question and weekly percentage changes

[34] http://www.cbo.gov/publication/45653
[35] St. Louis Federal Reserve - Retrieved 11/22/2014. http://research.stlouisfed.org/fred2/series/DGS10
[36] http://research.stlouisfed.org/fred2/series/GS10; and http://research.stlouisfed.org/fred2/series/DGS30

in the NYSE Index. Value Line uses a five-year history when available, but in all cases a two-year period is the minimum. Value Line then adjusts this initial "raw" beta to account for the long-term tendency of betas to converge towards 1.00.

Q. PLEASE EXPLAIN HOW YOU OBTAINED THE RETURN ON THE MARKET PORTFOLIO [E (R_m)] INPUT FOR YOUR CAPM ANALYSIS.

A. The expected return on the market portfolio, E (R_m), was taken from the Ibbotson SBBI 2014 Classic Yearbook.[37] I used the long-term total return on large company stocks, which is a generally accepted measure of the return on the market portfolio.[38] Ibbotson calculates the total return on large company stocks (by using an index of S&P 500 total returns) from 1926-2013, and I have chosen to use the long-term total return that corresponds to that entire time period. Ibbotson notes that the period of time used should not be adjusted for unusual events, because "all periods are unusual".[39] Furthermore, Ibbotson states:

> The goal of this study of asset returns is to provide a period long enough to include most or all of the major types of events that investors have experienced and may experience in the future. Such events include war and peace, growth and decline, bull and bear markets, inflation and deflation, and other less dramatic events that affect asset returns.[40]

Ibbotson provides both the geometric mean (10.1%) and the arithmetic mean (12.1%) of the 1926-2013 total returns of large company stocks.[41] As the

[37] Ibbotson Associates (Firm), and Morningstar, Inc. *Ibbotson SBBI 2014 Classic Yearbook: Market Results for Stocks, Bonds, Bills, and Inflation*. Chicago, IL: Morningstar, Inc., 2014. p. 40.
[38] Pratt, Shannon. *Cost of Capital, Estimation and Applications*. New York, NY: John Wiley & Sons, Inc., 1998. p.61.
[39] Ibbotson Associates (Firm), and Morningstar, Inc. *Ibbotson SBBI 2014 Classic Yearbook: Market Results for Stocks, Bonds, Bills, and Inflation*. Chicago, IL: Morningstar, Inc., 2014. p. 37
[40] Ibid. p. 37
[41] Ibid. p. 40

geometric mean and the arithmetic mean values are significantly different, a discussion of their characteristics and the relative merits of employing one or the other is necessary.

Q. WHY EXACTLY IS IT IMPORTANT TO DISCUSS THE DIFFERENCES BETWEEN THE ARITHMETIC AND GEOMETRIC MEANS?

A. As provided by Ibbotson, the difference between the arithmetic mean of the 1926-2013 total returns on large company stocks and the geometric mean of the 1926-2013 total returns on large company stocks is 2% (12.1% - 10.1%). This difference has a significant impact on the calculation of the risk premium used in the CAPM model, and therefore also has a significant impact on the calculation of return on equity. As I will soon demonstrate, using the geometric mean in the CAPM model would produce a return on equity 1.25% lower than the return on equity which would be produced using the arithmetic mean. In order to insure that the estimate is neither too low nor too high, this issue must be given serious consideration.

Q. PLEASE EXPLAIN THE DIFFERENCE BETWEEN THE ARITHMETIC MEAN AND THE GEOMETRIC MEAN.

A. The arithmetic mean and the geometric mean are both measures of central tendency. The arithmetic mean, or simply "the mean", is the sum of the total observations divided by the number of observations. The geometric mean is defined as the *n*th root of the product of *n* numbers. Unless the observations are

equal, the geometric mean will be lower than the arithmetic mean. A simple example will serve to illustrate why it is important to consider both. Imagine the following situation: an investor purchases a security for $100. One year later, the value of the security has risen to $200. The investor decides to hold the security for a second year and then sell it. At the end of that second year, the security has decreased in value to $100. To calculate the arithmetic average return, we take the first year's return ($200/$100 – 1 = 100%), add the second year's return ($100/$200 – 1 = -50%), and then divide by the number of observations (2) to obtain 25% ((100% + -50%) / 2 = 25%). To find the geometric mean of the same scenario, we calculate the single-period returns as we did above, add "1" to each return, (100% + 1 = 2; -50% + 1 = .5;), multiply the two numbers (2 * .5 = 1), take the cube root of that product ($1^{\wedge 1/3} = 1$) and then subtract the 1 that was added during the calculation (1-1 = 0) which results in 0%. In this scenario, the investor began with $100 and ended, two years later, with $100. The arithmetic mean measured the investor's mean return as 25%; the geometric mean measured the mean return as 0%.

Q. WHAT RECOMMENDATIONS DO REPRESENTATIVES OF THE FINANCIAL COMMUNITY GIVE ON THE APPROPRIATE USE OF THE ARITHMETIC AND GEOMETRIC MEANS FOR THE PURPOSES OF INVESTMENT ANALYSIS?

