KENTUCKY PUBLIC SERVICE COMMISSION

Case No. 2016-00371

LOUISVILLE GAS AND ELECTRIC COMPANY

COST OF CAPITAL

DIRECT TESTIMONY

OF

J. RANDALL WOOLRIDGE, PH.D.

ON BEHALF OF
LOUISVILLE/JEFFERSON COUNTY METRO GOVERNMENT
March 3, 2016

LOUISVILLE GAS AND ELECTRIC COMPANY
Case No. 2016-00371

Direct Testimony of J. Randall Woolridge, Ph. D.

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LOUISVILLE GAS AND ELECTRIC COMPANY
Case No. 2016-00371

Summary of Direct Testimony of
J. Randall Woolridge, Ph. D.

Dr. Woolridge is testifying as to the appropriate cost of capital for Louisville Gas and Electric Company ("LGE") Company. He has also evaluated the testimony and rate of return recommendation, and testimony of LGE witnesses Daniel K. Arbough and Mr. Adrien McKenzie, respectively.

Mr. Arbough has proposed a capital structure that includes 3.82% short-term debt, 42.91% long-term debt and 53.27% common equity. The Company proposes a short-term debt cost rate of 0.72% and a long-term debt cost rate of 4.12%. Mr. McKenzie has proposed a common equity cost rate or return on equity ("ROE") of 10.23%. LGE's overall rate of return recommendation is 7.24%. Dr. Woolridge has adjusted the capital structure ratios of LGE to be more reflective of the capital structures of electric utility and gas distribution companies as well as LGE's parent company, PPL Corporation ("PPL"). His capital structure includes 50.0% debt and 50.0% common equity. In his calculations he has used the Company's proposed debt cost rates. Dr. Woolridge has applied the Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM") to a proxy group of publicly-held electric utility Companies ("Electric Proxy Group"), the proxy group developed by Mr. McKenzie ("McKenzie Proxy Group"), and a proxy group of gas distribution companies. Based on his equity cost rate range of 7.9% to 8.9%, he recommends an equity cost rate of 8.75% for LGE electric utility operations and 8.70% for LGE's gas distribution operations. Using his capital structure and senior capital cost rates, he recommends an overall fair rate of return or cost of capital of 6.29% for the electric utility operations of LGE and 6.26% for the gas distribution operations of LGE.

Dr. Woolridge also provides a critique of the ROE testimony of Mr. McKenzie. One major point of difference is their opposing views about the state of capital markets and capital costs. Mr. McKenzie bases his equity cost rate recommendation on forecasts of higher interest rates and capital costs. Dr. Woolridge shows that these forecasts of higher interest rates have been wrong for a decade. Dr. Woolridge indicates that: (1) the economy has been growing for over seven years and unemployment is below 5.0%; (2) inflationary expectations and interest rates remain at historically low levels and are likely to stay there for some time; and (3) reflective of the improved economic conditions, corporate earnings growth, and low interest rates, the stock market is at an all-time high.

Dr. Woolridge also highlights several issues with Mr. McKenzie's equity cost rate studies. In particular, Dr. Woolridge notes that (1) Mr. McKenzie has ignored his low-end DCF results, (2) he has used inflated base interest rates and risk premiums in his CAPM and Utility Risk Premium studies; and (3) he has included equity cost rate adjustments for size and flotation costs.

Dr. Woolridge concludes whereas his ROE recommendations of 8.75% and 8.70% are below the average authorized ROEs for electric utilities and gas companies, he notes that state-level authorized ROEs tend to lag behind interest rates and capital costs.

1 **Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.**

2 A. My name is J. Randall Woolridge, and my business address is 120 Haymaker Circle,
3 State College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co.
4 and Frank P. Smeal Endowed University Fellow in Business Administration at the
5 University Park Campus of the Pennsylvania State University. I am also the Director
6 of the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A
7 summary of my educational background, research, and related business experience is
8 provided in Appendix A.

9

10 **I. <u>SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS</u>**
11

12 **Q. WHAT IS THE SCOPE OF YOUR TESTIMONY IN THIS PROCEEDING?**
13
14 A. I have been asked by Louisville/Jefferson County Metro Government ("Louisville
15 Metro") to provide an opinion as to the fair rate of return or cost of capital for Louisville
16 Gas & Electric Company. ("LGE" or the "Company") and to evaluate the cost of capital
17 testimony of the Company. [1]

18

19 **Q. HOW IS YOUR TESTIMONY ORGANIZED?**

20 A. First, I summarize my cost of capital recommendation for the Company, and review the
21 primary areas of contention on the Company's position. Second, I provide an assessment
22 of capital costs in today's capital markets. Third, I discuss the selection of a proxy
23 group of electric utility and gas distribution companies for estimating the cost of equity
24 capital for the Company. Fourth, I discuss the Company's recommended capital

[1] In my testimony, I use the terms 'rate of return' and 'cost of capital' interchangeably. This is because the required rate of return of investors on a company's capital is the cost of capital.

1 structure and debt cost rates. Fifth, I provide an overview of the concept of the cost of
2 equity capital, and then estimate the equity cost rate for the Company. Finally, I critique
3 LGE's rate of return analysis and testimony. A table of contents is provided just after
4 the title page.
5
6 **Q. WHAT COMPRISES A UTILITY'S "RATE OF RETURN"?**
7 A. A company's overall rate of return consists of three main categories: (1) capital
8 structure (*i.e.*, ratios of short-term debt, long-term debt, preferred stock and common
9 equity); (2) cost rates for short-term debt, long-term debt, and preferred stock; and (3)
10 common equity cost, otherwise known as Return on Equity ("ROE").
11
12 **Q. WHAT IS A UTILITY'S ROE INTENDED TO REFLECT?**
13 A. An ROE is most simply described as the allowed rate of profit for a regulated
14 company. In a competitive market, a company's profit level is determined by a
15 variety of factors, including the state of the economy, the degree of competition a
16 company faces, the ease of entry into its markets, the existence of substitute or
17 complementary products/services, the company's cost structure, the impact of
18 technological changes, and the supply and demand for its services and/or products.
19 For a regulated monopoly, the regulator determines the level of profit available to the
20 public utility. The United States Supreme Court established the guiding principles for
21 determining an appropriate level of profitability for regulated public utilities in two
22 cases: (1) *Bluefield* and (2) *Hope*.[2] In those cases, the Court recognized that the fair

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

1 rate of return on equity should be: (1) comparable to returns investors expect to earn
2 on other investments of similar risk; (2) sufficient to assure confidence in the
3 company's financial integrity; and (3) adequate to maintain and support the
4 company's credit and to attract capital.
5 Thus, the appropriate ROE for a regulated utility requires determining the
6 market-based cost of capital. The market-based cost of capital for a regulated firm
7 represents the return investors could expect from other investments, while assuming
8 no more and no less risk. The purpose of all of the economic models and formulas in
9 cost of capital testimony (including those presented later in my testimony) is to
10 estimate, using market data of similar-risk firms, the rate of return on equity investors
11 require for that risk-class of firms in order to set an appropriate ROE for a regulated
12 firm.
13
14 **Q. PLEASE REVIEW THE ALTERNATIVE RECOMMENDATIONS**
15 **REGARDING THE APPROPRIATE RATE OF RETURN FOR THE**
16 **COMPANY.**
17 A. The Company's proposed capital structure and senior capital cost rates are provided
18 by Mr. Daniel K. Arbough. I have adjusted the capital structure ratios of LGE to be
19 more reflective of the capital structures of electric utility and gas distribution
20 companies and LGE's parent company, PPL Corporation ("PPL"). This capital
21 structure includes 50.0% debt and 50.0% common equity. I have slightly adjusted
22 the Company's Company's proposed long-term debt cost rate. Mr. Adrien M.
23 McKenzie has recommended a common equity cost rate of 10.23% for the Company.

1 I have applied the Discounted Cash Flow Model ("DCF") and the Capital Asset
2 Pricing Model ("CAPM") to a proxy group of publicly-held electric utility companies
3 ("Electric Proxy Group"), the group developed by Mr. McKenzie ("McKenzie Proxy
4 Group"), and a group of gas distribution companies ("Gas Proxy Group"). My
5 analysis indicates an equity cost rate of 8.75% is appropriate for the electric utility
6 operations and of 8.70% for the gas distribution operations of LGE. These figures are
7 in the upper end of my ranges for the proxy groups. With my proposed capital
8 structure and senior capital cost rates, I am recommending an overall fair rate of
9 return or cost of capital of 6.29% for the electric utility operations and 6.26% for the
10 gas distribution operations of LGE. This is summarized in Exhibit JRW-1.
11
12 **Q. WHAT ARE THE PRIMARY AREAS OF DISAGREEMENT IN**
13 **ESTIMATING THE RATE OF RETURN OR COST OF CAPITAL IN THIS**
14 **PROCEEDING?**
15 A. The primary areas of disagreement in measuring the Company's rate of return or cost
16 of capital are: (1) our opposing views regarding the state of the markets and capital
17 costs; (2) the Company's proposed capital structure; (3) the DCF equity cost rate
18 estimates, and in particular, (a) Mr. McKenzie has ignored a number of low-end DCF
19 results, and (b) his exclusive use of the earnings per share growth rates of Wall Street
20 analysts and *Value Line*; (4) the base interest rate and market or equity risk premium
21 in Mr. McKenzie's Utility Risk Premium ("URP") model and CAPM approach; (5)
22 Mr. McKenzie's two non-traditional equity cost rate approaches – the Expected
23 Earnings approach and his DCF applied to non-utilities; and (6) Mr. McKenzie's

equity cost rate adjustments for company size and flotation costs.

Q. PLEASE INITIALLY REVIEW THE DIFFERENCES IN OPINION REGARDING THE STATE OF THE CAPITAL MARKETS AND CAPITAL COSTS.

A. Mr. McKenzie and I have different opinions regarding capital market conditions. Mr. McKenzie's analyses and ROE results and recommendations reflect the assumption of higher interest rates and capital costs. I review current market conditions and conclude that interest rates and capital costs are at low levels and are likely to remain low for some time. On this issue, I show that the economists' forecasts of higher interest rates and capital costs, which are used by Mr. McKenzie, have been consistently wrong for a decade.

Q. WHY HAVE YOU RECOMMENDED AN ALTERNATIVE CAPITAL STRUCTURE?

A. The Company's proposed capital structure includes a common equity ratio of 53.27%. As a result, this capital structure has a higher common equity ratio and a lower level of financial risk than the capital structures of (1) the utilities in the three proxy groups and (2) LGE's parent, PPL Corporation. As a result, I have proposed a capital structure with a common equity ratio of 50.0%. This is more representative, albeit, a higher common equity ratio than the proxy group companies.

1 **Q. WHAT ARE THE PRIMARY ISSUES WITH RESPECT TO MEASURING**
2 **THE COST OF EQUITY CAPITAL IN THIS PROCEEDING?**

3 A. There are two primary errors in Mr. McKenzie's DCF analysis. First, he has
4 eliminated a number of his DCF results because he believes these DCF estimates are
5 too low. Second, his DCF growth rate is based exclusively on the projected long-
6 term earnings per share ("EPS") growth rates of Wall Street analysts. I provide
7 empirical evidence that demonstrates the long-term earnings growth rates of these
8 analysts are overly optimistic and upwardly-biased. In developing my DCF growth
9 rate, I have used thirteen growth rate measures including historic and projected
10 growth rate measures and have evaluated growth in dividends, book value, and
11 earnings per share.

12 The CAPM approach requires an estimate of the risk-free interest rate, beta,
13 and the market or equity risk premium. There are three major issues with Mr.
14 McKenzie's CAPM analyses. In his CAPM analysis, Mr. McKenzie has: (1)
15 employed the Empirical CAPM ("ECAPM") version of the CAPM, which makes
16 inappropriate adjustments to the risk-free rate and the market risk premium; (2)
17 included an unwarranted size adjustment; and (3) most significantly, used an inflated
18 market or equity risk premium that is excessive and does not reflect current market
19 fundamentals. As I highlight later in my testimony, there are three generally accepted
20 procedures for estimating a market or equity risk premium – historic returns, surveys,
21 and expected return models. To arrive at his projected market risk premium,
22 however, Mr. McKenzie's approach uses an expected stock market return of 11.7%
23 which is based primarily on analysts' EPS growth rate projections. These EPS growth

1 rate projections and the resulting expected market returns and risk premiums include
2 unrealistic assumptions regarding future economic and earnings growth and stock
3 returns. I have used an equity risk premium of 5.5%, which: (1) factors in all three
4 approaches to estimating a market risk premium; and (2) employs the results of many
5 studies of the market risk premium. As I note, my market risk premium reflects the
6 market risk premiums: (1) determined in studies by leading finance scholars; (2)
7 employed by leading investment banks and management consulting firms; and (3)
8 found in surveys of companies, financial forecasters, financial analysts, and corporate
9 CFOs.

10 In addition, Mr. McKenzie also estimates an equity cost rate using the URP.
11 His risk premium is based on the historical relationship between the long-term utility
12 yields and authorized returns on equity ("ROEs") for utility companies. There are
13 several problems with this approach. First and foremost, this approach is a gauge of
14 regulatory commission behavior and not investor behavior. Capital costs are
15 determined in the market place through the financial decisions of investors and are
16 reflected in such fundamental factors as dividend yields, expected growth rates,
17 interest rates, and investors' assessment of the risk and expected return of different
18 investments. Regulatory commissions evaluate capital market data in setting
19 authorized ROEs, but also take into account other utility and rate case-specific
20 information. As such, Mr. McKenzie's URP approach and results reflect other
21 factors used by utility commissions in authorizing ROEs in addition to capital costs.
22 This may especially be true when the authorized ROE data includes the results of rate
23 cases that are settled and not fully litigated. Second, the methodology produces an

1 inflated measure of the risk premium because the approach uses historic authorized
2 ROEs and utility yields, and the resulting risk premium is applied to *projected* utility
3 bond yields. Finally, the risk premium is inflated as a measure of an investor's
4 required risk premium since utility companies have been selling at market-to-book
5 ratios in excess of 1.0. This indicates that the authorized rates of return have been
6 greater than the return that investors require. In other words, customers have been
7 paying too much for too long.

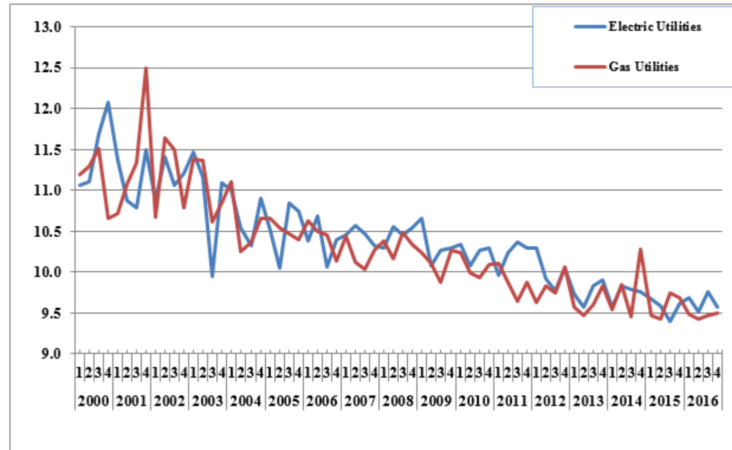
8 **Q. HOW DO MR. MCKENZIE'S URP ESTIMATES COMPARE TO THE**
9 **ACTUAL STATE-LEVEL AUTHORIZED ROES FOR ELECTRIC UTILITY**
10 **AND GAS DISTRIBUTION COMPANIES NATIONWIDE?**

11 A. Mr. McKenzie's URP equity cost rate estimates for electric utility companies range
12 from 10.1% to 11.1%. These figures overstate actual state-level authorized ROEs.
13 As shown in Figure 1, these authorized ROEs for electric utilities have declined from
14 an average of 10.01% in 2012, to 9.8% in 2013, to 9.76% in 2014, to 9.58% in 2015,
15 and are 9.60% in 2016 according to Regulatory Research Associates.[3] The authorized
16 ROEs for gas distribution companies have declined from 9.94% in 2012, to 9.68% in
17 2013, to 9.78% in 2014, 9.60% in 2015, and 9.50% in 2016.

18 **Figure 1**
19 **Authorized ROEs for Electric Utility and Gas Distribution Companies**
20 **2000-2016**

[3] *Regulatory Focus*, Regulatory Research Associates, July, 2015. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.

1



2 **Q. ARE THERE ANY OTHER ISSUES WITH MR. MCKENZIE'S EQUITY**
3 **COST RATE ANALYSES?**

4 A. There are several additional issues in Mr. McKenzie's equity cost rate analyses and
5 recommendation. First, he has included a flotation cost adjustment of 0.13% without
6 identifying any flotation costs actually paid by LGE. Second, Mr. McKenzie has also
7 used several other alternative ROE analyses. These approaches include an Expected
8 Earnings approach and a DCF analysis for a non-utility group. Below, I show that
9 these alternative approaches do not provide an appropriate measure of the equity cost
10 rate for LGE.