A. Ibbotson Associates notes that the geometric mean is backward-looking and measures the change in wealth over more than one period, while the arithmetic mean better represents the typical, single-period performance.[42]

Pinto, Henry, Robinson and Stowe, in their book *Equity Asset Valuation,*[43] which is a part of the CFA Institute Investment Series, also state that the arithmetic average best represents the mean return in a single period, while acknowledging that both the arithmetic and geometric means have been used in equity risk premium estimation.[44] Furthermore, they add an aspect to the discussion that is relevant to the present analysis:

> [...] The major finance models for estimating required return—in particular the CAPM and multifactor models—are single-period models; so the arithmetic mean, with its focus on single period returns, appears to be a model consistent choice. [...]
>
> The geometric mean return of a sample represents the compound rate of growth that equates the beginning value to the ending value of one unit of money initially invested in an asset. Present value models involve the discounting over multiple time periods. Discounting is just the reverse side of compounding in terms of finding amounts of equivalent worth at different points in time; because the geometric mean is a compound growth rate, it appears to be a logical choice for estimating a required return in a multiperiod context, *even when using a single-period required return model.*[45] [italics mine]

New York University Stern School of Business Professor Aswath Damodaran states that the arithmetic average would be the best measure of historical returns to use in establishing the equity risk premium if annual returns were uncorrelated over time; however, he also notes that empirical studies seem to indicate that returns on stocks are

[42] Ibid. p.83
[43] Pinto, Jerald E.; Henry, Elain; Robinson, Thomas R.; & Stowe, John D. *Equity Asset Valuation.* Hoboken, New Jersey: John Wiley & Sons, 2010.
[44] Ibid. p. 49
[45] Ibid. p.50

negatively correlated over time—that is to say, a good (bad) year is more likely to be followed by a bad (good) year.[46]

Finally, Koller, Goedhart and Wessells briefly discuss methods of overcoming the error of relying on either the arithmetic or geometric mean.[47] They cite researchers' use of weighted averages of arithmetic and geometric means.[48] When Koller, Goedhart and Wessells test these methods using Ibbotson U.S. stock data from 1900-2009, they arrive at the following conclusion: "The bottom line? No matter how we annualize excess returns, group the aggregation windows, or simulate estimators, the excess returns on U.S. stocks over government bonds generally falls between 5 and 6 percent."[49]

Q. HOW DO YOU ACCOUNT FOR THE DIFFERENCES OF OPINION CONCERNING THE USE OF THE ARITHMETIC AND GEOMETRIC MEANS?

A. I have chosen to use both the arithmetic and geometric mean total return on large company stocks from 1926-2013 in order to establish a range of reasonableness for my CAPM result. I have done this by making the CAPM calculation separately for both figures. I then take the average the two calculations to determine the result of my CAPM analysis. Employing both the arithmetic means and geometric means will reasonably account for the multiplicity of beliefs on the subject. Clearly, there are many analysts

[46] Damodaran, Aswath. "Equity Risk Premiums". p.7 Web. Source: http://www1.worldbank.org/finance/assets/images/Equity_Risk_Premiums.pdf
[47] Koller, Tim; Goedhart, Marc; & Wessels, David. *Valuation, Measuring and Managing the Value of Companies.* Hoboken, New Jersey: John Wiley & Sons, Inc., 2010. pp. 240-1
[48] D.C. Indro and W.Y. Lee, "Biases in Arithmetic and Geometric Averages Premia," *Financial Management* 26, no. 4 (Winter 1997) (as cited in Koller, Goedhart, & Wessells, 2010); and M.E. Blume, "Unbiased Estimators of Long Run Expected Rates of Return," *Journal of the American Statistical Association* 69, no. 347 (September 1974) (as cited in Koller, Goedhart, & Wessells, 2010)
[49] Koller, Tim; Goedhart, Marc; & Wessels, David. *Valuation, Measuring and Managing the Value of Companies.* Hoboken, New Jersey: John Wiley & Sons, Inc., 2010. pp. 240-1

who feel strongly about one method or the other, so to favor one for the purposes of the present analysis would unreasonably eliminate the view of those analysts who recommend the opposing mean and who also help shape investor expectations.

Q. PLEASE EXPLAIN HOW YOU OBTAINED THE MARKET RISK PREMIUM [$E(R_m) - r_f$] INPUT FOR YOUR CAPM ANALYSIS.

A. The market-risk premium, [$E(R_m) - r_f$], is calculated by taking the expected return on the market portfolio and subtracting the historical average total return on long-term government bonds that corresponds to the time period used to calculate the expected return on the market portfolio (for the present analysis, 1926-2013), which I obtained from the Ibbotson 2014 Classic Yearbook.[50] The historical total returns on long-term government bonds are also calculated using both the arithmetic mean and geometric mean. The risk premium calculated using the geometric mean is 4.6%; calculated using the arithmetic mean, 6.2%. To conduct a check of the validity of using both means to establish a range of reasonableness, I return to the risk premium calculated by Koller, Goedhart, and Wessels, which I cited above: all the methods they used to calculate the risk premium resulted in a range of 5% to 6%. For the present analysis, the midpoint of the arithmetic and geometric risk premia is 5.4%.

Q. WHAT RETURN ON EQUITY DOES YOUR CAPM ANALYSIS PRODUCE USING THE CURRENT RISK-FREE RATE?

[50] Ibbotson Associates (Firm), and Morningstar, Inc. *Ibbotson SBBI 2014 Classic Yearbook: Market Results for Stocks, Bonds, Bills, and Inflation.* Chicago, IL: Morningstar, Inc., 2014.

A. 7.44%. See Schedule LCS-9 for a summary of this model.

Q. WHAT IS THE EFFECT ON YOUR CAPM RETURN ON EQUITY OF USING A FORECASTED RISK-FREE RATE RATHER THAN THE CURRENT RISK-FREE RATE?

A. The return on equity increases by the difference between the current risk-free rate and the forecasted risk-free rate. This increase amounts to 1.3%.

Q. WHAT RETURN ON EQUITY DOES YOUR CAPM ANALYSIS PRODUCE USING THE FORECASTED RISK-FREE RATE?

A. **8.74%**. See Schedule LCS-10 for a summary of this model.

SUMMARY OF THE REQUIRED RETURN ON EQUITY

Q. PLEASE SUMMARIZE YOUR RECOMMENDATION OF AMEREN MISSOURI'S REQUIRED RETURN ON COMMON EQUITY

A. My recommendation of Ameren Missouri's required return on common equity is **9.01%**. This recommendation is the average of the three estimates I derived from the CAPM, constant-growth DCF, and three-stage DCF models. The range established by these estimates is 8.74% to 9.22%. My recommendation is summarized in the following table:

Summary of Recommended Return on Equity	
Method	**Result**
CAPM	8.74%
Constant-growth DCF	9.22%
Three-stage DCF	9.07%
Range of Estimates	8.74% to 9.22%
Final Recommendation	**9.01%**

SECTION 5: COST OF CAPITAL

Q. PLEASE GIVE A DEFINITION OF THE WEIGHTED AVERAGE COST OF CAPITAL.

A. The weighted average cost of capital is a calculation of the firm's overall cost of capital. It is represented by the following formula:

$$WACC = \left(\frac{E_C}{V} * K_{ec}\right) + \left(\frac{E_P}{V} * K_{ep}\right) + \left(\frac{D_L}{V} * K_{DL}\right) + \left(\frac{D_S}{V} * K_{DS}\right)$$

Where:

E_c, E_p, D_L and D_S are the amounts of common equity, preferred equity, long-term debt, and short-term debt in the capital structure, respectively.

V is the sum of the components of the capital structure (i.e., the sum of E_c, E_p, D_L and D_S).

K_{ec}, K_{ep}, K_{DL} and K_{DS} are the required returns on (costs of) equity capital, preferred equity capital, long-term debt, and short-term debt, respectively.

Q. WHAT EMBEDDED COST RATES ARE YOU USING FOR THE PRESENT ANALYSIS?

A. I have reviewed and accepted the Company's calculated costs of long-term debt, short-term debt, and preferred stock, which are summarized in Mr. Martin's direct testimony in Schedule RJM-1. The following table reproduces the relevant information: **

**

Q. WHAT IS YOUR RECOMMENDATION OF AMEREN MISSOURI'S WEIGHTED AVERAGE COST OF CAPITAL?

A. Using my calculated return on equity as the cost of common equity and the Company's capital structure and embedded costs of long-term debt, short-term debt, and preferred equity, my recommendation of Ameren Missouri's weighted average cost of capital is 7.327%. The following table summarizes the calculation: **

**

NP

Q. WILL THIS RECOMMENDATION UNDERMINE OR SUPPORT CONTINUATION OF AMEREN MISSOURI'S CURRENT CREDIT RATING?

A. My recommendation, if enacted, should support Ameren Missouri's current rating. Although recreating a complete credit-rating report is beyond the scope of the present analysis, calculating key financial ratios for Ameren Missouri using my recommended return on equity and comparing them to Ameren Missouri's current credit rating will provide evidence that my recommendation supports the Company's current rating.

Q. WHAT IS AMEREN MISSOURI'S CURRENT CREDIT RATING?

A. Standard & Poor's current rating of Ameren Missouri is BBB+ and reflects a financial risk profile of "significant".[51] Standard & Poor lists 6 financial risk profiles, the first being the most financially stable, the sixth being the least stable: 1. Minimal; 2. Modest; 3. Intermediate; 4. Significant; 5. Aggressive; 6. Highly leveraged.[52]

Q. WHICH FINANCIAL RATIOS WILL YOU CALCULATE IN ORDER TO PROVIDE EVIDENCE THAT YOUR RECOMMENDED RETURN ON EQUITY SUPPORTS AMEREN MISSOURI'S CURRENT CREDIT RATING?

A. Debt to EBITDA (earnings before interest, taxes, depreciation and amortization), and EBITDA to interest.

[51] Source:
http://www.standardandpoors.com/prot/ratings/articles/en/us?articleType=HTML&assetID=1245361119928
[52] Ibid.

Q. PLEASE EXPLAIN THE IMPORTANCE OF THE DEBT-TO-EBITDA RATIO.

A. The debt-to-EBITDA ratio is used by credit rating agencies to assess the probability of defaulting on debt. A high ratio suggests that a company may have difficulty servicing its debt. Higher debt-to-EBITDA ratios contribute to lower credit ratings.

Q. HOW DID YOU CALCULATE THE DEBT-TO-EBITDA RATIO?

A. To calculate Ameren Missouri's debt-to-EBITDA ratio based on my recommended return on equity, I first needed to calculate the pre-tax cost of capital. To do this, I obtained Ameren Missouri's tax rate from Company witness Laura M. Moore's work papers. I then computed the tax factor [1/(1-tax rate)] and applied it to Ameren Missouri's costs of preferred and common equity. The results are summarized in the following table: **

**

Second, using the Company's net original cost rate base, I multiplied the rate base by my pre-tax weighted cost. To that figure, I then added the Company's estimates of depreciation and amortization to calculate Ameren Missouri's EBITDA. Third, I multiplied the rate base by the percentage of debt component in the capital structure. This gave me the Company's debt. Finally, I divided the debt by EBITDA. The result is 2.7. The following table summarizes the calculation:**

NP

**

Q. HOW DOES THE DEBT-TO-EBITDA RATIO CALCULATED WITH YOUR RECOMMENDED RETURN ON EQUITY COMPARE TO AMEREN MISSOURI'S CURRENT FINANCIAL RISK PROFILE?