11

12 **<u>II. CAPITAL COSTS IN TODAY'S MARKETS</u>**

13

14 **A. Historic Interest Rates and Capital Costs**

15

16 **Q. PLEASE DISCUSS LONG-TERM INTEREST RATES AND CAPITAL COSTS**
17 **IN U.S. MARKETS.**

1 A. Long-term capital cost rates for U.S. corporations are a function of the required
2 returns on risk-free securities plus a risk premium. The risk-free rate of interest is the
3 yield on long-term U.S. Treasury bonds. The yields on 10-year U.S. Treasury bonds
4 from 1953 to the present are provided on Panel A of Exhibit JRW-2. These yields
5 peaked in the early 1980s and have generally declined since that time. These yields
6 fell to below 3.0% in 2008 as a result of the financial crisis. In 2012, the yields on
7 10-year Treasuries declined from 2.5% to 1.5% as the Federal Reserve initiated the
8 third stage of its quantitative easing program ("QE III") to support a low interest rate
9 environment. These yields increased to 3.0% as of December 2013 on speculation of
10 a tapering of the Federal Reserve's QE III policy. The Federal Reserve ended the QE
11 III program in 2015 and increased the federal funds rate in December 2015.
12 Nonetheless, due to slow economic growth and low inflation, the 10-year Treasury
13 yield subsequently declined to 1.5% in 2016. The 10-year Treasury yield has since
14 increased to the 2.5% range, with the majority of that increase coming in response to
15 the November 8, 2016 U.S. presidential election.
16 Panel B on Exhibit JRW-2 shows the differences in yields between ten-year
17 Treasuries and Moody's Baa-rated bonds since the year 2000. This differential
18 primarily reflects the additional risk premium required by bond investors for the risk
19 associated with investing in corporate bonds as opposed to obligations of the U.S.
20 Treasury. The difference also reflects, to some degree, yield curve changes over
21 time. The Baa rating is the lowest of the investment grade bond ratings for corporate
22 bonds. The yield differential hovered in the 2.0% to 3.5% range until 2005, declined
23 to 1.5% until late 2007, and then increased significantly in response to the financial

1 crisis. This differential peaked at 6.0% at the height of the financial crisis in early
2 2009 due to tightening in credit markets, which increased corporate bond yields, and
3 the "flight to quality," which decreased Treasury yields. The differential subsequently
4 declined and bottomed out at 2.4%. The differential has since increased to the 3.00%
5 range.
6

7 **Q. YOU MENTIONED RISK PREMIUM BEING REFLECTED AS THE**
8 **DIFFERENTIAL BETWEEN THE TEN-YEAR TREASURIES AND**
9 **MOODY'S BAA-RATED BONDS. PLEASE EXPLAIN WHAT THE RISK**
10 **PREMIUM IS AND HOW IT AFFECTS YOUR ANALYSIS.**

11 A. The risk premium is the return premium required by investors to purchase riskier
12 securities. The risk premium required by investors to buy corporate bonds is
13 observable based on yield differentials in the markets. The market risk premium is
14 the return premium required to purchase stocks as opposed to bonds. The market or
15 equity risk premium is not readily observable in the markets (like bond risk
16 premiums) because expected stock market returns are not readily observable. As a
17 result, equity risk premiums must be estimated using market data. There are
18 alternative methodologies to estimate the equity risk premium, and these alternative
19 approaches and equity risk premium results are subject to much debate. One way to
20 estimate the equity risk premium is to compare the mean returns on bonds and stocks
21 over long historical periods. Measured in this manner, the equity risk premium has
22 been in the 5% to 7% range.[4] However, studies by leading academics indicate that
23 the forward-looking equity risk premium is actually in the 4.0% to 6.0% range.

[4] See Exhibit JRW-11, p. 5-6.

1 These lower equity risk premium results are in line with the findings of equity risk
2 premium surveys of CFOs, academics, analysts, companies, and financial forecasters.
3
4 **Q. PLEASE REVIEW THE INTEREST RATES ON LONG-TERM UTILITY**
5 **BONDS.**
6 A. Panel A of Exhibit JRW-3 provides the yields on A-rated public utility bonds. These
7 yields peaked in November 2008 at 7.75% and henceforth declined significantly.
8 These yields dropped below 4.0% on three occasions - in mid-2013, in the first
9 quarter of 2015, and then again in the summer of 2016. These yields have increased
10 to about 4.25%, with much of the increase coming in the wake of the U.S.
11 presidential election.
12 Panel B of Exhibit JRW-3 provides the yield spreads between long-term A-
13 rated public utility bonds relative to the yields on 20-year U.S. Treasury bonds.
14 These yield spreads increased dramatically in the third quarter of 2008 during the
15 peak of the financial crisis and have decreased significantly since that time. The yield
16 spreads between 20-year U.S. Treasury bonds and A-rated utility bonds peaked at
17 3.4% in November 2008, then declined to about 1.5% in the summer of 2012 as
18 investor return requirements declined. The differential has gradually increased in
19 recent years, and is now close to 2.0%.
20
21 **B. Capital Market Conditions**
22

1 Q. **WHY ARE CAPITAL MARKET CONDITIONS AND THE OUTLOOK FOR**
2 **INTEREST RATES AND CAPITAL COSTS IMPORTANT IN THIS CASE?**
3 A. As discussed above, a company's rate of return is its overall cost of capital. Capital
4 costs, including the cost of debt and equity financing, are established in capital
5 markets and reflect investors' return requirements on alternative investments based on
6 risk and capital market conditions. These capital market conditions are a function of
7 investors' expectations concerning many factors, including economic growth,
8 inflation, government monetary and fiscal policies, and international developments,
9 among others. In the wake of the financial crisis, much of the focus in the capital
10 markets has been on the interaction of economic growth, interest rates, and the
11 actions of the Federal Reserve (the "Fed"). In addition, as illustrated in the United
12 Kingdom's June 24, 2016 decision to leave the European Union ("BREXIT"), capital
13 markets capital costs are impacted by global events.
14
15 **Q. WHAT IS MR. MCKENZIE'S ASSESSMENT OF THE CAPITAL MARKETS**
16 **ENVIRONMENT?**
17 A. As discussed on pages 14-19 of his testimony, Mr. McKenzie discusses the outlook
18 for interest rates and capital costs. Mr. McKenzie argues that market data and
19 economists' projections indicate that long-term interest rates are going to increase and
20 he employs forecasts of interest rates in his CAPM and URP approaches. He offers
21 this following conclusion on the topic:[5]

22 Given investors' expectations for rising interest rates and capital costs, the
23 Commission should consider near-term forecasts for higher public utility bond
24 yields in assessing the reasonableness of individual cost of equity estimates

[5] McKenzie Direct Testimony, p. 19.

1 and in evaluating the ROE for LGE. The use of these near-term forecasts for
2 public utility bond yields is supported below by economic studies that show
3 that equity risk premiums are higher when interest rates are at very low levels.

4 **Q. PLEASE EXPLAIN YOUR CONCERNS REGARDING MR. MCKENZIE'S**
5 **CONCLUSION OF HIGHER LONG-TERM INTEREST RATES.**

6 A. Over the last decade, there have been continual forecasts of higher long-term interest
7 rates. However, these forecasts have proven to be wrong. For example, after the
8 announcement of the end of the QE III program in 2014, all the economists in
9 Bloomberg's interest rate survey forecasted interest rates would increase in 2014, and
10 <u>100% of the economists were wrong</u>. According to the *Market Watch* article:[6]

11 The survey of economists' yield projections is generally skewed
12 toward rising rates — only a few times since early 2009 have a
13 majority of respondents to the Bloomberg survey thought rates
14 would fall. But the unanimity of the rising rate forecasts in the
15 spring was a stark reminder of how one-sided market views can
16 become. It also teaches us that economists can be universally
17 wrong.
18
19 Two other financial publications have produced studies on how economists consistently
20 predict higher interest rates, and yet they have been wrong. The first publication,
21 entitled "How Interest Rates Keep Making People on Wall Street Look Like Fools,"
22 evaluated economists' forecasts for the yield on ten-year Treasury bonds at the
23 beginning of the year for the last ten years.[7] The results demonstrated that

---

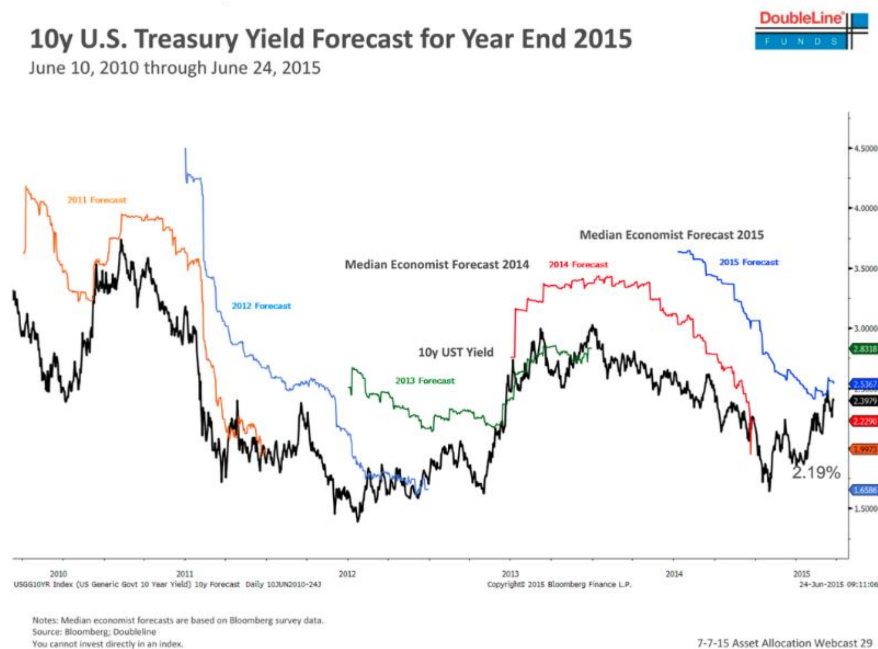
[6] Ben Eisen, "Yes, 100% of economists were dead wrong about yields, *Market Watch*," October 22, 2014**.** Perhaps reflecting this fact, *Bloomberg* reported that the Federal Reserve Bank of New York has stopped using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those forecasters' interest rate forecasts. See Susanne Walker and Liz Capo McCormick, "Unstoppable $100 Trillion Bond Market Renders Models Useless," *Bloomberg.com* (June 2, 2014).
http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html.

[7] Joe Weisenthal, "How Interest Rates Keep Making People on Wall Street Look Like Fools," Bloomberg.com, March 16, 2015. http://www.bloomberg.com/news/articles/2015-03-16/how-interest-rates-keep-making-people-on-wall-street-look-like-fools.

economists consistently predict that interest rates will go higher, and interest rates have not fulfilled those predictions.

The second study tracked economists' forecasts for the yield on ten-year Treasury bonds on an ongoing basis from 2010 until 2015.[8] The results of this study, which was entitled "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," are shown in Figure 2 and demonstrate how economists continually forecast that interest rates are going up, yet they do not. Indeed, as Bloomberg has reported, economists' continued failure in forecasting increasing interest rates has caused the Federal Reserve Bank of New York to stop using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those forecasters' interest rate forecasts.[9]

Figure 2
Economists' Forecasts of the Ten-Year Treasury Yield
2010-2015



[8] Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business Insider*, July 18, 2015. http://www.businessinsider.com/interest-rate-forecasts-are-wrong-most-of-the-time-2015-7.
[9] "*Market Watch*," October 22, 2014.

1 Source: Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business*
2 *Insider*, July 18, 2015.
3
4
5 **Q. PLEASE REVIEW THE FEDERAL RESERVE'S DECISION TO RAISE THE**
6 **FEDERAL FUNDS RATE IN DECEMBER 2015.**

7 A. On December 16, 2015, the Fed decided to increase the target rate for Federal Funds
8 to 0.25 – 0.50 percent.[10] This increase came after the rate was kept in the 0.0 to .25
9 percent range for over five years in order to spur economic growth in the wake of the
10 financial crisis. The move occurred almost two years after the end of QE III program,
11 the Federal Reserve's bond buying program. The Federal Reserve has been cautious
12 in its approach to scaling its monetary intervention, and has paid close attention to a
13 number of economic variables, including GDP growth, retail sales, consumer
14 confidence, unemployment, the housing market, and inflation.
15
16 **Q. HOW DID LONG-TERM INTEREST RATES REACT TO THE FEDERAL**
17 **RESERVE'S 2015 DECISION TO INCREASE THE FEDERAL FUND RATE?**

18 A. The Fed's decision to increase the Federal Fund rate range from 0.0%-0.25% to
19 0.25%-0.50% was highly anticipated in the markets. Yet, the yield on long-term
20 Treasury bonds subsequently decreased from the 3.0% range at the time of the
21 announcement to below 2.50% in mid-2015.

[10] The federal funds rate is set by the Federal Reserve and is the borrowing rate applicable to the most creditworthy financial institutions when they borrow and lend funds overnight to each other.

1 **Q. PLEASE ADDRESS THE FEDERAL RESERVE'S DECISION TO RAISE**
2 **THE FEDERAL FUNDS RATE IN DECEMBER 2016, AND THE IMPACT OF**
3 **THE U.S. PRESIDENTIAL ELECTION ON THE FEDERAL FUNDS RATE.**
4 A. Long-term interest rates in the U.S. bottomed out in August 2016 and have increased
5 since that time with improvements in the economy. Notable improvements include
6 lower unemployment and improving economic growth and corporate earnings. Then
7 came November 8, 2016, and financial markets moved significantly in the wake of
8 the unexpected results in the U.S. presidential election. The stock market has gained
9 more than 10% and the 30-year Treasury yield has increased about 50 basis points to
10 its current level of about 3.0%. These market adjustments reflect the expectation that
11 the new administration will make changes in fiscal, regulatory, and possibly monetary
12 policies which could lead to higher economic growth and inflation. As a result of
13 these developments, the Federal Reserve's decision at its December 13-14, 2016
14 meeting to raise its federal funds target rate to 0.50 - .075 percent was broadly
15 expected and there was no significant market reaction.
16
17 **Q. WHAT IS THE FEDERAL RESERVE EXPECTED TO DO WITH THE**
18 **FEDERAL FUNDS RATE IN 2017?**
19 A. The Federal Reserve is expected to increase the federal funds rate several times in
20 2017, with the first increase expected to come in March.

1

2 **Q. WILL INCREASES IN THE FEDERAL FUND RATE RESULT IN AN**
3 **INCREASE IN LONG-TERM INTEREST RATES?**

4 A. Not necessarily. As highlighted in the comments by former Federal Reserve chairman
5 Bernanke later on, the Federal Reserve does not directly determine long-term rates.
6 Long-term rates are primarily driven by economic growth and inflation.

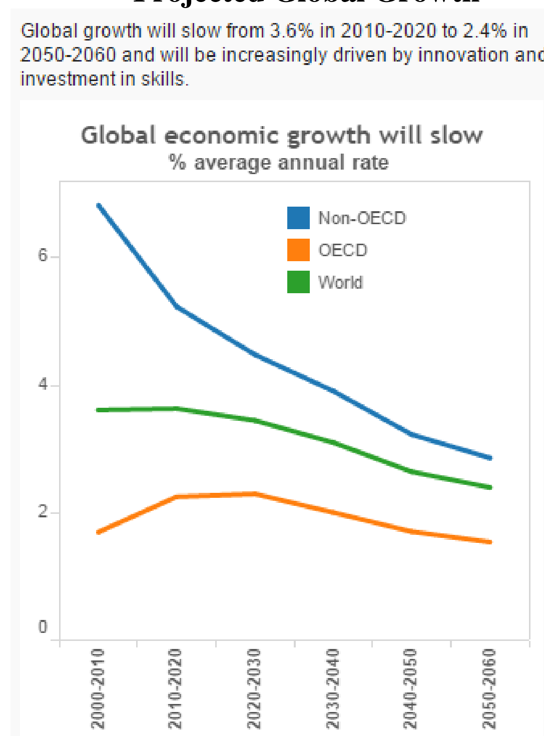
7

8 **Q. HOW WILL INTEREST RATES AND COST OF CAPITAL BE AFFECTED**
9 **BY ECONOMIC FACTORS IN THE LONG TERM?**

10 A. In the long term, the key drivers of economic growth measured in nominal dollars are
11 population growth, the advancement and diffusion of science and technology, and
12 currency inflation. Although the U.S. experienced rapid economic growth during the
13 "post-war" period (the 63 years that separated the end of World War II and the 2008
14 financial crisis), the post-war period is not necessarily reflective of expected future
15 growth. It was marked by a near-trebling of global population, from under 2.5 billion
16 to approximately 6.7 billion. Over the next 50 years, according to United Nations
17 projections, the global population will grow considerably more slowly, reaching
18 approximately 10.3 billion in 2070. With population growth slowing, life
19 expectancies lengthening, and post-war "baby boomers" reaching retirement age,
20 median ages in developed-economy nations have risen and continue to rise. The
21 postwar period was also marked by rapid catch-up growth as Europe, Japan, and
22 China recovered from successive devastations and as regions such as India and China
23 deployed and leapfrogged technologies that had been developed over a much longer

period in earlier-industrialized nations. That period of rapid catch-up growth is coming to an end. For example, although China remains one of the world's fastest-growing regions, its growth is now widely expected to slow substantially. This convergence of projected growth in the former "second world" and "third world" towards the slower growth of the nations that have long been considered "first world" is illustrated in this "key findings" chart published by the Organization for Economic Co-operation and Development:[11]

Figure 3
Projected Global Growth



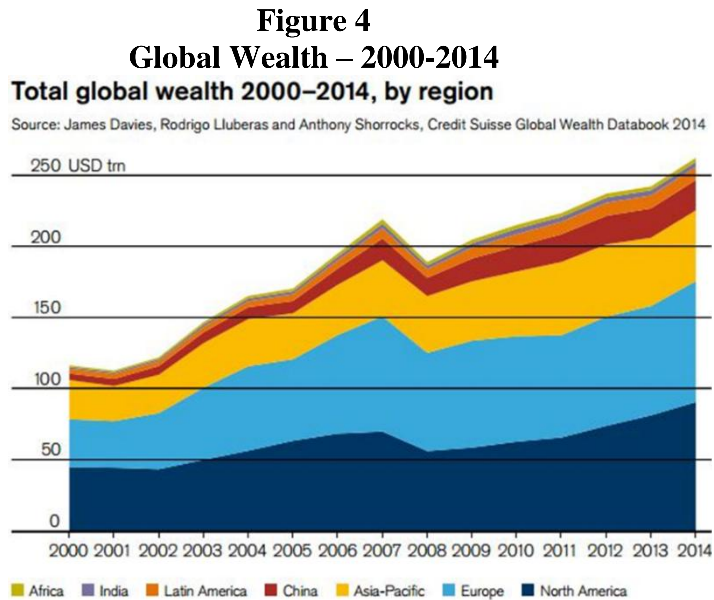
As to dollar inflation, it has declined to far below the level it reached in the 1970s. The Federal Reserve targets a 2% inflation rate; however, actual inflation has been below this figure. Indeed, inflation has been below the Fed's target rate for over four years due to a number of factors, including slow global economic growth, slack

[11] See http://www.oecd.org/eco/outlook/lookingto2060.htm.