A. Lower debt-to-EBITDA ratios are more favorable than higher ratios. For companies like Ameren Missouri that have a "significant" financial risk profile, the debt-to-EBITDA ratio is generally between 3 and 4. The result of the debt-to-EBITDA calculation for Ameren Missouri using my recommended return on equity is 2.7. The range for the better "intermediate" financial risk profile category is from 2 to 3. Accordingly, my recommended ROE should support continuation of Ameren Missouri's current credit rating and financial risk profile assessment using this measure.

NP

Q. PLEASE EXPLAIN THE INTEREST COVERAGE RATIO.

A. A company's interest coverage ratio helps indicate financial stability. The lower the ratio, the more a company is burdened by debt expense. This ratio is calculated by dividing the company's EBITDA by the amount of interest the company must pay. According to Standard & Poor's methodology for determining corporate ratings criteria, a company whose financial risk is classified as "significant" has an interest-coverage ratio in the range of 3 to 6.[53]

Q. HOW DID YOU CALCULATE THE INTEREST COVERAGE RATIO?

A. To calculate Ameren Missouri's interest coverage ratio based on my recommended return on equity, I began with Ameren Missouri's EBITDA, as calculated above. Second, using the Company's figures, I multiplied the rate base by the percentage of debt in the capital structure. I then multiplied that by the cost of debt in order to obtain the amount of interest the Company pays. Finally, I calculated Ameren Missouri's interest coverage ratio by dividing its EBITDA by the amount of interest it pays. The following table summarizes the calculation: **

[53] Source:
http://www.standardandpoors.com/prot/ratings/articles/en/us/?articleType=HTML&assetID=1245376263684

NP

**

Q. HOW DOES THE INTEREST-COVERAGE RATIO CALCULATED WITH YOUR RECOMMENDED RETURN ON EQUITY COMPARE TO AMEREN MISSOURI'S CURRENT FINANCIAL RISK PROFILE?

A. Higher interest-coverage ratios are more favorable than lower ratios. The interest-coverage ratio for companies like Ameren Missouri in the "significant" category falls in a range of 3 to 6. The result of the interest-coverage ratio calculation for Ameren Missouri using my recommended return on equity is 6.5. The range of the better "intermediate" category is 6 to 10. Accordingly, using this measure my recommended return on equity should support continuation of Ameren Missouri's current credit rating and financial risk profile.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

NP

In addition to reviewing rate cases from approximately 2004 to the present, I have reviewed the following materials to prepare the present testimony:

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Three- to Five-Year Earnings Growth Estimates (%)					
Company Name [1]	Ticker [2]	Value Line [3]	I/B/E/S [4]	Zacks [5]	Average of Earnings Growth Estimates [6]
Alliant Energy Corp	LNT	5.0%	4.40%	4.80%	4.73%
American Electric Power Company Inc.	AEP	4.5%	4.97%	4.92%	4.80%
Great Plains Energy Inc.	GXP	6.0%	5.00%	4.95%	5.32%
IDACORP Inc.	IDA	2.0%	4.00%	4.00%	3.33%
Pinnacle West Capital Corp	PNW	4.0%	3.95%	3.95%	3.97%
PNM Resources Inc.	PNM	12.0%	8.34%	8.50%	9.61%
Portland General Electric Company	POR	3.5%	7.83%	7.84%	6.39%
Southern Co	SO	3.5%	3.62%	3.55%	3.56%
Westar Energy Inc.	WR	5.5%	3.20%	3.80%	4.17%
Xcel Energy Inc.	XEL	4.5%	4.51%	4.16%	4.39%

[3] Data retrieved 11/5/2014 from Value Line (http://www.valuelinepro.com/)
[4] Data retrieved 11/6/2014 from Yahoo! Finance (http://finance.yahoo.com/)
[5] Data retrieved 11/6/2014 from Zacks (http://www.zacks.com/)
[6] The average of [4], [5], and [6]

Proxy Group Dividend Yields

Company Name	Ticker	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Historical Average (2004-2013)	Current	3-5 year Estimate
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
Alliant Energy Corp	LNT	3.90%	3.80%	3.30%	3.10%	4.10%	5.70%	4.60%	4.30%	4.10%	3.70%	4.06%	3.27%	4.20%
American Electric Power Company Inc	AEP	4.30%	3.90%	4.10%	3.40%	4.20%	5.50%	4.90%	5.00%	4.60%	4.20%	4.41%	3.70%	4.50%
Great Plains Energy Inc	GXP	5.40%	5.50%	5.60%	5.50%	7.00%	5.00%	4.50%	4.10%	4.10%	3.80%	5.05%	3.70%	4.70%
IDACORP Inc	IDA	4.10%	4.10%	3.40%	3.50%	4.00%	4.50%	3.40%	3.10%	3.30%	3.20%	3.66%	3.05%	4.20%
Pinnacle West Capital Corp	PNW	4.50%	4.50%	4.70%	4.80%	6.20%	6.80%	5.40%	4.80%	5.30%	4.00%	5.10%	3.83%	4.80%
PNM Resources Inc	PNM	2.90%	2.90%	3.20%	3.40%	4.90%	4.80%	4.10%	3.20%	3.00%	3.00%	3.54%	2.60%	3.30%
Portland General Electric Company	POR	-	-	2.50%	3.30%	4.30%	5.40%	5.20%	4.40%	4.10%	3.70%	4.11%	3.11%	4.40%
Southern Co	SO	4.70%	4.40%	4.50%	4.40%	4.60%	5.50%	5.10%	4.60%	4.30%	4.60%	4.67%	4.60%	5.20%
Westar Energy Inc	WR	3.90%	4.00%	4.30%	4.20%	5.20%	6.30%	5.30%	4.80%	4.60%	4.30%	4.69%	3.58%	4.40%
Xcel Energy Inc	XEL	4.70%	4.60%	4.40%	4.00%	4.70%	5.10%	4.50%	4.20%	3.90%	3.90%	4.40%	3.58%	4.70%
Proxy Group Average		4.27%	4.19%	4.00%	3.96%	4.92%	5.46%	4.70%	4.25%	4.13%	3.84%	4.37%	3.50%	4.44%

[3] through [12]	Source: the Value Line Investment Survey
[13]	Average of columns [3] through [12]. For Portland General Electric, the average is of columns [5] through [12].
[14]	Source: the Value Line Investment Survey. Retrieved 11/23/2014
[15]	Source: the Value Line Investment Survey. Retrieved 11/23/2014

Dividend Yield Adjustment Calculation Based on Forecasted Dividend Yield

Company Name [1]	Ticker [2]	Current Div Yld [3]	2015 [4]	2016 [5]	2017 [6]	2018 [7]	2019 [8]	2015-2019 [9]	Adjustment [10]
Alliant Energy Corp	LNT	3.27%	3.46%	3.64%	3.83%	4.01%	4.20%	3.74%	0.47%
American Electric Power Company Inc.	AEP	3.70%	3.86%	4.02%	4.18%	4.34%	4.50%	4.10%	0.40%
Great Plains Energy Inc.	GXP	3.70%	3.90%	4.10%	4.30%	4.50%	4.70%	4.20%	0.50%
IDACORP Inc.	IDA	3.05%	3.28%	3.51%	3.74%	3.97%	4.20%	3.63%	0.58%
Pinnacle West Capital Corp	PNW	3.83%	4.02%	4.22%	4.41%	4.61%	4.80%	4.32%	0.48%
PNM Resources Inc.	PNM	2.60%	2.74%	2.88%	3.02%	3.16%	3.30%	2.95%	0.35%
Portland General Electric Company	POR	3.11%	3.37%	3.63%	3.88%	4.14%	4.40%	3.76%	0.65%
Southern Co	SO	4.60%	4.72%	4.84%	4.96%	5.08%	5.20%	4.90%	0.30%
Westar Energy Inc.	WR	3.58%	3.74%	3.91%	4.07%	4.24%	4.40%	3.99%	0.41%
Xcel Energy Inc.	XEL	3.58%	3.80%	4.03%	4.25%	4.48%	4.70%	4.14%	0.56%
Proxy Group Average		3.50%	3.69%	3.88%	4.06%	4.25%	4.44%	3.97%	**0.47%**

Dividend Yield Adjustment Calculation Based on Historical Dividend Yield

Company Name* [11]	Ticker [12]	Current Div Yld [13]	2015 [14]	2016 [15]	2017 [16]	2018 [17]	2019 [18]	2015-2019 [19]	Adjustment [20]
Alliant Energy Corp	LNT	3.27%	3.43%	3.59%	3.74%	3.90%	4.06%	3.67%	0.40%
American Electric Power Company Inc.	AEP	3.70%	3.84%	3.98%	4.13%	4.27%	4.41%	4.06%	0.36%
Great Plains Energy Inc.	GXP	3.70%	3.97%	4.24%	4.51%	4.78%	5.05%	4.38%	0.68%
IDACORP Inc.	IDA	3.05%	3.17%	3.29%	3.42%	3.54%	3.66%	3.36%	0.31%
Pinnacle West Capital Corp	PNW	3.83%	4.08%	4.34%	4.59%	4.85%	5.10%	4.47%	0.64%
PNM Resources Inc.	PNM	2.60%	2.79%	2.98%	3.16%	3.35%	3.54%	3.07%	0.47%
Portland General Electric Company	POR	3.11%	3.31%	3.51%	3.71%	3.91%	4.11%	3.61%	0.50%
Southern Co	SO	4.60%	4.61%	4.63%	4.64%	4.66%	4.67%	4.64%	0.04%
Westar Energy Inc.	WR	3.58%	3.80%	4.02%	4.25%	4.47%	4.69%	4.14%	0.56%
Xcel Energy Inc.	XEL	3.58%	3.74%	3.91%	4.07%	4.24%	4.40%	3.99%	0.41%
Proxy Group Average		3.50%	3.68%	3.85%	4.02%	4.20%	4.37%	3.94%	**0.43%**

[3]	Source: The Value Line Investment Survey. Retrieved 11/23/2014.
[4], [5], [6], [7]	These rates are incremental transitions from the rate of column [3] to the rate in column [8]
[8]	The Value Line 3-5 year dividend yield estimate. Source: the Value Line Investment Survey, retrieved 11/23/2014.
[9]	The average of columns [3] through [8]
[10]	Column [9] minus column [3]
[13]	Source: The Value Line Investment Survey. Retrieved 11/23/2014.
[14], [15], [16], [17]	These rates are incremental transitions from the rate of column [13] to the rate in column [18]
[18]	Estimated as the historical avg. dividend yield (2004-2013 average). Source: Value Line, retrieved 11/23/2014.
[19]	The average of columns [13] through [18]
[20]	Column [19] minus column [13]