1 in the economy, and declining energy and commodity prices. The slow pace of
2 inflation is also reflected in the decline in forecasts of future inflation. The Energy
3 Information Administration's annual Energy Outlook includes in its nominal GDP
4 growth projection a long-term inflation component, which the EIA projects at only
5 2.1% per year for its forecast period through 2040.[12]

6 All of this translates into slowed growth in annual economic production and
7 income, even when measured in nominal rather than real dollars. Meanwhile, the
8 stored wealth that is available to fund investments has continued to rise. According
9 to the most recent release of the Credit Suisse global wealth report, global wealth has
10 more than doubled since the turn of this century, notwithstanding the temporary
11 setback following the 2008 financial crisis:

12 **Figure 4**
13 **Global Wealth – 2000-2014**



14

15 These long-term trends mean that overall, and relative to what had been the
16 post-war norm, the world now has more wealth chasing fewer opportunities for

[12]See EIA Annual Energy Outlook 2016, Table 20 (available at http://www.eia.gov/forecasts/aeo/tables_ref.cfm).

investment rewards. Ben Bernanke, the former Chairman of the Federal Reserve, called this phenomenon a "global savings glut."[13] Like any other liquid market, capital markets are subject to the law of supply and demand. With a large supply of capital available for investment and relatively scarce demand for investment capital, it should be no surprise to see the cost of investment capital decline and therefore interest rates should remain low.

Q. ON THE ISSUE OF THE FEDERAL RESERVE AND LONG-TERM INTEREST RATES, PLEASE HIGHLIGHT MR. BERNANKE'S RECENT TAKE ON THE LOW INTEREST RATES IN THE U.S.

A. Mr. Bernanke addressed the issue of the continuing low interest rates in his weekly Brookings Blog. He indicated that the focus should be on real and not nominal interest rates and noted that, in the long term, these rates are not determined by the Federal Reserve:[14]

> If you asked the person in the street, "Why are interest rates so low?," he or she would likely answer that the Fed is keeping them low. That's true only in a very narrow sense. The Fed does, of course, set the benchmark nominal short-term interest rate. The Fed's policies are also the primary determinant of inflation and inflation expectations over the longer term, and inflation trends affect interest rates, as the figure above shows. But what matters most for the economy is the real, or inflation-adjusted, interest rate (the market, or nominal, interest rate minus the inflation rate). The real interest rate is most relevant for capital investment decisions, for example. The Fed's ability to affect real rates of return, especially longer-term real rates, is transitory and limited. Except in the short run, real interest rates are determined by a wide range of economic factors, including prospects for economic growth—

[13] Ben S. Bernanke, *The Global Saving Glut and the U.S. Current Account Deficit* (Mar. 10, 2005), available at http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/.

[14] Ben S. Bernanke, "Why are Interest Rates So Low," Weekly Blog, Brookings, March 30, 2015. https://www.brookings.edu/blog/ben-bernanke/2015/03/30/why-are-interest-rates-so-low/.

1 not by the Fed.

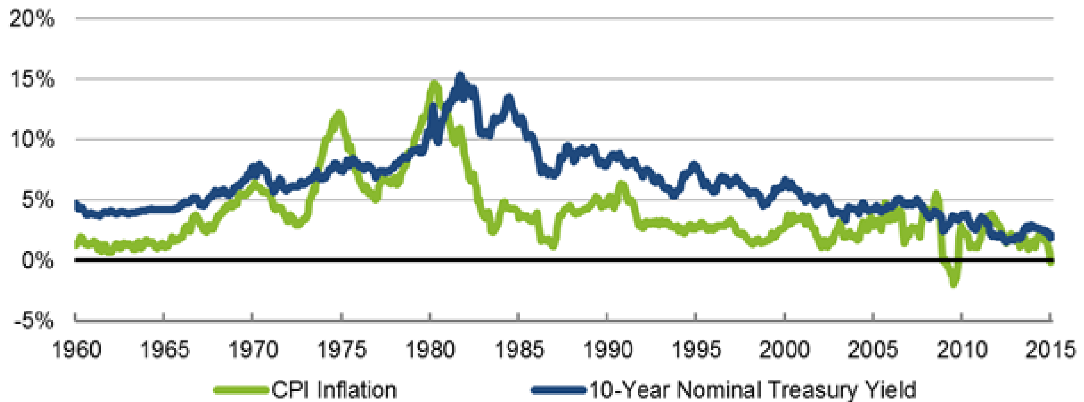
2

3 Mr. Bernanke also addressed the issue about whether low-interest rates are a

4 short-term aberration or a long-term trend:[15]

5 Low interest rates are not a short-term aberration, but part of a
6 long-term trend. As the figure below shows, ten-year government
7 bond yields in the United States were relatively low in the 1960s,
8 rose to a peak above 15 percent in 1981, and have been declining
9 ever since. That pattern is partly explained by the rise and fall of
10 inflation, also shown in the figure. All else equal, investors
11 demand higher yields when inflation is high to compensate them
12 for the declining purchasing power of the dollars with which they
13 expect to be repaid. But yields on inflation-protected bonds are
14 also very low today; the real or inflation-adjusted return on lending
15 to the U.S. government for five years is currently about minus 0.1
16 percent.

17
18 **Figure 5**
19 **Interest Rates and Inflation**
20 **1960-Present**



21
22

[15] Ibid.

1 **Q. CAN YOU PLEASE PROVIDE THE KENTUCKY PUBLIC SERVICE**
2 **COMMISSION WITH YOUR OPINION REGARDING THE FUTURE**
3 **OUTLOOK FOR INTEREST RATES AND CAPITAL COSTS?**

4 A. I believe that U.S. Treasuries offer an attractive yield relative to those of other major
5 governments around the world; the yield will attract capital to the U.S. and keep U.S.
6 interest rates down. There are several factors driving this conclusion.

7 First, the economy has been growing for over seven years, and, as noted
8 above, the Federal Reserve sees continuing strength in the economy. The labor
9 market has improved, with unemployment now below 5.0%, and the stock market is
10 near an all-time high.

11 Second, interest rates remain at relatively low levels and are likely to remain
12 low. There are two factors driving the continued lower interest rates: (1) inflationary
13 expectations in the U.S. remain low; and (2) global economic growth – including
14 Europe, where growth is stagnant, and China, where growth is slowing significantly.
15 As a result, while the yields on long-term U.S. Treasury bonds are low by historical
16 standards, these yields are well above the government bond yields in Germany, Japan,
17 and the United Kingdom. Thus, U.S. Treasuries offer an attractive yield relative to
18 those of other major governments around the world, thereby attracting capital to the
19 U.S. and keeping U.S. interest rates down.
20
21 **Q. WHAT DO YOU RECOMMEND THE COMMISSION DO REGARDING**
22 **THE FORECASTS OF HIGHER INTEREST RATES AND CAPITAL COSTS?**

23 A. I suggest that the Commission set an equity cost rate based on current market cost rate

1 indicators and not speculate on the future direction of interest rates. As the above
2 studies indicate, economists are always predicting that interest rates are going up, and
3 yet they are almost always wrong. Obviously, investors are well aware of the
4 consistently wrong forecasts of higher interest rates, and therefore place little weight on
5 such forecasts. Moreover, investors would not be buying long-term Treasury bonds or
6 utility stocks at their current yields if they expected interest rates to suddenly increase,
7 thereby producing higher yields and negative returns. For example, consider a utility that
8 pays a dividend of $2.00 with a stock price of $50.00. The current dividend yield is
9 4.0%. If, as Mr. McKenzie suggests, interest rates and required utility yields increase,
10 the price of the utility stock would decline. In the example above, if higher return
11 requirements led the dividend yield to increase from 4.0% to 5.0% in the next year, the
12 stock price would have to decline to $40, which would be a negative 20% return on the
13 stock.[16] Obviously, investors would not buy the utility stock with an expected return of
14 negative 20% due to higher dividend yield requirements.
15 In sum, it appears to be impossible to accurately forecast prices and rates that are
16 determined in the financial markets, such as interest rates, the stock market, and gold
17 prices. For interest rates, I have never seen a study that suggests one forecasting service
18 is consistently better than others or that interest rate forecasts are consistently better than
19 just assuming that the current interest rate will be the rate in the future. As discussed
20 above, investors would not be buying long-term Treasury bonds or utility stocks at their
21 current yields if they expected interest rates to suddenly increase, thereby producing
22 higher yields and negative returns.

[16] In this example, for a stock with a $2.00 dividend, a dividend yield 5.0% dividend yield would require a stock price of $40 ($2.00/$40 = 5.0%).

III. PROXY GROUP SELECTION

Q. PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF RETURN RECOMMENDATION FOR THE COMPANY.

A. To develop a fair rate of return recommendation for the Company, I have evaluated the return requirements of investors on the common stock of a proxy group of publicly-held electric utility companies ("Electric Proxy Group"). I have also employed the group developed by Mr. McKenzie ("McKenzie Proxy Group") as well as a group of gas distribution companies ("Gas Proxy Group").

Q. PLEASE DESCRIBE YOUR PROXY GROUP OF COMPANIES.

A. The selection criteria for the Electric Proxy Group include the following:

1. At least 50% of revenues from regulated electric operations as reported by *AUS Utilities Report*;
2. Listed as an Electric Utility by *Value Line Investment Survey* and listed as an Electric Utility or Combination Electric & Gas Utility in *AUS Utilities Report*;
3. An investment-grade corporate credit and bond rating;
4. Has paid a cash dividend for the past six months, with no cuts or omissions;
5. Not involved in an acquisition of another utility, and not the target of an acquisition; and
6. Analysts' long-term EPS growth rate forecasts available from Yahoo, Reuters, and/or Zack's.

1 The Electric Proxy Group includes thirty-one companies. Summary financial
2 statistics for the proxy group are listed in Exhibit JRW-4, page 1.[17] The median
3 operating revenues and net plant among members of the Electric Proxy Group are
4 $6,028.0 million and $14,705.0 million, respectively. The group receives 82% of its
5 revenues from regulated electric operations, has a BBB+ bond rating from Standard
6 & Poor's and a Baa1 rating from Moody's, a current common equity ratio of 47.2%,
7 and an earned return on common equity of 9.1%.
8
9 **Q. PLEASE DESCRIBE THE MCKENZIE PROXY GROUP.**
10 A. Mr. McKenzie's group is smaller (twenty-two utilities) and includes combination
11 electric and gas utility companies. Summary financial statistics for Mr. McKenzie's
12 proxy group are provided in Panel B of page 1 of Exhibit JRW-4. The median
13 operating revenues and net plant for the McKenzie Proxy Group are $7,472.5 million
14 and $19,541.1 million, respectively. The group receives 69% of its revenues from
15 regulated electric operations and 18% from regulated gas operations, has a BBB+
16 bond rating from Standard & Poor's and a Baa1 rating from Moody's, a common
17 equity ratio of 46.2%, and a current earned return on common equity of 9.6%.
18
19 **Q. PLEASE DESCRIBE YOUR PROXY GROUP OF GAS DISTRIBUTION**
20 **COMPANIES.**

[17] In my testimony, I present financial results using both mean and medians as measures of central tendency. However, due to outliers among means, I have used the median as a measure of central tendency.

1 A. My Gas Proxy Group consists of eight natural gas distribution companies. The
2 companies include Atmos Energy, Chesapeake Utilities, New Jersey Resources,
3 NiSource, Inc. Northwest Natural Gas Company, South Jersey Industries, Southwest
4 Gas, and Spire.
5 Summary financial statistics for the Gas Proxy Group are listed on Panel C of
6 page 1 of Exhibit JRW-4. The median operating revenues and net plant among
7 members of the Gas Proxy Group are $2,000.5 million and $2,874.5 million,
8 respectively. The group receives 55% of revenues from regulated gas operations, has
9 an A- average issuer credit rating from S&P and an A3 long-term rating from
10 Moody's, a current median common equity ratio of 48.6%, and a median earned
11 return on common equity of 9.1%.
12
13 **Q. HOW DOES THE INVESTMENT RISK OF THE COMPANY COMPARE TO**
14 **THAT OF YOUR PROXY GROUPS?**
15 A. I believe that bond ratings provide a good assessment of the investment risk of a
16 company. LGE's issuer credit rating is A- according to S&P and A3 according to
17 Moody's. LGE's S&P and Moody's are one notch above the averages for the Electric
18 and McKenzie Proxy Groups. Specifically, LGE's S&P rating is one notch (A- vs
19 BBB+) above average of the groups, and LGE's Moody's rating is one notch (A3 vs
20 Baa1) above the average of the groups. These ratings suggest that LGE's investment
21 risk is below that of these proxy groups. LGE's credit ratings are the same as the
22 S&P and Moody's averages for the Gas Proxy Group.

1 On page 2 of Exhibit JRW-4, I have assessed the riskiness of the three proxy
2 groups using five different risk measures. These measures include Beta, Financial
3 Strength, Safety, Earnings Predictability, and Stock Price Stability. These risk
4 measures indicate that the two proxy groups are similar in risk. The comparisons of
5 the risk measures include Beta (0.69 vs. 0.69 vs. 0.72), Financial Strength (A vs. A
6 vs. A) Safety (2.0 vs. 2.0 vs. 1.9), Earnings Predictability (79 vs. 79 vs. 83), and
7 Stock Price Stability (95 vs. 95 vs. 91). On balance, these measures suggest that the
8 three proxy groups are similar in risk.
9
10 **IV. <u>CAPITAL STRUCTURE RATIOS AND DEBT COST RATES</u>**
11
12 **Q. WHAT ARE LGE'S RECOMMENDED CAPITAL STRUCTURE AND**
13 **SENIOR CAPITAL COST RATES FOR RATEMAKING PURPOSES?**
14 A. LGE's recommended capital structure includes 3.82% short-term debt, 42.91% long-
15 term debt and 53.27% common equity. The Company proposes a short-term debt
16 cost rate of 0.72% and a long-term debt cost rate of 4.12%.
17
18 **Q. HOW DOES LGE'S RECOMMENDED CAPITAL STRUCTURE COMPARE**
19 **TO THAT OF ITS PARENT COMPANY, PPL?**
20 A. Panel B of page 1 of Exhibit JRW-5 shows PPL's capitalization ratios. PPL's capital
21 structure includes 4.69% short-term debt, 62.12% long-term debt, and 33.19%
22 common equity. These ratios highlight the fact that PPL's capitalization includes a

1 much lower common equity ratio and hence much more financial risk than the capital
2 structure proposed by LGE.
3
4 **Q. PLEASE DISCUSS THE CAPITAL STRUCTURES OF THE COMPANIES IN**
5 **THE ELECTRIC AND GAS GROUPS.**
6 A. Panel C of Exhibit JRW-5 provides the average capitalization ratios for the companies in
7 the Electric and Gas Proxy Groups. The average capitalization ratios for the Electric
8 Proxy Group are 5.45% short-term debt, 47.74% long-term debt, 0.51% preferred
9 stock, and 46.30% common equity. The average capitalization ratios for the Gas Proxy
10 Group are 13.54% short-term debt, 39.73% long-term debt, 0.00% preferred stock, and
11 46.73% common equity. These are the capital structure ratios for the holding
12 companies that trade in the markets and are used to estimate an equity cost rate for
13 LGE. These ratios indicate that the Electric and Gas Proxy Group have, on average, a
14 lower common equity ratio than proposed by LGE, and a much higher common
15 equity ratio than PPL.
16
17 **Q. BASED ON THESE OBSERVATIONS, WHAT DO YOU CONCLUDE**
18 **ABOUT THE COMPANY'S PROPOSED CAPITAL STRUCTURE?**
19 A. LGE has proposed a capital structure that has more common equity and less financial
20 risk than the capital structures of other electric utilities companies as well as LGE's
21 parent, PPL.
22
23 **Q. PLEASE DISCUSS THE SIGNIFICANCE OF THE AMOUNT OF EQUITY**

1 **THAT IS INCLUDED IN A UTILITY'S CAPITAL STRUCTURE.**
2 A. A utility's decision as to the amount of equity capital it will incorporate into its
3 capital structure involves fundamental trade-offs relating to the amount of financial
4 risk the firm carries, the overall revenue requirements its customers are required to
5 bear through the rates they pay, and the return on equity that investors will require.
6
7 **Q. PLEASE DISCUSS A UTILITY'S DECISION TO USE DEBT VERSUS**
8 **EQUITY TO MEET ITS CAPITAL NEEDS.**
9 A. Utilities satisfy their capital needs through a mix of equity and debt. Because equity
10 capital is more expensive than debt, the issuance of debt enables a utility to raise
11 more capital for a given commitment of dollars than it could raise with just equity.
12 Debt is, therefore, a means of "leveraging" capital dollars. However, as the amount
13 of debt in the capital structure increases, its financial risk increases and the risk of the
14 utility, as perceived by equity investors also increases. Significantly for this case, the
15 converse is also true. As the amount of debt in the capital structure decreases, the
16 financial risk decreases. The required return on equity capital is a function of the
17 amount of overall risk that investors perceive, including financial risk in the form of
18 debt.
19
20 **Q. WHY IS THIS RELATIONSHIP IMPORTANT TO THE UTILITY'S**
21 **CUSTOMERS?**
22 A. Just as there is a direct correlation between the utility's authorized return on equity
23 and the utility's revenue requirements (the higher the return, the greater the revenue