DCF Constant-Growth Model

Company Name	Ticker	13-week Avg Price	Growth Rate (G)	D_1	ROE (K)
[1]	[2]	[3]	[4]	[5]	[6]
Alliant Energy Corp	LNT	58.87	4.73%	2.09	8.28%
American Electric Power Company Inc.	AEP	54.64	4.80%	2.17	8.77%
Great Plains Energy Inc.	GXP	25.53	5.32%	0.94	9.02%
IDACORP Inc.	IDA	57.66	3.33%	1.91	6.65%
Pinnacle West Capital Corp	PNW	58.03	3.97%	2.43	8.15%
PNM Resources Inc.	PNM	26.95	9.61%	0.78	12.49%
Portland General Electric Company	POR	34.38	6.39%	1.16	9.75%
Southern Co	SO	45.29	3.56%	2.14	8.28%
Westar Energy Inc.	WR	36.32	4.17%	1.43	8.10%
Xcel Energy Inc.	XEL	32.06	4.39%	1.23	8.21%
Proxy Group Average					8.77%
With Adjustment (45 basis points)					**9.22%**

[3]	The thirteen-week average of High and Low stock prices
[4]	The average of analysts' 3-5 year earnings growth estimates
[5]	The most recent dividend, annualized and adjusted (multiplied) by (1 + .5g)
[6]	(Column [5] / column [3]) + column [4]

Historical Average and Estimates of Real GDP Growth (%)

	EIA	OECD	Average of Estimates
[1]	[2]	[3]	[4]
Average Annual Growth in Real GDP 1929-2012	3.3%		3.30%
Real GDP Growth 2014-2040	2.40%	2.45%	2.42%
Real GDP Growth 2041-2060		1.59%	1.59%

[2] From the U.S. Energy Information Administration, Annual Energy Outlook 2014 (http://www.eia.gov/forecasts/aeo/pdf/0383(2014).pdf), retrieved Nov. 13th, 2014

[3] source: http://knoema.com/qhswwkc/us-gdp-growth-forecast-2014-2015-and-up-to-2060-data-and-charts

[4] The Average of Estimates from [2] and [3], when two individual estimates for the same time period where available; otherwise, the single estimate is reproduced here

Estimates of GDP Deflator Growth (%)

Source	2025-2034	2035-2060
[5]	[6]	[7]
Social Security Administration[1]	2.30%	2.30%
OECD Long-Term Forecast[2]	2.04%	2.03%
Average*	2.17%	2.17%

[1] Source: http://www.socialsecurity.gov/OACT/tr/2014/lr5b1.html. Data retrieved 11/20/2014

[2] Source:http://knoema.com/kyaewad/us-inflation-forecast-2013-2015-and-up-to-2060-data-and-charts, retrieved 11/14/2014

Forecast of Nominal GDP

Real GDP [1]		GDP Deflator (reciprocal) [2]		Nominal GDP [3]		
DATE	VALUE	DATE	GDPDEF	DATE	VALUE	Percent Change YOY
2009-01-01	14418.8	2009-01-01	100.000	2009-01-01	14418.7	
2010-01-01	14783.8	2010-01-01	101.217	2010-01-01	14964.4	3.78%
2011-01-01	15020.6	2011-01-01	103.307	2011-01-01	15517.9	3.70%
2012-01-01	15369.2	2012-01-01	105.164	2012-01-01	16163.2	4.16%
2013-01-01	15710.3	2013-01-01	106.729	2013-01-01	16768.1	3.74%
2014-01-01	16227.4	2014-01-01	108.429	2014-01-01	17595.2	4.93%
2015-01-01	16761.6	2015-01-01	110.404	2015-01-01	18505.5	5.17%
2016-01-01	17313.3	2016-01-01	112.495	2016-01-01	19476.7	5.25%
2017-01-01	17733.1	2017-01-01	114.755	2017-01-01	20349.7	4.48%
2018-01-01	18163.1	2018-01-01	117.154	2018-01-01	21278.8	4.57%
2019-01-01	18603.6	2019-01-01	119.672	2019-01-01	22263.3	4.63%
2020-01-01	19054.7	2020-01-01	122.263	2020-01-01	23296.9	4.64%
2021-01-01	19516.7	2021-01-01	124.910	2021-01-01	24378.4	4.64%
2022-01-01	19989.9	2022-01-01	127.615	2022-01-01	25510.1	4.64%
2023-01-01	20474.7	2023-01-01	130.378	2023-01-01	26694.4	4.64%
2024-01-01	20971.1	2024-01-01	133.200	2024-01-01	27933.6	4.64%
2025-01-01	21479.6	2025-01-01	136.091	2025-01-01	29231.8	4.65%
2026-01-01	22000.5	2026-01-01	139.044	2026-01-01	30590.3	4.65%
2027-01-01	22534.0	2027-01-01	142.061	2027-01-01	32012.0	4.65%
2028-01-01	23080.4	2028-01-01	145.144	2028-01-01	33499.7	4.65%
2029-01-01	23640.0	2029-01-01	148.293	2029-01-01	35056.6	4.65%
2030-01-01	24213.2	2030-01-01	151.511	2030-01-01	36685.8	4.65%
2031-01-01	24800.4	2031-01-01	154.799	2031-01-01	38390.8	4.65%
2032-01-01	25401.7	2032-01-01	158.158	2032-01-01	40175.0	4.65%
2033-01-01	26017.7	2033-01-01	161.590	2033-01-01	42042.1	4.65%
2034-01-01	26648.6	2034-01-01	165.097	2034-01-01	43995.9	4.65%
2035-01-01	27294.7	2035-01-01	168.671	2035-01-01	46038.4	4.64%
2036-01-01	27956.6	2036-01-01	172.323	2036-01-01	48175.6	4.64%
2037-01-01	28634.5	2037-01-01	176.054	2037-01-01	50412.1	4.64%
2038-01-01	29328.8	2038-01-01	179.865	2038-01-01	52752.4	4.64%