1 requirement), there is a direct correlation between the amount of equity in the capital
2 structure and the revenue requirements the customers are called on to bear. Again,
3 equity capital is more expensive than debt. Not only does equity command a higher
4 cost rate, it also adds more to the income tax burden that ratepayers are required to
5 pay through rates. As the equity ratio increases, the utility's revenue requirements
6 increase and the rates paid by customers increase. If the proportion of equity is too
7 high, rates will be higher than they need to be. For this reason, the utility's
8 management should pursue a capital acquisition strategy that results in the proper
9 balance in the capital structure.
10
11 **Q. HOW HAVE UTILITIES TYPICALLY STRUCK THIS BALANCE?**
12 A. Due to regulation and the essential nature of its output, a regulated utility is exposed
13 to less business risk than other companies that are not regulated. This means that an
14 electric utility can reasonably carry relatively more debt in its capital structure than
15 can most unregulated companies. Thus, a utility should take appropriate advantage of
16 its lower business risk to employ cheaper debt capital at a level that will benefit its
17 customers through lower revenue requirements. Typically, one may see equity ratios
18 for electric utilities range from the 40% to 50% range.
19
20 **Q. HAVE RATING AGENCIES RECOGNIZED THE TREND TOWARD**
21 **UTILITY HOLDING COMPANIES USING MORE DEBT THAN THEIR**
22 **OPERATING SUBSIDIARIES?**
23 A. Yes, they have. The strategy of using low-cost debt at the parent level to finance equity

1 in a regulated subsidiary is known as "double leverage." Moody's recently published
2 an article on the use of low-cost debt financing by public utility holding companies to
3 increase their ROEs. The summary observations included the following: [18]

4 US utilities use leverage at the holding-company level to invest in
5 other businesses, make acquisitions and earn higher returns on
6 equity. In some cases, an increase in leverage at the parent can hurt
7 the credit profiles of its regulated subsidiaries.
8
9 Moody's defined double leverage in the following way:[19]
10
11 Double leverage is a financial strategy whereby the parent raises
12 debt but downstreams the proceeds to its operating subsidiary,
13 likely in the form of an equity investment. Therefore, the
14 subsidiary's operations are financed by debt raised at the
15 subsidiary level and by debt financed at the holding-company
16 level. In this way, the subsidiary's equity is leveraged twice, once
17 with the subsidiary debt and once with the holding-company debt.
18 In a simple operating-company / holding-company structure, this
19 practice results in a consolidated debt-to-capitalization ratio that is
20 higher at the parent than at the subsidiary because of the additional
21 debt at the parent.
22
23 Moody's goes on to discuss the potential risk to utilities of this strategy, and
24 specifically notes that regulators could take it into consideration in setting authorized
25 ROEs.[20]

26 **"Double leverage" drives returns for some utilities but could**
27 **pose risks down the road.** The use of double leverage, a long-
28 standing practice whereby a holding company takes on debt and
29 downstreams the proceeds to an operating subsidiary as equity,
30 could pose risks down the road if regulators were to ascribe the
31 debt at the parent level to the subsidiaries or adjust the authorized
32 return on capital.
33

34 **Q. GIVEN THAT LGE HAS PROPOSED AN EQUITY RATIO THAT IS**

[18] Moody's Investors' Service, "High Leverage at the Parent Often Hurts the Whole Family," May 11, 2015, p.1.
[19] *Ibid.* p. 5.
[20] *Ibid.* p. 1.

1 **HIGHER THAN THAT OF BOTH PROXY GROUPS AND ITS PARENT,**
2 **WHAT SHOULD THE COMMISSION DO IN THIS RATEMAKING**
3 **PROCEEDING?**

4 A. When a regulated electric utility's actual capital structure contains a high equity ratio,
5 the options are: (1) to impute a more reasonable capital structure and to reflect the
6 imputed capital structure in revenue requirements; or (2) to recognize the downward
7 impact that an unusually high equity ratio will have on the financial risk of a utility
8 and authorize a lower common equity cost rate.
9

10 **Q. PLEASE ELABORATE ON THIS "DOWNWARD IMPACT."**

11 A. As I stated earlier, there is a direct correlation between the amount of debt in a
12 utility's capital structure and the financial risk that an equity investor will associate
13 with that utility. A relatively lower proportion of debt translates into a lower required
14 return on equity, all other things being equal. Stated differently, a utility cannot
15 expect to "have it both ways." Specifically, a utility cannot maintain an unusually
16 high equity ratio and not expect to have the resulting lower risk reflected in its
17 authorized return on equity. The fundamental relationship between the lower risk and
18 the appropriate authorized return should not be ignored.

19 **Q. HOW DO YOU PLAN TO ACCOUNT FOR THE DIFFERENCE IN THE**
20 **CAPITAL STRUCTURE?**

1 A. I am using a capital structure with an imputed common equity ratio of 50.0%. In
2 other words, as shown in Panel D of page 1 of Exhibit JRW-5, I lower the common
3 equity ratio from 53.27% to 50.00%, and make a proportional increase in the ratios
4 for short-term debt (3.82% to 4.09%) and long-term debt (42.91% to 45.92%).
5
6 **Q. WHAT CAPTIAL STRUCTURES ARE YOU PROPOSING FOR LGE?**
7 A. My proposed capital structure includes 4.09% short-term debt, 45.91% long-term
8 debt, and 50.00% common equity. It should be noted that this capital structure
9 includes a common equity ratio (50.0%) that is still above the averages of the three
10 proxy groups I have used, and much higher than LGE's parent, PPL (33.19%).
11
12 **Q. WHAT SENIOR CAPITAL COST RATES ARE YOU USING FOR LGE?**
13 A. I am using the Company's proposed cost rate for short-term debt of 0.72%. On page
14 2 of Exhibit JRW-5, I have made a slight adjustment to the Company's proposed
15 long-term debt cost rate to reflect a recent interest rate swap termination. The long-
16 term rate is reduced from 4.12% to 4.10%.[21]
17
18 ## V. THE COST OF COMMON EQUITY CAPITAL
19
20 ### A. Overview
21
22 **Q. WHY MUST AN OVERALL COST OF CAPITAL OR FAIR RATE OF**
23 **RETURN BE ESTABLISHED FOR A PUBLIC UTILITY?**

[21] This is based on LGE responses to PSC 3-17 and KIUC 2-8.

1 A. In a competitive industry, the return on a firm's common equity capital is determined
2 through the competitive market for its goods and services. Due to the capital
3 requirements needed to provide utility services and the economic benefit to society
4 from avoiding duplication of these services and the construction of utility
5 infrastructure facilities, many public utilities are monopolies. Because of the lack of
6 competition and the essential nature of their services, it is not appropriate to permit
7 monopoly utilities to set their own prices. Thus, regulation seeks to establish prices
8 that are fair to consumers and, at the same time, sufficient to meet the operating and
9 capital costs of the utility, *i.e.*, provide an adequate return on capital to attract
10 investors.
11
12 **Q. PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE**
13 **CONTEXT OF THE THEORY OF THE FIRM.**
14 A. The total cost of operating a business includes the cost of capital. The cost of
15 common equity capital is the expected return on a firm's common stock that the
16 marginal investor would deem sufficient to compensate for risk and the time value of
17 money. In equilibrium, the expected and required rates of return on a company's
18 common stock are equal.
19 Normative economic models of a company or firm, developed under very
20 restrictive assumptions, provide insight into the relationship between firm
21 performance or profitability, capital costs, and the value of the firm. Under the
22 economist's ideal model of perfect competition, where entry and exit are costless,
23 products are undifferentiated, and there are increasing marginal costs of production,

1 firms produce up to the point where price equals marginal cost. Over time, a long-run
2 equilibrium is established where price equals average cost, including the firm's
3 capital costs. In equilibrium, total revenues equal total costs, and because capital
4 costs represent investors' required return on the firm's capital, actual returns equal
5 required returns, and the market value must equal the book value of the firm's
6 securities.

7 In a competitive market, firms can achieve competitive advantage due to
8 product market imperfections. Most notably, companies can gain competitive
9 advantage through product differentiation (adding real or perceived value to products)
10 and by achieving economies of scale (decreasing marginal costs of production).
11 Competitive advantage allows firms to price products above average cost and thereby
12 earn accounting profits greater than those required to cover capital costs. When these
13 profits are in excess of that required by investors, or when a firm earns a return on
14 equity in excess of its cost of equity, investors respond by valuing the firm's equity in
15 excess of its book value.

16 James M. McTaggart, founder of the international management consulting
17 firm Marakon Associates, described this essential relationship between the return on
18 equity, the cost of equity, and the market-to-book ratio in the following manner:

> 19 Fundamentally, the value of a company is determined by the cash
> 20 flow it generates over time for its owners, and the minimum
> 21 acceptable rate of return required by capital investors. This "cost
> 22 of equity capital" is used to discount the expected equity cash flow,
> 23 converting it to a present value. The cash flow is, in turn,
> 24 produced by the interaction of a company's return on equity and
> 25 the annual rate of equity growth. High return on equity (ROE)
> 26 companies in low-growth markets, such as Kellogg, are prodigious
> 27 generators of cash flow, while low ROE companies in high-growth

> markets, such as Texas Instruments, barely generate enough cash flow to finance growth.
>
> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable and its market value will be less than book value.[22]

As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio is relatively straightforward. A firm that earns a return on equity above its cost of equity will see its common stock sell at a price above its book value. Conversely, a firm that earns a return on equity below its cost of equity will see its common stock sell at a price below its book value.

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE RELATIONSHIP BETWEEN ROE AND MARKET-TO-BOOK RATIOS.

A. This relationship is discussed in a classic Harvard Business School case study entitled "Note on Value Drivers." On page 2 of that case study, the author describes the relationship very succinctly:

> For a given industry, more profitable firms – those able to generate higher returns per dollar of equity– should have higher market-to-book ratios. Conversely, firms which are unable to generate returns in excess of their cost of equity should sell for less than book value.

Profitability	*Value*
If ROE > K	*then Market/Book > 1*
If ROE = K	*then Market/Book =1*

[22] James M. McTaggart, "The Ultimate Poison Pill: Closing the Value Gap," *Commentary* (Spring 1986), p.3.

1 *If ROE < K* *then Market/Book < 1*[23]

2 To assess the relationship by industry, as suggested above, I performed a
3 regression study between estimated ROE and market-to-book ratio ratios using
4 natural gas distribution, electric utility, and water utility companies. I used all
5 companies in these three industries that are covered by *Value Line* and have estimated
6 ROE and market-to-book ratio data. The results are presented in Panels A-C of pages
7 1-2 of Exhibit JRW-6. The average R-squares for the electric, gas, and water
8 companies are 0.77, 0.56, and 0.75, respectively.[24] This demonstrates the strong
9 positive relationship between ROEs and market-to-book ratios for public utilities.
10

11 **Q. WHAT ECONOMIC FACTORS HAVE AFFECTED THE COST OF EQUITY**
12 **CAPITAL FOR PUBLIC UTILITIES?**

13 A. Exhibit JRW-7 provides indicators of public utility equity cost rates over the past
14 decade.

15 Page 1 shows the yields on long-term A-rated public utility bonds. These
16 yields decreased from 2000 until 2003, and then hovered in the 5.50%-6.50% range
17 from mid-2003 until mid-2008. These yields peaked in November 2008 at 7.75% and
18 henceforth declined significantly. These yields have generally declined since then,
19 dropping below 4.0% on three occasions - in mid-2013, in the first quarter of 2015,
20 and then again in the summer of 2016. These yields have increased to about 4.25% in
21 the past six months, with much of the increase coming in the wake of the U.S.

[23] Benjamin Esty, "Note on Value Drivers," Harvard Business School, Case No. 9-297-082, April 7, 1997.

[24] R-square measures the percent of variation in one variable (e.g., market-to-book ratios) explained by another variable (e.g., expected ROE). R-squares vary between zero and 1.0, with values closer to 1.0 indicating a higher relationship between two variables.

1 presidential election.

2 Panel A of page 2 of Exhibit JRW-7 provides the dividend yields for electric
3 utilities over the past decade. The dividend yields for electric utilities declined from
4 the year 2000 to 2007, increased to 5.2% in 2009, and declined to about 3.75% in
5 2014 and 2015. Panel B provides the dividend yields for the Gas Proxy Group over
6 the past decade. The dividend yields for this group have declined slightly over the
7 decade. Gas company yields declined from the year 2000 to 2007, bottomed out at
8 3.25% in 2007, increased to 3.9% in 2009, and have since declined to about 3.0% as
9 of 2015.

10 Average earned returns on common equity and market-to-book ratios for
11 electric utilities are provided in Panel A of page 3 of Exhibit JRW-7. For the electric
12 group, earned returns on common equity have declined gradually since the year 2000
13 and have been in the 9.0% range in recent years. The average market-to-book ratios
14 for this group peaked at 1.68X in 2007, declined to 1.07X in 2009, and have
15 increased since that time. As of 2015, the average market-to-book for the group was
16 1.55X. Average earned returns on common equity and market-to-book ratios for the
17 gas companies are shown in Panel B of page 3 of Exhibit JRW-7. For the group,
18 earned returns on common equity peaked at about 12.0% in 2008 and have since
19 declined to about 10.0%. Over the past decade, the average market-to-book ratios for
20 this group have ranged from 1.50X to 1.80X, with a 2015 reading of 1.78X. Overall,
21 these results indicate that, for at least the last decade, returns on common equity have
22 been greater than the cost of capital, or more than necessary to meet investors'

1 required returns. This also means that customers have been paying more than
2 necessary to support an appropriate profit level for regulated utilities.
3
4 **Q. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED**
5 **RATE OF RETURN ON EQUITY?**
6 A. The expected or required rate of return on common stock is a function of market-wide
7 as well as company-specific factors. The most important market factor is the time
8 value of money as indicated by the level of interest rates in the economy. Common
9 stock investor requirements generally increase and decrease with like changes in
10 interest rates. The perceived risk of a firm is the predominant factor that influences
11 investor return requirements on a company-specific basis. A firm's investment risk is
12 often separated into business and financial risk. Business risk encompasses all factors
13 that affect a firm's operating revenues and expenses. Financial risk results from
14 incurring fixed obligations in the form of debt in financing its assets.
15
16 **Q. HOW DOES THE INVESTMENT RISK OF UTILITIES COMPARE WITH**
17 **THAT OF OTHER INDUSTRIES?**
18 A. Due to the essential nature of their service as well as their regulated status, public
19 utilities are exposed to a lesser degree of business risk than other, non-regulated
20 businesses. The relatively low level of business risk allows public utilities to meet
21 much of their capital requirements through borrowing in the financial markets,
22 thereby incurring greater than average financial risk. Nonetheless, the overall
23 investment risk of public utilities is below most other industries.

1 Exhibit JRW-8 provides an assessment of investment risk for 97 industries as
2 measured by beta, which according to modern capital market theory, is the only
3 relevant measure of investment risk. These betas come from the *Value Line*
4 *Investment Survey.* The study shows that the investment risk of utilities is very low.
5 The average betas for electric, water, and gas utility companies are 0.69, 0.73, and
6 0.76, respectively. As such, the cost of equity for utilities is among the lowest of all
7 industries in the U.S.
8
9 **Q. WHAT IS THE COST OF COMMON EQUITY CAPITAL?**
10 A. The costs of debt and preferred stock are normally based on historical or book values
11 and can be determined with a great degree of accuracy. The cost of common equity
12 capital, however, cannot be determined precisely and must instead be estimated from
13 market data and informed judgment. This return requirement of the stockholder
14 should be commensurate with the return requirement on investments in other
15 enterprises having comparable risks.
16 According to valuation principles, the present value of an asset equals the
17 discounted value of its expected future cash flows. Investors discount these expected
18 cash flows at their required rate of return that, as noted above, reflects the time value
19 of money and the perceived riskiness of the expected future cash flows. As such, the
20 cost of common equity is the rate at which investors discount expected cash flows
21 associated with common stock ownership.

1 **Q. HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON**
2 **COMMON EQUITY CAPITAL BE DETERMINED?**
3 A. Models have been developed to ascertain the cost of common equity capital for a
4 firm. Each model, however, has been developed using restrictive economic
5 assumptions. Consequently, judgment is required in selecting appropriate financial
6 valuation models to estimate a firm's cost of common equity capital, in determining
7 the data inputs for these models, and in interpreting the models' results. All of these
8 decisions must take into consideration the firm involved as well as current conditions
9 in the economy and the financial markets.
10
11 **Q. HOW DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL**
12 **FOR LGE?**
13 A. I rely primarily on the discounted cash flow ("DCF") model to estimate the cost of
14 equity capital. Given the investment valuation process and the relative stability of the
15 utility business, the DCF model provides the best measure of equity cost rates for
16 public utilities. I have also performed a capital asset pricing model ("CAPM") study;
17 however, I give these results less weight because I believe that risk premium studies,
18 of which the CAPM is one form, provide a less reliable indication of equity cost rates
19 for public utilities.
20
21 **B. DCF Analysis**
22

1 **Q. PLEASE DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF**
2 **MODEL.**

3 A. According to the DCF model, the current stock price is equal to the discounted value
4 of all future dividends that investors expect to receive from investment in the firm.
5 As such, stockholders' returns ultimately result from current as well as future
6 dividends. As owners of a corporation, common stockholders are entitled to a *pro*
7 *rata* share of the firm's earnings. The DCF model presumes that earnings that are not
8 paid out in the form of dividends are reinvested in the firm so as to provide for future
9 growth in earnings and dividends. The rate at which investors discount future
10 dividends, which reflects the timing and riskiness of the expected cash flows, is
11 interpreted as the market's expected or required return on the common stock.
12 Therefore, this discount rate represents the cost of common equity. Algebraically, the
13 DCF model can be expressed as:

14
15
16
17

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

18 where P is the current stock price, D_n is the dividend in year n, and k is the cost of
19 common equity.

20

21 **Q. IS THE DCF MODEL CONSISTENT WITH VALUATION TECHNIQUES**
22 **EMPLOYED BY INVESTMENT FIRMS?**

23 A. Yes. Virtually all investment firms use some form of the DCF model as a valuation
24 technique. One common application for investment firms is called the three-stage
25 DCF or dividend discount model ("DDM"). The stages in a three-stage DCF model

1 are presented in Exhibit JRW-9, Page 1 of 2. This model presumes that a company's
2 dividend payout progresses initially through a growth stage, then proceeds through a
3 transition stage, and finally assumes a maturity (or steady-state) stage. The dividend-
4 payment stage of a firm depends on the profitability of its internal investments which,
5 in turn, is largely a function of the life cycle of the product or service.