2039-01-01	30040.0	2039-01-01	183.759	2039-01-01	55201.3	4.64%
2040-01-01	30768.4	2040-01-01	187.738	2040-01-01	57763.9	4.64%
2041-01-01	31783.8	2041-01-01	191.802	2041-01-01	60962.0	5.54%
2042-01-01	32832.6	2042-01-01	195.955	2042-01-01	64337.1	5.54%
2043-01-01	33916.1	2043-01-01	200.197	2043-01-01	67899.1	5.54%
2044-01-01	35035.3	2044-01-01	204.532	2044-01-01	71658.3	5.54%
2045-01-01	36191.5	2045-01-01	208.960	2045-01-01	75625.6	5.54%

2025 - 2045 Average Nom GDP Growth: **4.86%**

[1] 2009-2013 historical data from the St.Louis Federal Reserve. 2014-2045: forecasted values
[2] 2009-2013 historical data from the St. Louis Federal Reserve. 2014-2045: forecasted values
[3] 2009-2013 historical data from the St. Louis Federal Reserve. 2014 -2045: forecasted values

Three-Stage DCF Model - Stage 3 Growth Rate at 100% of Nominal GDP

Part 1: Three-Stage DCF *Projected Cash Flows*

Company Name	Ticker	13-week Avg Price	Stage 1 D_1	D_2	D_3	D_4	D_5	D_6	Stage 2 D_7	D_8	D_9	D_{10}	Stage 3 D_{11}	Terminal Value$_{11}$
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
Alliant Energy Corp	LNT	58.87	2.09	2.19	2.29	2.40	2.51	2.63	2.76	2.89	3.03	3.18	3.33	99.11
American Electric Power Company Inc	AEP	54.64	2.17	2.27	2.38	2.50	2.62	2.74	2.88	3.02	3.16	3.31	3.48	92.02
Great Plains Energy Inc	GXP	25.53	0.94	0.99	1.05	1.10	1.16	1.22	1.29	1.35	1.42	1.49	1.56	43.18
IDACORP Inc	IDA	57.66	1.91	1.98	2.04	2.11	2.18	2.26	2.34	2.44	2.55	2.66	2.79	96.16
Pinnacle West Capital Corp	PNW	58.03	2.43	2.52	2.62	2.73	2.84	2.95	3.08	3.21	3.36	3.52	3.69	97.04
PNM Resources Inc	PNM	26.95	0.78	0.85	0.93	1.02	1.12	1.22	1.32	1.41	1.50	1.59	1.66	46.97
Portland General Electric Company	POR	34.38	1.16	1.23	1.31	1.39	1.48	1.57	1.66	1.76	1.85	1.95	2.04	58.59
Southern Co	SO	45.29	2.14	2.21	2.29	2.37	2.46	2.55	2.65	2.76	2.89	3.02	3.17	75.38
Westar Energy Inc	WR	36.32	1.43	1.49	1.55	1.62	1.68	1.75	1.83	1.91	2.00	2.10	2.20	60.86
Xcel Energy Inc	XEL	32.06	1.23	1.28	1.34	1.40	1.46	1.52	1.59	1.66	1.74	1.83	1.91	53.83

Part 2: Three-Stage DCF Calculated ROE and *Present Value of the Projected Cash Flows*

Company Name	ROE (K)	Sum of Present Value of Future Cash Flows	Stage 1 D_1	D_2	D_3	D_4	D_5	D_6	Stage 2 D_7	D_8	D_9	D_{10}	Stage 3 D_{11}	Terminal Value$_{11}$
[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
Alliant Energy Corp	8.38%	58.87	1.93	1.86	1.80	1.74	1.68	1.62	1.57	1.52	1.47	1.42	1.37	40.89
American Electric Power Company Inc	8.82%	54.64	1.99	1.92	1.85	1.78	1.72	1.65	1.59	1.53	1.48	1.42	1.37	36.33
Great Plains Energy Inc	8.65%	25.53	0.87	0.84	0.82	0.79	0.77	0.74	0.72	0.70	0.67	0.65	0.63	17.34
IDACORP Inc	7.90%	57.66	1.77	1.70	1.62	1.56	1.49	1.43	1.38	1.33	1.28	1.24	1.21	41.65
Pinnacle West Capital Corp	8.84%	58.03	2.23	2.13	2.03	1.94	1.86	1.78	1.70	1.63	1.57	1.51	1.45	38.20
PNM Resources Inc	8.57%	26.95	0.71	0.72	0.73	0.74	0.74	0.74	0.74	0.73	0.72	0.70	0.67	19.01
Portland General Electric Company	8.51%	34.37	1.07	1.04	1.02	1.00	0.98	0.96	0.94	0.91	0.89	0.86	0.83	23.86
Southern Co	9.26%	45.29	1.96	1.85	1.76	1.67	1.58	1.50	1.43	1.36	1.30	1.25	1.20	28.45
Westar Energy Inc	8.65%	36.32	1.32	1.26	1.21	1.16	1.11	1.07	1.03	0.99	0.95	0.92	0.88	24.44
Xcel Energy Inc	8.59%	32.06	1.13	1.09	1.04	1.00	0.96	0.93	0.89	0.86	0.83	0.80	0.77	21.75