6 1. Growth stage: Characterized by rapidly expanding sales, high profit
7 margins, and an abnormally high growth in earnings per share. Because of
8 highly profitable expected investment opportunities, the payout ratio is low.
9 Competitors are attracted by the unusually high earnings, leading to a decline
10 in the growth rate.

11 2. Transition stage: In later years, increased competition reduces profit
12 margins and earnings growth slows. With fewer new investment
13 opportunities, the company begins to pay out a larger percentage of earnings.

14 3. Maturity (steady-state) stage: Eventually, the company reaches a
15 position where its new investment opportunities offer, on average, only
16 slightly more attractive ROEs. At that time, its earnings growth rate, payout
17 ratio, and ROE stabilize for the remainder of its life. The constant-growth
18 DCF model is appropriate when a firm is in the maturity stage of the life cycle.

19 In using this model to estimate a firm's cost of equity capital, dividends are
20 projected into the future using the different growth rates in the alternative stages, and
21 then the equity cost rate is the discount rate that equates the present value of the
22 future dividends to the current stock price.

23

1 **Q. HOW DO YOU ESTIMATE STOCKHOLDERS' EXPECTED OR REQUIRED**
2 **RATE OF RETURN USING THE DCF MODEL?**

3 A. Under certain assumptions, including a constant and infinite expected growth rate,
4 and constant dividend/earnings and price/earnings ratios, the DCF model can be
5 simplified to the following:

6
7
8
9

$$P = \frac{D_1}{k - g}$$

10 where D_1 represents the expected dividend over the coming year and g is the expected
11 growth rate of dividends. This is known as the constant-growth version of the DCF
12 model. To use the constant-growth DCF model to estimate a firm's cost of equity,
13 one solves for k in the above expression to obtain the following:

14
15
16
17
18

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

19 **Q. IN YOUR OPINION, IS THE CONSTANT-GROWTH DCF MODEL**
20 **APPROPRIATE FOR PUBLIC UTILITIES?**

21 A. Yes. The economics of the public utility business indicate that the industry is in the
22 steady-state or constant-growth stage of a three-stage DCF. The economics include
23 the relative stability of the utility business, the maturity of the demand for public
24 utility services, and the regulated status of public utilities (especially the fact that their
25 returns on investment are effectively set through the ratemaking process). The DCF
26 valuation procedure for companies in this stage is the constant-growth DCF. In the
27 constant-growth version of the DCF model, the current dividend payment and stock

price are directly observable. However, the primary problem and controversy in applying the DCF model to estimate equity cost rates entails estimating investors' expected dividend growth rate.

Q. WHAT FACTORS SHOULD ONE CONSIDER WHEN APPLYING THE DCF METHODOLOGY?

A. One should be sensitive to several factors when using the DCF model to estimate a firm's cost of equity capital. In general, one must recognize the assumptions under which the DCF model was developed in estimating its components (the dividend yield and the expected growth rate). The dividend yield can be measured precisely at any point in time; however, it tends to vary somewhat over time. Estimation of expected growth is considerably more difficult. One must consider recent firm performance, in conjunction with current economic developments and other information available to investors, to accurately estimate investors' expectations.

Q. WHAT DIVIDEND YIELDS HAVE YOU REVIEWED?

A. I have calculated the dividend yields for the companies in the proxy group using the current annual dividend and the 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided in Panel A of page 2 of Exhibit JRW-10. For the Electric Proxy Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 3.40% to 3.50%. I am using the average of the medians, 3.45%, as the dividend yield for the Electric Proxy Group. The dividend yields for the McKenzie Proxy Group are shown in Panel B of page 2 of Exhibit

1 JRW-10. The median dividend yields range from 3.4% to 3.5% using the 30-day, 90-
2 day, and 180-day average stock prices. I am using the average of the medians,
3 3.45%, as the dividend yield for the McKenzie Proxy Group. The dividend yields for
4 the Gas Proxy Group are shown in Panel C of page 2 of Exhibit JRW-10. The
5 median dividend yields range from 2.8% to 2.9% using the 30-day, 90-day, and 180-
6 day average stock prices. I am using the average of the medians, 2.85%, as the
7 dividend yield for the Gas Proxy Group.
8

9 **Q. PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT**
10 **DIVIDEND YIELD.**
11 A. According to the traditional DCF model, the dividend yield term relates to the
12 dividend yield over the coming period. As indicated by Professor Myron Gordon,
13 who is commonly associated with the development of the DCF model for popular use,
14 this is obtained by: (1) multiplying the expected dividend over the coming quarter by
15 4, and (2) dividing this dividend by the current stock price to determine the
16 appropriate dividend yield for a firm that pays dividends on a quarterly basis.[25]
17 In applying the DCF model, some analysts adjust the current dividend for
18 growth over the coming year as opposed to the coming quarter. This can be
19 complicated because firms tend to announce changes in dividends at different times
20 during the year. As such, the dividend yield computed based on presumed growth
21 over the coming quarter as opposed to the coming year can be quite different.

---

[25] *Petition for Modification of Prescribed Rate of Return*, Federal Communications Commission, Docket No. 79-05, Direct Testimony of Myron J. Gordon and Lawrence I. Gould at 62 (April 1980).

1 Consequently, it is common for analysts to adjust the dividend yield by some fraction
2 of the long-term expected growth rate.
3
4 **Q. GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR DO YOU USE**
5 **FOR YOUR DIVIDEND YIELD?**
6 A. I adjust the dividend yield by one-half (1/2) of the expected growth so as to reflect
7 growth over the coming year. The DCF equity cost rate ("K") is computed as:
8 $$K = [(D/P) * (1 + 0.5g)] + g$$
9
10
11 **Q. PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF**
12 **MODEL.**
13 A. There is debate as to the proper methodology to employ in estimating the growth
14 component of the DCF model. By definition, this component is investors'
15 expectation of the long-term dividend growth rate. Presumably, investors use some
16 combination of historical and/or projected growth rates for earnings and dividends per
17 share and for internal or book-value growth to assess long-term potential.
18
19 **Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE PROXY**
20 **GROUPS?**
21 A. I have analyzed a number of measures of growth for companies in the proxy groups.
22 I reviewed *Value Line's* historical and projected growth rate estimates for earnings
23 per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS").
24 In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as
25 provided by Yahoo, Reuters and Zacks. These services solicit five-year earnings

1 growth rate projections from securities analysts and compile and publish the means
2 and medians of these forecasts. Finally, I also assessed prospective growth as
3 measured by prospective earnings retention rates and earned returns on common
4 equity.
5
6 **Q. PLEASE DISCUSS HISTORICAL GROWTH IN EARNINGS AND**
7 **DIVIDENDS AS WELL AS INTERNAL GROWTH.**
8 A. Historical growth rates for EPS, DPS, and BVPS are readily available to investors
9 and are presumably an important ingredient in forming expectations concerning
10 future growth. However, one must use historical growth numbers as measures of
11 investors' expectations with caution. In some cases, past growth may not reflect
12 future growth potential. Also, employing a single growth rate number (for example,
13 for five or ten years) is unlikely to accurately measure investors' expectations, due to
14 the sensitivity of a single growth rate figure to fluctuations in individual firm
15 performance as well as overall economic fluctuations (*i.e.*, business cycles).
16 However, one must appraise the context in which the growth rate is being employed.
17 According to the conventional DCF model, the expected return on a security is equal
18 to the sum of the dividend yield and the expected long-term growth in dividends.
19 Therefore, to best estimate the cost of common equity capital using the conventional
20 DCF model, one must look to long-term growth rate expectations.
21 Internally generated growth is a function of the percentage of earnings
22 retained within the firm (the earnings retention rate) and the rate of return earned on
23 those earnings (the return on equity). The internal growth rate is computed as the

1 retention rate times the return on equity. Internal growth is significant in determining
2 long-run earnings and, therefore, dividends. Investors recognize the importance of
3 internally generated growth and pay premiums for stocks of companies that retain
4 earnings and earn high returns on internal investments.
5
6 **Q. PLEASE DISCUSS THE SERVICES THAT PROVIDE ANALYSTS' EPS**
7 **FORECASTS.**
8 A. Analysts' EPS forecasts for companies are collected and published by a number of
9 different investment information services, including Institutional Brokers Estimate
10 System ("I/B/E/S"), Bloomberg, FactSet, Zacks, First Call and Reuters, among others.
11 Thompson Reuters publishes analysts' EPS forecasts under different product names,
12 including I/B/E/S, First Call, and Reuters. Bloomberg, FactSet, and Zacks each publish
13 their own set of analysts' EPS forecasts for companies. These services do not reveal (1)
14 the analysts who are solicited for forecasts or (2) the identity of the analysts who
15 actually provide the EPS forecasts that are used in the compilations published by the
16 services. I/B/E/S, Bloomberg, FactSet, and First Call are fee-based services. These
17 services usually provide detailed reports and other data in addition to analysts' EPS
18 forecasts. In contrast, Thompson Reuters and Zacks do provide limited EPS forecast
19 data free-of-charge on the Internet. Yahoo finance (http://finance.yahoo.com) lists
20 Thompson Reuters as the source of its summary EPS forecasts. The Reuters website
21 (www.reuters.com) also publishes EPS forecasts from Thompson Reuters, but with
22 more detail. Zacks (www.zacks.com) publishes its summary forecasts on its website.
23 Zacks estimates are also available on other websites, such as msn.money

1 (http://money.msn.com).

2

3 **Q. PLEASE PROVIDE AN EXAMPLE OF THESE EPS FORECASTS.**

4 A. The following example provides the EPS forecasts compiled by Reuters for Alliant
5 Energy Corp. (stock symbol "LNT"). The figures are provided on page 2 of Exhibit
6 JRW-9. Line one shows that one analyst has provided EPS estimates for the quarter
7 ending March 31, 2017. The mean, high and low estimates are \$0.43, \$0.45, and
8 \$0.41, respectively. The second line shows the quarterly EPS estimates for the
9 quarter ending June 30, 2017 of \$0.33 (mean), \$0.36 (high), and \$0.30 (low). Line
10 three shows the annual EPS estimates for the fiscal year ending December 2017
11 (\$2.00 (mean), \$2.01 (high), and \$1.97 (low). The quarterly and annual EPS
12 forecasts in lines 1-3 are expressed in dollars and cents. As in the LNT case shown
13 here, it is common for more analysts to provide estimates of annual EPS as opposed
14 to quarterly EPS. The bottom line shows the projected long-term EPS growth rate,
15 which is expressed as a percentage. For LNT, one analyst has provided a long-term
16 EPS growth rate forecast, with mean, high, and low growth rates of 6.00%, 6.00%,
17 and 6.00%.

18

19 **Q. WHICH OF THESE EPS FORECASTS IS USED IN DEVELOPING A DCF**
20 **GROWTH RATE?**

21 A. The DCF growth rate is the long-term projected growth rate in EPS, DPS, and BVPS.
22 Therefore, in developing an equity cost rate using the DCF model, the projected long-
23 term growth rate is the projection used in the DCF model.

1

2 **Q. WHY DO YOU NOT RELY EXCLUSIVELY ON THE EPS FORECASTS OF**
3 **WALL STREET ANALYSTS IN ARRIVING AT A DCF GROWTH RATE FOR**
4 **THE PROXY GROUP?**

5 A. There are several issues with using the EPS growth rate forecasts of Wall Street
6 analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is
7 the dividend growth rate, not the earnings growth rate. Nonetheless, over the very
8 long term, dividend and earnings will have to grow at a similar growth rate.
9 Therefore, consideration must be given to other indicators of growth, including
10 prospective dividend growth, internal growth, as well as projected earnings growth.
11 Second, a recent study by Lacina, Lee, and Xu (2011) has shown that analysts' long-
12 term earnings growth rate forecasts are not more accurate at forecasting future
13 earnings than naïve random walk forecasts of future earnings.[26] Employing data over
14 a twenty-year period, these authors demonstrate that using the most recent year's EPS
15 figure to forecast EPS in the next 3-5 years proved to be just as accurate as using the
16 EPS estimates from analysts' long-term earnings growth rate forecasts. In the
17 authors' opinion, these results indicate that analysts' long-term earnings growth rate
18 forecasts should be used with caution as inputs for valuation and cost of capital
19 purposes. Finally, and most significantly, it is well known that the long-term EPS
20 growth rate forecasts of Wall Street securities analysts are overly optimistic and
21 upwardly biased. This has been demonstrated in a number of academic studies over

[26] M. Lacina, B. Lee & Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

the years.[27] Hence, using these growth rates as a DCF growth rate will provide an overstated equity cost rate. On this issue, a study by Easton and Sommers (2007) found that optimism in analysts' growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[28]

Q. IS IT YOUR OPINION THAT STOCK PRICES REFLECT THE UPWARD BIAS IN THE EPS GROWTH RATE FORECASTS?

A. Yes, I do believe that investors are well aware of the bias in analysts' EPS growth rate forecasts, and therefore stock prices reflect the upward bias.

Q. HOW DOES THAT AFFECT THE USE OF THESE FORECASTS IN A DCF EQUITY COST RATE STUDY?

A. According to the DCF model, the equity cost rate is a function of the dividend yield and expected growth rate. Because stock prices reflect the bias, it would affect the dividend yield. In addition, the DCF growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias.

---

[27] The studies that demonstrate analysts' long-term EPS forecasts are overly-optimistic and upwardly biased include: R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," *Journal of Business Finance & Accounting*, pp. 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings," *Contemporary Accounting Research (2000);* K. Chan, L., Karceski, J., & Lakonishok, J., "The Level and Persistence of Growth Rates," *Journal of Finance* pp. 643−684, (2003); M. Lacina, B. Lee and Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101; and Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," *McKinsey on Finance*, pp. 14-17, (Spring 2010).

[28] Peter D. Easton & Gregory A. Sommers, *Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts*, 45 J. ACCT. RES. 983–1015 (2007).

1 **Q. PLEASE DISCUSS THE HISTORICAL GROWTH OF THE COMPANIES IN**
2 **THE PROXY GROUPS, AS PROVIDED BY *VALUE LINE.***
3 A. Page 3 of Exhibit JRW-10 provides the 5- and 10- year historical growth rates for
4 EPS, DPS, and BVPS for the companies in the two proxy groups, as published in the
5 *Value Line Investment Survey.* The median historical growth measures for EPS, DPS,
6 and BVPS for the Electric Proxy Group, as provided in Panel A, range from 3.5% to
7 6.0%, with an average of the medians of 4.3%. For the McKenzie Proxy Group, as
8 shown in Panel B of page 3 of Exhibit JRW-10, the historical growth measures in
9 EPS, DPS, and BVPS, as measured by the medians, range from 3.5% to 4.5%, with
10 an average of the medians of 3.9%. The median historical growth measures for EPS,
11 DPS, and BVPS for the Gas Proxy Group, as provided in Panel C, range from 3.5% to
12 6.5%, with an average of the medians of 5.3%.
13
14 **Q. PLEASE SUMMARIZE *VALUE LINE'S* PROJECTED GROWTH RATES**
15 **FOR THE COMPANIES IN THE PROXY GROUPS.**
16 A. *Value Line's* projections of EPS, DPS, and BVPS growth for the companies in the
17 proxy groups are shown on page 4 of Exhibit JRW-10. As stated above, due to the
18 presence of outliers, the medians are used in the analysis. For the Electric Proxy
19 Group, as shown in Panel A of page 4 of Exhibit JRW-10, the medians range from
20 4.0% to 5.0%, with an average of the medians of 4.7%. The range of the medians for
21 the McKenzie Proxy Group, shown in Panel B of page 4 of Exhibit JRW-10, is from
22 4.0% to 6.0%, with an average of the medians of 5.0%. The range of the medians for

1 the Gas Proxy Group, shown in Panel C of page 4 of Exhibit JRW-10, is from 4.3%
2 to 6.8%, with an average of the medians of 5.3%.
3 Also provided on page 4 of Exhibit JRW-10 are the prospective sustainable
4 growth rates for the companies in the proxy groups as measured by *Value Line*'s
5 average projected retention rate and return on shareholders' equity. As noted above,
6 sustainable growth is a significant and a primary driver of long-run earnings growth.
7 For the Electric, McKenzie and Gas Proxy Groups, the median prospective
8 sustainable growth rates are 3.7%, 4.2%, and 5.1%, respectively.
9

10 **Q. PLEASE ASSESS GROWTH FOR THE PROXY GROUPS AS MEASURED**
11 **BY ANALYSTS' FORECASTS OF EXPECTED 5-YEAR EPS GROWTH.**
12 A. Yahoo, Zacks, and Reuters collect, summarize, and publish Wall Street analysts'
13 long-term EPS growth rate forecasts for the companies in the proxy groups. These
14 forecasts are provided for the companies in the proxy groups on page 5 of Exhibit
15 JRW-10. I have reported both the mean and median growth rates for the groups.
16 Since there is considerable overlap in analyst coverage between the three services, and
17 not all of the companies have forecasts from the different services, I have averaged the
18 expected five-year EPS growth rates from the three services for each company to arrive
19 at an expected EPS growth rate for each company. The mean/median of analysts'
20 projected EPS growth rates for the Electric, McKenzie, and Gas Proxy Groups are
21 4.4%/5.2%, 4.8%/5.6%, and 6.0%/6.0%, respectively.[29]
22

[29] Given variation in the measures of central tendency of analysts' projected EPS growth rates proxy groups, I have considered both the means and medians figures in the growth rate analysis.

1 **Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE HISTORICAL AND**
2 **PROSPECTIVE GROWTH OF THE PROXY GROUPS.**
3 A. Page 6 of Exhibit JRW-10 shows the summary DCF growth rate indicators for the
4 proxy groups.
5 The historical growth rate indicators for my Electric Proxy Group imply a
6 baseline growth rate of 4.3%. The average of the projected EPS, DPS, and BVPS
7 growth rates from *Value Line* is 4.7%, and *Value Line*'s projected sustainable growth
8 rate is 3.7%. The projected EPS growth rates of Wall Street analysts for the Electric
9 Proxy Group are 4.4% and 5.2% as measured by the mean and median growth rates.
10 The overall range for the projected growth rate indicators (ignoring historical growth)
11 is 3.7% to 5.2%. Giving primary weight to the projected EPS growth rate of Wall
12 Street analysts, I believe that the appropriate projected growth rate is 5.0%. This
13 growth rate figure is in the upper end of the range of historic and projected growth
14 rates for the Electric Proxy Group.
15 For the McKenzie Proxy Group, the historical growth rate indicators indicate
16 a growth rate of 3.9%. The average of the projected EPS, DPS, and BVPS growth
17 rates from *Value Line* is 5.0%, and *Value Line*'s projected sustainable growth rate is
18 4.2%. The projected EPS growth rates of Wall Street analysts are 4.8% and 5.6% as
19 measured by the mean and median growth rates. The overall range for the projected
20 growth rate indicators is 4.2% to 5.6%. Giving primary weight to the projected EPS
21 growth rate of Wall Street analysts, I believe that the appropriate projected growth
22 rate range is 5.25% to 5.50%. I will use the midpoint of this range, 5.375%, as the
23 DCF growth rate for the McKenzie Group. This growth rate figure is in the upper

1 end of the range of historic and projected growth rates for the McKenzie Proxy
2 Group.
3 The historical growth rate indicators for my Gas Proxy Group indicate a
4 baseline growth rate of 5.3%. The average of the projected EPS, DPS, and BVPS
5 growth rates from *Value Line* is 5.3%, and *Value Line*'s projected sustainable growth
6 rate is 5.1%. The projected EPS growth rates of Wall Street analysts for the Gas
7 Proxy Group are 6.0% and 6.0% as measured by the mean and median growth rates.
8 The overall range for the projected growth rate indicators (ignoring historical growth)
9 is 5.1% to 6.0%. Giving primary weight to the projected EPS growth rate of Wall
10 Street analysts, I believe that the appropriate projected growth rate range is 5.5% to
11 6.0%. I will use the midpoint of this range, 5.75%, as the DCF growth rate for the Gas
12 Proxy Group. This growth rate figure is in the upper end of the range of historic and
13 projected growth rates for the group.

14 **Q. BASED ON THE ABOVE ANALYSIS, WHAT ARE YOUR INDICATED**
15 **COMMON EQUITY COST RATES FROM THE DCF MODEL FOR THE**
16 **PROXY GROUPS?**
17 A. My DCF-derived equity cost rates for the groups are summarized on page 1 of
18 Exhibit JRW-10 and in Table 1 below.
19

20 **Table 1**
21 **DCF-derived Equity Cost Rate/ROE**

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Electric Proxy Group	**3.45%**	**1.025000**	**5.000%**	**8.55%**
McKenzie Proxy Group	**3.45%**	**1.026875**	**5.375%**	**8.90%**

Gas Proxy Group	2.85%	1.028750	5.750%	8.70%

The DCF result for the Electric Proxy Group is the 3.45% dividend yield, times the one and one-half growth adjustment of 1.025, plus the DCF growth rate of 5.0%, which results in an equity cost rate of 8.55%. The result for the McKenzie Proxy Group is 8.90%, which includes a dividend yield of 3.45%, an adjustment factor of 1.026875, and a DCF growth rate of 5.375%. For the Gas Proxy Group, the DCF result Group is the 2.85% dividend yield, times the one and one-half growth adjustment of 1.02875, plus the DCF growth rate of 5.75, which results in an equity cost rate of 8.70%.

C. Capital Asset Pricing Model

Q. PLEASE DISCUSS THE CAPITAL ASSET PRICING MODEL ("CAPM").

A. The CAPM is a risk premium approach to gauging a firm's cost of equity capital. According to the risk premium approach, the cost of equity is the sum of the interest rate on a risk-free bond (R_f) and a risk premium (RP), as in the following:

$$k = R_f + RP$$

The yield on long-term U.S. Treasury securities is normally used as R_f. Risk premiums are measured in different ways. The CAPM is a theory of the risk and expected returns of common stocks. In the CAPM, two types of risk are associated with a stock: firm-specific risk or unsystematic risk, and market or systematic risk, which is measured by a firm's beta. The only risk that investors receive a return for bearing is systematic risk.

According to the CAPM, the expected return on a company's stock, which is also the equity cost rate (K), is equal to:

$$K = (R_f) + ß * [E(R_m) - (R_f)]$$

Where:

- K represents the estimated rate of return on the stock;
- $E(R_m)$ represents the expected return on the overall stock market. Frequently, the 'market' refers to the S&P 500;
- (R_f) represents the risk-free rate of interest;
- $[E(R_m) - (R_f)]$ represents the expected equity or market risk premium—the excess return that an investor expects to receive above the risk-free rate for investing in risky stocks; and
- *Beta*—(ß) is a measure of the systematic risk of an asset.

To estimate the required return or cost of equity using the CAPM requires three inputs: the risk-free rate of interest (R_f), the beta (ß), and the expected equity or market risk premium $[E(R_m) - (R_f)]$. R_f is the easiest of the inputs to measure – it is represented by the yield on long-term U.S. Treasury bonds. ß, the measure of systematic risk, is a little more difficult to measure because there are different opinions about what adjustments, if any, should be made to historical betas due to their tendency to regress to 1.0 over time. And finally, an even more difficult input to measure is the expected equity or market risk premium ($E(R_m) - (R_f)$). I will discuss each of these inputs below.

Q. PLEASE DISCUSS EXHIBIT JRW-11.

A. Exhibit JRW-11 provides the summary results for my CAPM study. Page 1 shows the results, and the following pages contain the supporting data.

1 **Q. PLEASE DISCUSS THE RISK-FREE INTEREST RATE.**

2 A. The yield on long-term U.S. Treasury bonds has usually been viewed as the risk-free
3 rate of interest in the CAPM. The yield on long-term U.S. Treasury bonds, in turn,
4 has been considered to be the yield on U.S. Treasury bonds with 30-year maturities.
5

6 **Q. WHAT RISK-FREE INTEREST RATE ARE YOU USING IN YOUR CAPM?**

7 A. As shown on page 2 of Exhibit JRW-11, the yield on 30-year U.S. Treasury bonds has
8 been in the 2.5% to 4.0% range over the 2013–2017 time period. The 30-year
9 Treasury yield is in the middle of this range. Given the recent range of yields and the
10 possibility of higher interest rates, I use the higher end 4.0% as the risk-free rate, or
11 R_f, in my CAPM.
12

13 **Q. DOES YOUR 4.0% RISK-FREE INTEREST RATE TAKE INTO**
14 **CONSIDERATION FORECASTS OF HIGHER INTEREST RATES?**

15 A. No, it does not. As I stated before, forecasts of higher interest rates have been
16 notoriously wrong for a decade. My 4.0% risk-free interest rate takes into account the
17 range of interest rates in the past and effectively synchronizes the risk-free rate with the
18 market risk premium ("MRP"). The risk-free rate and the MRP are interrelated in that
19 the MRP is developed in relation to the risk-free rate. As discussed below, my MRP is
20 based on the results of many studies and surveys that have been published over time.
21 Therefore, my risk-free interest rate of 4.0% is effectively a normalized risk-free rate of
22 interest.
23

1 **Q. WHAT BETAS ARE YOU EMPLOYING IN YOUR CAPM?**

2 A. Beta (ß) is a measure of the systematic risk of a stock. The market, usually taken to
3 be the S&P 500, has a beta of 1.0. The beta of a stock with the same price movement
4 as the market also has a beta of 1.0. A stock whose price movement is greater than
5 that of the market, such as a technology stock, is riskier than the market and has a
6 beta greater than 1.0. A stock with below average price movement, such as that of a
7 regulated public utility, is less risky than the market and has a beta less than 1.0.
8 Estimating a stock's beta involves running a linear regression of a stock's return on
9 the market return.

10 As shown on page 3 of Exhibit JRW-11, the slope of the regression line is the
11 stock's ß. A steeper line indicates that the stock is more sensitive to the return on the
12 overall market. This means that the stock has a higher ß and greater-than-average
13 market risk. A less steep line indicates a lower ß and less market risk.

14 Several online investment information services, such as Yahoo and Reuters,
15 provide estimates of stock betas. Usually these services report different betas for the
16 same stock. The differences are usually due to: (1) the time period over which ß is
17 measured; and (2) any adjustments that are made to reflect the fact that betas tend to
18 regress to 1.0 over time. In estimating an equity cost rate for the proxy groups, I am
19 using the betas for the companies as provided in the *Value Line Investment Survey*.
20 As shown on page 3 of Exhibit JRW-11, the median betas for the companies in the
21 Electric, McKenzie, and Gas Proxy Groups are 0.70, 0.70, and 0.70, respectively.

22

1 **Q. PLEASE DISCUSS THE MARKET RISK PREMIUM.**

2 A. The MRP is equal to the expected return on the stock market (e.g., the expected return
3 on the S&P 500, $E(R_m)$ minus the risk-free rate of interest (R_f)). The MRP is the
4 difference in the expected total return between investing in equities and investing in
5 "safe" fixed-income assets, such as long-term government bonds. However, while
6 the MRP is easy to define conceptually, it is difficult to measure because it requires
7 an estimate of the expected return on the market - $E(R_m)$. As is discussed below,
8 there are different ways to measure $E(R_m)$, and studies have come up with
9 significantly different magnitudes for $E(R_m)$. As Merton Miller, the 1990 Nobel Prize
10 winner in economics indicated, $E(R_m)$ is very difficult to measure and is one of the
11 great mysteries in finance.[30]

12 **Q. PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING**
13 **THE MRP.**

14 A. Page 4 of Exhibit JRW-11 highlights the primary approaches to, and issues in,
15 estimating the expected MRP. The traditional way to measure the MRP was to use
16 the difference between historical average stock and bond returns. In this case,
17 historical stock and bond returns, also called *ex post* returns, were used as the
18 measures of the market's expected return (known as the *ex-ante* or forward-looking
19 expected return). This type of historical evaluation of stock and bond returns is often
20 called the "Ibbotson approach" after Professor Roger Ibbotson, who popularized this
21 method of using historical financial market returns as measures of expected returns.

[30] Merton Miller, "The History of Finance: An Eyewitness Account," *Journal of Applied Corporate Finance*, 2000, P. 3.

1 Most historical assessments of the equity risk premium suggest an equity risk
2 premium range of 5% to 7% above the rate on long-term U.S. Treasury bonds.
3 However, this can be a problem because: (1) *ex post* returns are not the same as *ex*
4 *ante* expectations; (2) market risk premiums can change over time, increasing when
5 investors become more risk-averse and decreasing when investors become less risk-
6 averse; and (3) market conditions can change such that *ex post* historical returns are
7 poor estimates of *ex ante* expectations.

8 The use of historical returns as market expectations has been criticized in
9 numerous academic studies as discussed later in my testimony. The general theme of
10 these studies is that the large equity risk premium discovered in historical stock and
11 bond returns cannot be justified by the fundamental data. These studies, which fall
12 under the category "*Ex Ante* Models and Market Data," compute *ex ante* expected
13 returns using market data to arrive at an expected equity risk premium. These studies
14 have also been called "Puzzle Research" after the famous study by Mehra and
15 Prescott in which the authors first questioned the magnitude of historical equity risk
16 premiums relative to fundamentals.[31]

17 In addition, there are a number of surveys of financial professionals regarding
18 the MRP. There have also been several published surveys of academics on the equity
19 risk premium. *CFO Magazine* conducts a quarterly survey of CFOs, which includes
20 questions regarding their views on the current expected returns on stocks and bonds.
21 Usually, over 500 CFOs participate in the survey.[32] Questions regarding expected
22 stock and bond returns are also included in the Federal Reserve Bank of

[31] Rajnish Mehra & Edward C. Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics,* 145 (1985).
[32] *See* DUKE/CFO Magazine Global Business Outlook Survey, www.cfosurvey.org, December, 2016.

1 Philadelphia's annual survey of financial forecasters, which is published as the *Survey*
2 *of Professional Forecasters*.[33] This survey of professional economists has been
3 published for almost fifty years. In addition, Pablo Fernandez conducts annual
4 surveys of financial analysts and companies regarding the equity risk premiums they
5 use in their investment and financial decision-making.[34]
6
7 **Q. PLEASE PROVIDE A SUMMARY OF THE MRP STUDIES.**
8 A. Derrig and Orr (2003), Fernandez (2007), and Song (2007) completed the most
9 comprehensive review of the research on the MRP.[35] Derrig and Orr's study
10 evaluated the various approaches to estimating MRPs, as well as the issues with the
11 alternative approaches and summarized the findings of the published research on the
12 MRP. Fernandez examined four alternative measures of the MRP – historical,
13 expected, required, and implied. He also reviewed the major studies of the MRP and
14 presented the summary MRP results. Song provides an annotated bibliography and
15 highlights the alternative approaches to estimating the MRP.
16 Page 5 of Exhibit JRW-11 provides a summary of the results of the primary
17 risk premium studies reviewed by Derrig and Orr, Fernandez, and Song, as well as
18 other more recent studies of the MRP. In developing page 5 of Exhibit JRW-11, I

[33] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (Feb, 2017). The Survey of Professional Forecasters was formerly conducted by the American Statistical Association ("ASA") and the National Bureau of Economic Research ("NBER") and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.
[34] Pablo Fernandez, Alberto Ortiz and Isabel Fernandez Acín, "Market Risk Premium used in 71 countries in 2016: a survey with 6,932 answers: survey," May 9, 2016.
[35] *See* Richard Derrig & Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, (August 28, 2003); Pablo Fernandez, "Equity Premium: Historical, Expected, Required, and Implied," IESE Business School Working Paper, (2007); Zhiyi Song, "The Equity Risk Premium: An Annotated Bibliography," CFA Institute, (2007).

1 have categorized the studies as discussed on page 4 of Exhibit JRW-11. I have also
2 included the results of studies of the "Building Blocks" approach to estimating the
3 equity risk premium. The Building Blocks approach is a hybrid approach employing
4 elements of both historical and *ex ante* models.
5
6 **Q. PLEASE DISCUSS PAGE 5 OF EXHIBIT JRW-11.**
7 A. Page 5 of Exhibit JRW-11 provides a summary of the results of the MRP studies that
8 I have reviewed. These include the results of: (1) the various studies of the historical
9 risk premium, (2) *ex ante* MRP studies, (3) MRP surveys of CFOs, financial
10 forecasters, analysts, companies and academics, and (4) the Building Blocks approach
11 to the MRP. There are results reported for over forty studies, and the median MRP is
12 4.63%.
13
14 **Q. PLEASE HIGHLIGHT THE RESULTS OF THE MORE RECENT RISK**
15 **PREMIUM STUDIES AND SURVEYS.**
16 A. The studies cited on page 5 of Exhibit JRW-11 include every MRP study and survey I
17 could identify that was published over the past decade and that provided an MRP
18 estimate. Most of these studies were published prior to the financial crisis that began
19 in 2008. In addition, some of these studies were published in the early 2000s at the
20 market peak. It should be noted that many of these studies (as indicated) used data
21 over long periods of time (as long as fifty years of data) and so were not estimating an
22 MRP as of a specific point in time (e.g., the year 2001). To assess the effect of the
23 earlier studies on the MRP, I have reconstructed page 5 of Exhibit JRW-11 on page 6

1 of Exhibit JRW-11; however, I have eliminated all studies dated before January 2, 2010. The median for this subset of studies is 4.76%.

Q. GIVEN THESE RESULTS, WHAT MRP ARE YOU USING IN YOUR CAPM?

A. Much of the data indicates that the market risk premium is in the 4.0% to 6.0% range. Several recent studies (such as Damodaran, American Appraisers, Duarte and Rosa, and Duff & Phelps) have suggested an increase in the market risk premium. Therefore, I will use 5.5%, which is in the upper end of the range, as the market risk premium or MRP.

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs USED BY CFOs?

A. Yes. In the December 2016 CFO survey conducted by *CFO Magazine* and Duke University, which included approximately 300 responses, the expected 10-year MRP was 3.47%.[36]

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs OF PROFESSIONAL FORECASTERS?

A. The financial forecasters in the previously referenced Federal Reserve Bank of Philadelphia survey projected both stock and bond returns. In the February 2017 survey, the median long-term expected stock and bond returns were 5.60% and 3.68%, respectively. This provides an expected MRP of 1.92% (5.60%-3.68%).

[36] *Id*. p. 36.

1 **Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs OF FINANCIAL**
2 **ANALYSTS AND COMPANIES?**

3 A. Yes. Pablo Fernandez published the results of his 2016 survey of academics,
4 financial analysts, and companies.[37] This survey included over 4,000 responses. The
5 median MRP employed by U.S. analysts and companies was 5.3%.

6

7 **Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs OF FINANCIAL**
8 **ADVISORS?**

9 A. Yes. Duff & Phelps is a well-known valuation and corporate finance advisor that
10 publishes extensively on the cost of capital. As of 2017, Duff & Phelps
11 recommended using a 5.5% MRP for the U.S, with a normalized risk-free interest rate
12 of 3.5%.[38]

13

14 **Q. WHAT EQUITY COST RATE IS INDICATED BY YOUR CAPM ANALYSIS?**

15 A. The results of my CAPM study for the proxy groups are summarized on page
16 1 of Exhibit JRW-11 and in Table 2 below.

17 **Table 2**
18 **CAPM-derived Equity Cost Rate/ROE**
19 $K = (R_f) + ß * [E(R_m) - (R_f)]$

	Risk-Free Rate	Beta	Equity Risk Premium	Equity Cost Rate
Electric Proxy Group	**4.0%**	**0.70**	**5.5%**	**7.9%**
McKenzie Proxy Group	**4.0%**	**0.70**	**5.5%**	**7.9%**
Gas Proxy Group	**4.0%**	**0.70**	**5.5%**	**7.9%**

20

21 For the Electric, McKenzie, and Gas Proxy Groups, the risk-free rate of 4.0% plus the

[37] *Ibid.* p. 3.
[38] *See* http://www.duffandphelps.com/insights/publications/cost-of-capital/index.