Proxy Group Average	8.62%
With Adjustment (45 basis points)	**9.07%**

[3]	The current, thirteen-week average of High and Low stock prices
[4]	The most recent dividend, annualized (i.e., multiplied by 4) and adjusted (multiplied) by (1+ half the stage-1 growth rate).
[5],[6],[7],[8]	Each individual dividend was calculated by multiplying the previous dividend by 1+ the stage-1 growth rate.
[9],[10],[11],[12],[13]	Each individual dividend was calculated by multiplying the previous dividend by 1+ the stage-2 growth rate.
[14]	The Stage-3 dividend is calculated by multiplying the previous dividend [13] by 1+ the stage-3 growth rate.
[15]	((Column [14] * (1 + terminal-stage growth rate)) / (Column [17] - stage-3 growth rate))
[17]	ROE is the discount rate that makes the value of the projected cash flows ([4] through [15]) equal to the 13-week Avg Price of the stock (column [3]) [allow .01 for rounding].
[18]	Column [18] is calculated as the sum of columns [19] through [30]. When the correct ROE is used, column [18] will equal column [3]. [allow .01 for rounding]
[19]	Column [4] / (1 + column [17])
[20]	Column [5] / (1 + column [17])^2
[21]	Column [6] / (1 + column [17])^3
[22]	Column [7] / (1 + column [17])^4
[23]	Column [8] / (1 + column [17])^5
[24]	Column [9] / (1 + column [17])^6
[25]	Column [10] / (1 + column [17])^7
[26]	Column [11] / (1 + column [17])^8
[27]	Column [12] / (1 + column [17])^9
[28]	Column [13] / (1 + column [17])^10
[29]	Column [14] / (1 + column [17])^11
[30]	Column [15] / (1 + column [17])^11

CAPM - Current Risk-Free Rate

Company Name	Ticker	Beta	Risk-Free Rate	Historical Return On the Market Portfolio (1926-2013)		Historical Return On long-term Govt. Bonds (1926-2013)		Risk Premium		CAPM Results		
				Geo. Average	Arith. Average	Geo. Average	Arith. Average	Geo. Average	Arith. Average	Geo. Average	Arith. Average	Midpoint of Geo and Arith.
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
Alliant Energy Corp	LNT	0.80	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	6.88%	8.16%	7.52%
American Electric Power Company Inc	AEP	0.70	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	6.42%	7.54%	6.98%
Great Plains Energy Inc	GXP	0.90	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	7.34%	8.78%	8.06%
IDACORP Inc	IDA	0.80	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	6.88%	8.16%	7.52%
Pinnacle West Capital Corp	PNW	0.70	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	6.42%	7.54%	6.98%
PNM Resources Inc	PNM	0.90	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	7.34%	8.78%	8.06%
Portland General Electric Company	POR	0.80	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	6.88%	8.16%	7.52%
Southern Co	SO	0.60	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	5.96%	6.92%	6.44%
Westar Energy Inc	WR	0.80	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	6.88%	8.16%	7.52%
Xcel Energy Inc	XEL	0.70	3.20%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	6.42%	7.54%	6.98%
Proxy Group Average										6.74%	7.97%	7.36%
Proxy Group Median										6.88%	8.16%	7.52%
Midpoint of average and median										6.81%	8.07%	**7.44%**

[3]	Beta estimates from the Value Line Investment Survey
[4]	The 30-year U.S. Treasury zero-coupon STRIPS rate (maturing 2044 Aug 15) as of 11/20/2014. Source: The Wall Street Journal Market Data Center (http://online.wsj.com/mdc/public/page/2_3020-tstrips.html)
[5],[6],[7], and [8]	Source: the Ibbotson 2014 Classic Yearbook published by Morningstar, p. 40. These averages are of total returns.
[9]	Column [5] minus column [7]
[10]	Column [6] minus column [8]
[11]	Column [4] + (Column [3]*Column [9])
[12]	Column [4] + (Column [3]*Column [10])

CAPM - Forecasted Risk-Free Rate

Company Name	Ticker	Beta	Risk-Free Rate	Historical Return (1926-2013) On the Market Portfolio		Historical Return (1926-2013) On long-term Govt. Bonds		Risk Premium		CAPM Results		
				Geo. Average	Arith. Average	Geo. Average	Arith. Average	Geo. Average	Arith. Average	Geo. Average	Arith. Average	Midpoint of Geo and Arith.
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
Alliant Energy Corp	LNT	0.80	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	8.18%	9.46%	8.82%
American Electric Power Company Inc	AEP	0.70	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	7.72%	8.84%	8.28%
Great Plains Energy Inc	GXP	0.90	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	8.64%	10.08%	9.36%
IDACORP Inc	IDA	0.80	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	8.18%	9.46%	8.82%
Pinnacle West Capital Corp	PNW	0.70	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	7.72%	8.84%	8.28%
PNM Resources Inc	PNM	0.90	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	8.64%	10.08%	9.36%
Portland General Electric Company	POR	0.80	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	8.18%	9.46%	8.82%
Southern Co	SO	0.60	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	7.26%	8.22%	7.74%
Westar Energy Inc	WR	0.80	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	8.18%	9.46%	8.82%
Xcel Energy Inc	XEL	0.70	4.50%	10.1%	12.1%	5.5%	5.9%	4.60%	6.20%	7.72%	8.84%	8.28%
Proxy Group Average										8.05%	9.28%	8.66%
Proxy Group Median										8.18%	9.46%	8.82%
Midpoint of average and median										8.12%	9.37%	**8.74%**

[3]	Beta estimates from the Value Line Investment Survey
[4]	The Forecasted 30-year Treasury Bond Yield
[5],[6],[7], and [8]	Source: the Ibbotson 2014 Classic Yearbook published by Morningstar, p. 40. These averages are of total returns.
[9]	Column [5] minus column [7]
[10]	Column [6] minus column [8]
[11]	Column [4] + (Column [3]*Column [9])
[12]	Column [4] + (Column [3]*Column [10])