1 product of the beta of 0.70 times the equity risk premium of 5.5% results in a 7.9%
2 equity cost rate.
3
4 **D. Equity Cost Rate Summary**
5
6 **Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EQUITY COST RATE**
7 **STUDIES.**
8 A. My DCF analyses for the Electric and McKenzie Proxy Groups indicate equity cost
9 rates of 8.55% and 8.90%, respectively. The CAPM equity cost rates for the Electric,
10 McKenzie, and Gas Proxy Groups are all 7.9%.

11 **Table 3**
12 **ROEs Derived from DCF and CAPM Models**

	DCF	CAPM
Electric Proxy Group	**8.55%**	**7.90%**
McKenzie Proxy Group	**8.90%**	**7.90%**
Gas Proxy Group	**8.70%**	**7.90%**

13 **Q. GIVEN THESE RESULTS, WHAT IS YOUR ESTIMATED EQUITY COST**
14 **RATE FOR THE GROUPS?**
15 A. Given these results, I conclude that the appropriate equity cost rate for companies in
16 the Electric and McKenzie Proxy Groups is in the 7.90% to 8.90% range. Because I
17 give primary weight to the DCF results, I believe that the appropriate equity cost rate
18 range is 8.55% to 8.90%. Given this range, I will use 8.75%, as the equity cost rate of
19 for LGE's electric utility operations. The range of results for the Gas Proxy Group is
20 7.9% to 8.70%. Again, since I rely primarily on the DCF approach. I will use 8.70%
21 for the gas distribution operations of LGE.

1 **Q. PLEASE INDICATE WHY AN EQUITY COST RATES OF 8.75% AND 8.70%**
2 **ARE APPROPRIATE FOR THE ELECTRIC AND GAS OPERATIONS OF**
3 **LGE.**

4 A. There are a number of reasons why equity cost rates of 8.75% and 8.70% are
5 appropriate and fair for the Company in this case:

6 1. I have employed a capital structure that has a higher common equity ratio
7 and therefore slightly lower financial risk than the capital structures of the three proxy
8 groups as well as LGE's parent company, PPL.

9 2. As shown in Exhibits JRW-2 and JRW-3, capital costs for utilities, as
10 indicated by long-term bond yields, are still at low levels. In addition, given low
11 inflationary expectations and slow global economic growth, interest rates are likely to
12 remain at low levels for some time.

13 3. As shown in Exhibit JRW-8, the electric utility and gas distribution
14 industries are among the lowest risk industries in the U.S. as measured by beta. As
15 such, the cost of equity capital for this industry is among the lowest in the U.S.,
16 according to the CAPM.

17 4. The investment risk of LGE, as indicated by the Company's S&P and
18 Moody's issuer credit ratings of A- and A3, is below the investment risk of the
19 Electric and McKenzie Proxy Groups, with average S&P and Moody's ratings of
20 BBB+ and Baa1. LGE's S&P and Moody's credit ratings are the same as the averages
21 of the Gas Proxy Group.

22 5. The authorized ROEs for electric utilities have declined from 10.01% in
23 2012, to 9.8% in 2013, to 9.76% in 2014, 9.58% in 2015, and 9.60% in 2016,

1 according to Regulatory Research Associates.[39] The authorized ROEs for gas
2 distribution companies have declined from 9.94% in 2012, to 9.68% in 2013, to
3 9.78% in 2014, 9.60% in 2015, and 9.50% in 2016. In my opinion, these authorized
4 ROEs have lagged behind capital market cost rates, or in other words, authorized
5 ROEs have been slow to reflect low capital market cost rates. This has been
6 especially true in recent years as some state commissions have been reluctant to
7 authorize ROEs below 10%. However, the trend has been towards lower ROEs, and
8 the norm now is below ten percent. Hence, I believe that my recommended ROE
9 reflects the low capital cost rates in today's markets, and these low capital cost rates
10 are finally being recognized by state utility commissions.
11
12 **Q. PLEASE DISCUSS YOUR RECOMMENDATION IN LIGHT OF A RECENT**
13 **MOODY'S PUBLICATION.**
14 A. Moody's recently published an article on utility ROEs and credit quality. In the
15 article, Moody's recognizes that authorized ROEs for electric and gas companies are
16 declining due to lower interest rates. The article explains:

> 17 The credit profiles of US regulated utilities will remain intact over
> 18 the next few years despite our expectation that regulators will
> 19 continue to trim the sector's profitability by lowering its authorized
> 20 returns on equity (ROE). Persistently low interest rates and a
> 21 comprehensive suite of cost recovery mechanisms ensure a low
> 22 business risk profile for utilities, prompting regulators to scrutinize
> 23 their profitability, which is defined as the ratio of net income to
> 24 book equity. We view cash flow measures as a more important
> 25 rating driver than authorized ROEs, and we note that regulators can
> 26 lower authorized ROEs without hurting cash flow, for instance by
> 27 targeting depreciation, or through special rate structures.[40]

[39] *Regulatory Focus*, Regulatory Research Associates, January, 2016. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.
[40] Moody's Investors Service, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles,"

1
2 Moody's indicates that with the lower authorized ROEs, electric and gas
3 companies are earning ROEs of 9.0% to 10.0%, yet this is not impairing their credit
4 profiles and is not deterring them from raising record amounts of capital. With
5 respect to authorized ROEs, Moody's recognizes that utilities and regulatory
6 commissions are having trouble justifying higher ROEs in the face of lower interest
7 rates and cost recovery mechanisms.

8 Robust cost recovery mechanisms will help ensure that US
9 regulated utilities' credit quality remains intact over the next few
10 years. As a result, falling authorized ROEs are not a material credit
11 driver at this time, but rather reflect regulators' struggle to justify
12 the cost of capital gap between the industry's authorized ROEs and
13 persistently low interest rates. We also see utilities struggling to
14 defend this gap, while at the same time recovering the vast majority
15 of their costs and investments through a variety of rate
16 mechanisms.[41]
17

18 Overall, this article further supports the prevailing/emerging belief that lower
19 authorized ROEs are unlikely to hurt the financial integrity of utilities or their ability
20 to attract capital.

21 **Q. DO YOU BELIEVE THAT YOUR 8.75% AND 8.70% ROE**
22 **RECOMMENDATIONS MEET *HOPE* AND *BLUEFIELD* STANDARDS?**
23 A. Yes, I do. As previously noted, according to the *Hope* and *Bluefield* decisions,
24 returns on capital should be: (1) comparable to returns investors expect to earn on
25 other investments of similar risk; (2) sufficient to assure confidence in the company's

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March 10, 2015.

[41] Moody's Investors Service, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," March 10, 2015.

1 financial integrity; and (3) adequate to maintain and support the company's credit and
2 to attract capital. LGE's S&P and Moody's issuer credit ratings of A- and A3 are
3 above the average of the Electric and McKenzie Proxy Groups of BBB+ and Baa1.
4 LGE's S&P and Moody's rating re the same as the averages of the Gas Proxy Group.
5 This indicates that LGE's investment risk is below that of the two proxy groups. And
6 while my recommendation is below the average authorized ROEs for electric utility
7 companies, it reflects the downward trend in authorized and earned ROEs of electric
8 utility companies. As is highlighted in the Moody's publication cited above that
9 states, despite authorized and earned ROEs below 10%, the credit quality of electric
10 and gas companies has not been impaired but, in fact, has improved and utilities are
11 raising about $50 billion per year in capital. Major positive factors in the improved
12 credit quality of utilities are regulatory ratemaking mechanisms. Therefore, I do
13 believe that my ROE recommendation meets the criteria established in the *Hope* and
14 *Bluefield* decisions.
15
16 **VI. <u>CRITIQUE OF LGE'S RATE OF RETURN TESTIMONY</u>**
17
18 **Q. PLEASE SUMMARIZE THE COMPANY'S COST OF CAPITAL**
19 **RECOMMENDATION.**
20 A. LGE witness Mr. Daniel K. Arbough provides the recommended capital structure and
21 debt cost rates, and Mr. McKenzie recommend a common equity cost rate for LGE.
22 LGE's recommended capital structure includes 3.82% short-term debt, 42.91% long-
23 term debt and 53.27% common equity. The Company proposes a short-term debt

1 cost rate of 0.72% and a long-term debt cost rate of 4.12%. Mr. McKenzie has
2 recommended a ROE or common equity cost rate of 10.23%. This rate of return
3 recommendation is summarized on page 1 of Exhibit JRW-12.
4
5 **Q. WHAT ISSUES DO YOU HAVE WITH THE COMPANY'S COST OF**
6 **CAPITAL POSITION?**
7 A. The primary areas of disagreement are: (1) our opposing views regarding the state of
8 the markets and capital costs; (2) the Company's proposed capital structure; (3) the
9 DCF equity cost rate estimates, and in particular, (a) Mr. McKenzie's exclusion of a
10 number of his low-end results, and (b) Mr. McKenzie's exclusive use of the earnings
11 per share growth rates of Wall Street analysts and *Value Line*; (4) the base interest
12 rate and market or equity risk premium in Mr. McKenzie's URP and CAPM
13 approaches; (5) Mr. McKenzie's two non-traditional equity cost rate approaches – the
14 Expected Earnings approach and his DCF applied to non-utilities; and (6) Mr.
15 McKenzie's equity cost rate adjustments for company size and flotation costs.
16 There are several other less significant issues in Mr. McKenzie's equity cost
17 rate analyses. In his CAPM analysis, he has: (1) used a projected risk-free rate that is
18 above current market rates; and (2) employed the Empirical CAPM ("ECAPM")
19 version of the CAPM, which makes inappropriate adjustments to the risk-free rate
20 and the market risk premium.
21 The alternative views on the state of the capital markets and the capital
22 structure issue was previously discussed. The discussion below focusses on Mr.
23 McKenzie's recommended equity cost rate.

1

2 **Q. PLEASE REVIEW MR. MCKENZIE'S EQUITY COST RATE APPROACHES**
3 **AND RESULTS.**

4 A. Mr. McKenzie has developed a proxy group of combination electric and gas utility
5 companies and employs DCF, CAPM, and URP equity cost rate approaches. Mr.
6 McKenzie's equity cost rate estimates for LGE are summarized on pages 1 and 2 of
7 Exhibit JRW-13. Based on these figures, he concludes that the appropriate equity cost
8 rate is 10.23% for LGE.

9

10 **A. DCF Approach**

11

12 **Q. PLEASE SUMMARIZE MR. MCKENZIE'S DCF ESTIMATES.**

13 A. On pages 33-46 of his direct testimony and in his Exhibit Nos. 4-5, Mr. McKenzie
14 develops an equity cost rate by applying the DCF model to his proxy group. Mr.
15 McKenzie's DCF results are summarized on page 1 of Exhibit JRW-13. In the
16 traditional DCF approach, the equity cost rate is the sum of the dividend yield and
17 expected growth. For the DCF growth rate, Mr. McKenzie uses four measures of
18 projected EPS growth: the projected EPS growth of Wall Street analysts as compiled by
19 IBES and Zack's; *Value Line's* projected EPS projected growth rate; and a measure of
20 sustainable growth as computed by the sum of internal ("*br*") and by external ("*sv*")
21 growth. The average of the mean DCF results is 9.1%.

22

23 **Q. WHAT ARE THE ERRORS IN MR. MCKENZIE'S DCF ANALYSES?**

1 A. The primary issues in Mr. McKenzie's DCF analyses are: (1) His asymmetric
2 elimination of low-end DCF results, and (2) The excessive use of the overly optimistic
3 and upwardly-biased EPS growth rate forecasts of Wall Street analysts as the growth
4 rate in his DCF model.
5
6 1. The Asymmetric Elimination of Low-End DCF Results
7
8
9 **Q. PLEASE ADDRESS MR. MCKENZIE'S ASYMMETRIC ELIMINATION OF**
10 **DCF RESULTS.**
11 A. One significant error with Mr. McKenzie's DCF equity cost rate analyses is his
12 asymmetric elimination of DCF results. Page 2 of Exhibit JRW-13 provides Mr.
13 McKenzie's DCF results for his group. In deriving a DCF equity cost rate, Mr.
14 McKenzie has labeled certain equity cost rates as extreme outliers. All but one of the
15 eliminated DCF results are on the low end. By eliminating low-end outliers while not
16 eliminating the same number of high-end outliers, Mr. McKenzie biases his DCF equity
17 cost rate study and reports a higher DCF equity cost rate than the data indicate. In my
18 DCF analysis, I have used the median as a measure of central tendency so as to not give
19 outlier results too much weight. This approach also avoids biasing the results by
20 including all data in the analysis and not selectively eliminating outcomes.
21 On page 2 of Exhibit JRW-13, I have recalculated Mr. McKenzie's DCF equity
22 cost rate for the utility group without eliminating the so-called extreme outliers. The
23 actual mean and median DCF equity cost rates, using all observations in the analysis, are
24 8.7% and 8.8% for the group. As such, Mr. McKenzie's asymmetric elimination of low-
25 end DCF results distorts his reported DCF ROEs.

1

2. Analysts' EPS Growth Rates

3

4 **Q. PLEASE REVIEW MR. MCKENZIE'S DCF GROWTH RATE.**

5 A. In his constant-growth DCF model, Mr. McKenzie's DCF growth rate is the average
6 of the EPS growth rate forecasts of: (1) Wall Street analysts as compiled by IBES and
7 Zacks; and (2) *Value Line*.

8

9 **Q. PLEASE DISCUSS MR. MCKENZIE'S USE OF THE PROJECTED EPS**
10 **GROWTH RATES OF WALL STREET ANALYSTS AND *VALUE LINE* IN HIS**
11 **DCF MODELS.**

12 A. A very significant issue with Mr. McKenzie's DCF analyses is his excessive reliance
13 on the EPS growth rate forecasts of Wall Street analysts.

14

15 **Q. WHY IS IT ERRONEOUS TO RELY EXCESSIVELY ON THE EPS**
16 **FORECASTS OF WALL STREET ANALYSTS AND *VALUE LINE* IN**
17 **ARRIVING AT A DCF GROWTH RATE?**

18 A. There are several issues with using the EPS growth rate forecasts of Wall Street
19 analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is
20 the dividend growth rate rather than the earnings growth rate. Therefore, in my
21 opinion, consideration must be given to other indicators of growth, including historic
22 growth, prospective dividend growth, internal growth, as well as projected earnings
23 growth. Second, as previously discussed, it is well-known that the long-term EPS

1 growth rate forecasts of Wall Street securities analysts are overly optimistic and
2 upwardly biased.
3
4 **B. CAPM Approach**
5
6 **Q. PLEASE DISCUSS MR. MCKENZIE'S CAPM.**
7 A. On pages 42-48 of his testimony and in Exhibit Nos. 7-8, Mr. McKenzie develops an
8 equity cost rate by applying the CAPM model to his groups. Mr. McKenzie has used a
9 traditional CAPM, as well as a variant, the Empirical CAPM ("ECAPM"). The CAPM
10 approach requires an estimate of the risk-free interest rate, Beta, and the equity risk
11 premium. Mr. McKenzie calculates a CAPM equity cost rate using the current long-
12 term Treasury bond yield of 2.4% and a projected bond yield of 3.9% and Betas from
13 *Value Line*. A market risk premium is computed for each risk-free rate, and both are
14 based on an expected stock market return of 11.1%. He also adds a "size premium" to
15 his CAPM equity cost rate. The ECAPM makes adjustments to the risk-free rate and
16 the market risk premium in calculating an equity cost rate. Using current interest
17 rates, Mr. McKenzie reports average unadjusted CAPM and ECAPM equity cost rates
18 of 8.6% and 9.3%, and equity cost rates of 9.2% and 9.8% including a size adjustment.
19 With a projected interest rate of 3.9%, Mr. McKenzie's average unadjusted CAPM and
20 ECAPM equity cost rates are 9.0% and 9.6%, and 9.6% and 10.1% including a size
21 adjustment.
22
23 **Q. WHAT ARE THE ERRORS IN MR. MCKENZIE'S CAPM ANALYSIS?**

1 A. The primary errors with Mr. McKenzie's ECAPM analysis are: (1) the use of the
2 ECAPM version of the CAPM; (2) the projected risk-free interest rate; (3) the
3 expected market return of 11.1% that is used to compute the market risk premiums; and
4 (4) the size adjustment.
5
6 1. ECAPM Approach
7
8 **Q. WHAT ISSUES DO YOU HAVE WITH MR. MCKENZIE'S ECAPM?**
9 A. In addition to the CAPM, Mr. McKenzie has employed a variation of the CAPM
10 which he calls the "ECAPM." The ECAPM, as popularized by rate of return
11 consultant Dr. Roger Morin, attempts to model the well-known finding of tests of the
12 CAPM that have indicated the Security Market Line ("SML") is not as steep as
13 predicted by the CAPM. As such, the ECAPM is nothing more than an ad hoc
14 version of the CAPM. Moreover, the ECAPM has not been theoretically or
15 empirically validated in refereed journals. The ECAPM provides for weights which
16 are used to adjust the risk-free rate and market risk premium in applying the ECAPM.
17 Mr. McKenzie uses 0.25 and 0.75 factors to boost the equity risk premium measure, but
18 provides no empirical justification for those figures.
19 Beyond the lack of any theoretical or empirical validation of the ECAPM, there
20 are two errors in Mr. McKenzie's ECAPM. I am not aware of any tests of the CAPM
21 that use adjusted betas such as those used by Mr. McKenzie. Adjusted betas address
22 the empirical issues with the CAPM by increasing the expected returns for low beta
23 stocks and decreasing the returns for high beta stocks.

1

2. Projected Risk-Free Interest Rate

3
4 **Q. PLEASE DISCUSS THE BASE YIELD OF MR. MCKENZIE'S CAPM/ECAPM**
5 **ANALYSES.**

6 A. Mr. McKenzie uses a projected risk-free interest rate 3.9% in his CAPM/ECAPM. This
7 figure is almost 100 basis points above the current yield on long-term Treasury bonds.

8

9 3. Market Risk Premium

10

11 **Q. PLEASE ASSESS MR. MCKENZIE'S MARKET RISK PREMIUMS**
12 **DERIVED FROM APPLYING THE DCF MODEL TO THE S&P 500.**

13 A. The primary problem with Mr. McKenzie's CAPM analysis is the magnitude of the
14 MRP. Mr. McKenzie develops an expected market risk premium by: (1) applying the
15 DCF model to the S&P 500 to get an expected market return; and (2) subtracting the
16 risk-free rate of interest. Mr. McKenzie's estimated market return of 11.1% for the
17 S&P 500 equals the sum of the dividend yield of 2.5% and expected EPS growth rate
18 of 8.8%. The expected EPS growth rate is the average of the expected EPS growth
19 rates from IBES. The primary error in this approach is Mr. McKenzie's expected
20 DCF growth rate. As previously discussed, the expected EPS growth rates of Wall
21 Street analysts are upwardly biased. In addition, as explained below, the projected
22 growth rate is inconsistent with economic and earnings growth in the U.S.

23

1 **Q. BEYOND YOUR PREVIOUS DISCUSSION OF THE UPWARD BIAS IN**
2 **WALL STREET ANALYSTS' EPS GROWTH RATE FORECASTS, IS**
3 **THERE OTHER EVIDENCE THAT INDICATES THAT MR. MCKENZIE'S**
4 **S&P 500 GROWTH RATE IS EXCESSIVE?**
5 A. Yes. A long-term EPS growth rate of 8.8% is not consistent with historic as well as
6 projected economic and earnings growth in the U.S for several reasons: (1) long-term
7 EPS and economic growth, as measured by GDP, is about one-third lower than Mr.
8 McKenzie's projected EPS growth rate of 8.8%; (2) more recent trends in GDP
9 growth, as well as projections of GDP growth, suggest slower economic and earnings
10 growth in the future; and (3) over time, EPS growth tends to lag behind GDP growth.
11 The long-term economic, earnings, and dividend growth rate in the U.S. has
12 only been in the 5% to 7% range. I performed a study of the growth in nominal GDP,
13 S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960.
14 The results are provided on page 1 of Exhibit JRW-14, and a summary is given in the
15 table below.

16 **Table 4**
17 **GDP, S&P 500 Stock Price, EPS, and DPS Growth**
18 **1960-Present**

Nominal GDP	**6.51%**
S&P 500 Stock Price	**6.74%**
S&P 500 EPS	**6.56%**
S&P 500 DPS	**5.74%**
Average	**6.39%**

19

20 In sum, the historical long-run growth rates for GDP, S&P EPS, and S&P
21 DPS are in the 5% to 7% range. By comparison, Mr. McKenzie's long-run growth
22 rate projection of 8.8% is overstated. These estimates suggest that companies in the

1 U.S. would be expected to: (1) increase their growth rate of EPS by almost 50% in the
2 future and (2) maintain that growth indefinitely in an economy that is expected to
3 grow at about one-half of his projected growth rates.
4
5 **Q. DO MORE RECENT DATA SUGGEST THAT THE U.S. ECONOMY'S**
6 **GROWTH IS FASTER OR SLOWER THAN THE LONG-TERM DATA?**
7 A. The more recent trends suggest lower future economic growth than the long-term
8 historic GDP growth. The historic GDP growth rates for 10-, 20-, 30-, 40- and 50-
9 years, is presented in Panel A of page 2 of Exhibit JRW-14 and in the table below.

10 **Table 5**
11 **Historic GDP Growth Rates**

10-Year Average	**2.97%**
20-Year Average	**4.23%**
30-Year Average	**4.77%**
40-Year Average	**5.90%**
50-Year Average	**6.45%**

12
13 These data clearly suggest that nominal GDP growth in recent decades has slowed to the
14 3.0% to 5.0% area.
15
16
17 **Q. ARE THE LOWER GDP GROWTH RATES OF RECENT DECADES**
18 **CONSISTENT WITH THE FORECASTS OF GDP GROWTH?**
19 A. Yes. A lower range is also consistent with long-term GDP forecasts. There are several
20 forecasts of annual GDP growth that are available from economists and government
21 agencies. These are listed in Panel B of on page 2 of Exhibit JRW-14. The mean 10-
22 year nominal GDP growth forecast (as of February 2017) by economists in the recent
23 *Survey of Professional Forecasters* is 4.7%. The Energy Information Administration

1 ("EIA"), in its projections used in preparing *Annual Energy Outlook,* forecasts long-
2 term GDP growth of 4.3% for the period 2015-2040.[42] The Congressional Budget
3 Office ("CBO"), in its forecasts for the period 2016 to 2026, projects a nominal GDP
4 growth rate of 4.1%.[43] Finally, the Social Security Administration ("SSA"), in its
5 Annual OASDI Report, provides a projection of nominal GDP from 2016-2090.[44]
6 The projected growth GDP growth rate over this period is 4.3%.
7
8 **Q. WHY IS GDP GROWTH RELEVANT IN YOUR CRITIQUE OF MR.**
9 **MCKENZIE'S USE OF THE LONG-TERM EPS GROWTH RATES IN**
10 **DEVELOPING A MRP FOR HIS CAPM?**
11 A. Because, as indicated in recent research, the long-term earnings growth rates of
12 companies are limited to the growth rate in GDP.
13
14 **Q. PLEASE HIGHLIGHT THE RESEARCH ON THE LINK BETWEEN**
15 **ECONOMIC AND EARNINGS GROWTH AND EQUITY RETURNS.**
16 A. In 2010, Brad Cornell of the California Institute of Technology published a study on
17 GDP growth, earnings growth, and equity returns. He found that long-term EPS
18 growth in the U.S. is directly related to GDP growth, with GDP growth providing an
19 upward limit on EPS growth. In addition, he found that long-term stock returns are

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[42]Energy Information Administration, A*nnual Energy Outlook,*
http://www.eia.gov/outlooks/aeo/pdf/0383(2016).pdf
[43]Congressional Budget Office, The *2016 Long-term Budget Outlook*, July 2016.
https://www.cbo.gov/publication/51129.
[44] Social Security Administration, 2016 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program. https://www.ssa.gov/oact/tr/2016/X1_trLOT.html.

1 determined by long-term earnings growth. He concludes with the following

2 observations:[45]

3 The long-run performance of equity investments is fundamentally
4 linked to growth in earnings. Earnings growth, in turn, depends on
5 growth in real GDP. This article demonstrates that both theoretical
6 research and empirical research in development economics suggest
7 relatively strict limits on future growth. In particular, real GDP
8 growth in excess of 3 percent in the long run is highly unlikely in
9 the developed world. In light of ongoing dilution in earnings per
10 share, this finding implies that investors should anticipate real
11 returns on U.S. common stocks to average no more than about 4–5
12 percent in real terms.
13

14 Given current inflation in the 2% to 3% range, the results imply nominal

15 expected stock market returns in the 7% to 8% range. As such, Mr. McKenzie's

16 projected earnings growth rates and implied expected stock market returns and equity

17 risk premiums are not indicative of the realities of the U.S. economy and stock

18 market. As such, his expected CAPM equity cost rate is significantly overstated.

19

20 **Q. PLEASE PROVIDE A SUMMARY ASSESSMENT OF MR. MCKENZIE'S**

21 **PROJECTED EQUITY RISK PREMIUM DERIVED FROM EXPECTED**

22 **MARKET RETURNS.**

23 A. Mr. McKenzie's market risk premium derived from his DCF application to the S&P

24 500 is inflated due to errors and bias in his study. Investment banks, consulting firms,

25 and CFOs use the equity risk premium concept every day in making financing,

26 investment, and valuation decisions. On this issue, the opinions of CFOs and financial

27 forecasters are especially relevant. CFOs deal with capital markets on an ongoing

[45] Bradford Cornell, "Economic Growth and Equity Investing," *Financial Analysts Journal* (January- February, 2010), p. 63.

1 basis since they must continually assess and evaluate capital costs for their
2 companies. The CFOs in the December 2016 *CFO Magazine* – Duke University
3 Survey of more than 300 CFOs shows an expected return on the S&P 500 of 5.70%
4 over the next ten years. In addition, the financial forecasters in the February 2017
5 Federal Reserve Bank of Philadelphia survey expect an annual market return of
6 5.60% over the next ten years. With a more realistic equity or market risk premium,
7 the appropriate equity cost rate for a public utility should be in the 8.0% to 9.0%
8 range and not in the 10.0% to 11.0% range.

9 4. Size Adjustment

10

11 **Q. PLEASE DISCUSS MR. MCKENZIE'S SIZE ADJUSTMENT.**

12 A. Mr. McKenzie includes a size adjustment in his CAPM approach for the size of the
13 companies in the utility group. This adjustment is based on the historical stock
14 market returns studies as performed by Morningstar (formerly Ibbotson Associates).
15 There are numerous errors in using historical market returns to compute risk
16 premiums. These errors provide inflated estimates of expected risk premiums.
17 Among the errors are survivorship bias (only successful companies survive – poor
18 companies do not) and unattainable return bias (the Ibbotson procedure presumes
19 monthly portfolio rebalancing). The net result is that Ibbotson's size premiums are
20 poor measures for risk adjustment to account for the size of a utility.

21 In addition, Professor Annie Wong has tested for a size premium in utilities
22 and concluded that, unlike industrial stocks, utility stocks do not exhibit a significant

1 size premium.[46] As explained by Professor Wong, there are several reasons why such a
2 size premium would not be attributable to utilities. Utilities are regulated closely by
3 state and federal agencies and commissions, and hence, their financial performance is
4 monitored on an ongoing basis by both the state and federal governments. In addition,
5 public utilities must gain approval from government entities for common financial
6 transactions such as the sale of securities. Furthermore, unlike their industrial
7 counterparts, accounting standards and reporting are fairly standardized for public
8 utilities. Finally, a utility's earnings are predetermined to a certain degree through the
9 ratemaking process in which performance is reviewed by state commissions and other
10 interested parties. Overall, in terms of regulation, government oversight, performance
11 review, accounting standards, and information disclosure, utilities are much different
12 than industrials, which could account for the lack of a size premium.
13

14 **Q. PLEASE DISCUSS THE RESEARCH ON THE SIZE PREMIUM IN**
15 **ESTIMATING THE EQUITY COST RATE.**

16 A. As noted, there are errors in using historical market returns to compute risk
17 premiums. With respect to the small firm premium, Richard Roll (1983) found that
18 one-half of the historic return premium for small companies disappears once biases
19 are eliminated and historic returns are properly computed. The error arises from the
20 assumption of monthly portfolio rebalancing and the serial correlation in historic
21 small firm returns.[47]

[46] Annie Wong, "Utility Stocks and the Size Effect: An Empirical Analysis," *Journal of the Midwest Finance Association*, pp. 95-101, (1993).

[47] *See* Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics*, pp. 371-86, (1983).

1 In a more recent paper, Ching-Chih Lu (2009) estimated the size premium
2 over the long-run. Lu acknowledges that many studies have demonstrated that
3 smaller companies have historically earned higher stock market returns. However, Lu
4 highlights that these studies rebalance the size portfolios on an annual basis. This
5 means that at the end of each year the stocks are sorted based on size, split into
6 deciles, and the returns are computed over the next year for each stock decile. This
7 annual rebalancing creates the problem. Using a size premium in estimating a CAPM
8 equity cost rate requires that a firm carry the extra size premium in its discount factor
9 for an extended period of time, not just for one year, which is the presumption with
10 annual rebalancing. Through an analysis of small firm stock returns for longer time
11 periods (and without annual rebalancing), Lu finds that the size premium disappears
12 within two years. Lu's conclusion with respect to the size premium is that "a small
13 firm should not be expected to have a higher size premium going forward sheerly
14 because it is small now":[48]

15 However, an analysis of the evolution of the size premium will show
16 that it is inappropriate to attach a fixed amount of premium to the cost
17 of equity of a firm simply because of its current market capitalization.
18 For a small stock portfolio which does not rebalance since the day it
19 was constructed, its annual return and the size premium are all
20 declining over years instead of staying at a relatively stable level.
21 This confirms that a small firm should not be expected to have a
22 higher size premium going forward sheerly because it is small now.
23

24 **C. Utility Risk Premium ("URP") Approach**

25
26 **Q. PLEASE DISCUSS MR. MCKENZIE'S URP APPROACH.**

[48] Ching-Chih Lu, "The Size Premium in the Long Run," 2009 Working Paper, SSRN abstract no. 1368705.

1 A. On pages 48-52 of his testimony and in Exhibit 9, Mr. McKenzie develops an equity cost rate by applying the URP model to his group. Mr. McKenzie estimates equity cost rates of 10.0% and 11.1% current and projected utility bond yields. Mr. McKenzie develops an equity cost rate using the URP by: (1) regressing the annual authorized returns on equity for electric utility companies from the 1974 to 2015 time period Moody's long-term public utility bond yields; and (2) adding the appropriate risk premiums established in (1) to current and projected Moody's long-term public utility bond yields of 4.41% and 6.34%.

Q. WHAT ARE THE ISSUES WITH MR. MCKENZIE'S URP APPROACH?

A. The base yield and the measurement and magnitude of the risk premium.

1. Base Interest Rate

Q. PLEASE DISCUSS THE BASE YIELD OF MR. MCKENZIE'S URP ANALYSIS.

A. The base yield in Mr. McKenzie's URP analyses is the prospective yield on long-term, 'A' rated public utility bonds. This is erroneous for two reasons. First, the 6.34% projected yield is about 150 basis points above current long-term utility bond yields. Second, using the yield on these securities inflates the required return on equity for the Company in two ways: (1) long-term bonds are subject to interest rate risk, a risk which does not affect common stockholders since dividend payments (unlike bond interest payments) are not fixed but tend to increase over time; and (2) the base yield in Mr. McKenzie's risk premium study is subject to credit risk since it is not default risk-free

1 like an obligation of the U.S. Treasury. As a result, its yield-to-maturity includes a
2 premium for default risk and therefore, is above its expected return. Hence, using a
3 bond's yield-to-maturity as a base yield results in an overstatement of investors' return
4 expectations.
5
6
7
8 2. Risk Premium
9
10 **Q. WHAT ARE THE ISSUES WITH MR. MCKENZIE'S RISK PREMIUM?**
11 A. The most important issue is that Mr. McKenzie's risk premium is not necessarily
12 applicable to measure utility investors' required rate of return. Mr. McKenzie's URP
13 approach is a gauge of *commission* behavior, not *investor* behavior. Capital costs are
14 determined in the market place through the financial decisions of investors and are
15 reflected in such fundamental factors as dividend yields, expected growth rates,
16 interest rates, and investors' assessment of the risk and expected return of different
17 investments. Regulatory commissions evaluate capital market data in setting
18 authorized ROEs, but also take into account other utility- and rate case-specific
19 information in setting ROEs. As such, Mr. McKenzie's approach and results reflect
20 other factors such as capital structure, credit ratings and other risk measures, service
21 territory, capital expenditures, energy supply issues, rate design, investment and
22 expense trackers, and other factors used by utility commissions in determining an
23 appropriate ROE in addition to capital costs. This may be especially true when, due

to the inherent compromises and trade-offs upon which settlements are made, the authorized ROE data includes the results of rate cases that are settled and not fully litigated.

Finally, Mr. McKenzie's methodology produces an inflated required rate of return since utilities have been selling at market-to-book ratios in excess of 1.0 for many years. This indicates that the authorized rates of return have been greater than the return that investors require. The relationship between ROE, the equity cost rate, and market-to-book ratios was explained on pages 34-35 of this testimony. In short, a market-to-book ratio above 1.0 indicates a company's ROE is above its equity cost rate. Therefore, the risk premium produced from the study is overstated as a measure of investor return requirements and produced an inflated equity cost rate.

D. Flotation Costs

Q. PLEASE DISCUSS MR. MCKENZIE'S ADJUSTMENT FOR FLOTATION COSTS.

A. Mr. McKenzie claims that an upward adjustment of 0.13% to the equity cost rate recommendation to account for flotation costs. This adjustment factor is erroneous for several reasons.

First and foremost, Mr. McKenzie has not identified *any* flotation costs for LGE. Therefore, LGE is requesting annual revenues in the form of a higher return on equity for flotation costs that have not been identified.

1 Second, it is commonly argued that a flotation cost adjustment (such as that
2 used by the Company) is necessary to prevent the dilution of the existing
3 shareholders. In this case, Mr. McKenzie justifies a flotation cost adjustment by
4 referring to bonds and the manner in which issuance costs are recovered by including
5 the amortization of bond flotation costs in annual financing costs. However, this is
6 incorrect for several reasons:
7 (1) If an equity flotation cost adjustment is similar to a debt flotation cost
8 adjustment, the fact that the market-to-book ratios for electric utility and gas
9 distribution companies are over 1.5X actually suggests that there should be a flotation
10 cost *reduction* (and not an increase) to the equity cost rate. This is because when (a) a
11 bond is issued at a price in excess of face or book value, and (b) the difference
12 between its market price and the book value is greater than the flotation or issuance
13 costs, the cost of that debt is lower than the coupon rate of the debt. The amount by
14 which market values of electric utility and gas distribution companies are in excess of
15 book values is much greater than flotation costs. Hence, if common stock flotation
16 costs were exactly like bond flotation costs, and one was making an explicit flotation
17 cost adjustment to the cost of common equity, the adjustment would be downward;
18 (2) If a flotation cost adjustment is needed to prevent dilution of existing
19 stockholders' investment, then the reduction of the book value of stockholder
20 investment associated with flotation costs can occur only when a company's stock is
21 selling at a market price at or below its book value. As noted above, electric utility
22 and gas distribution companies are selling at market prices well in excess of book

1 value. Hence, when new shares are sold, existing shareholders realize an increase in
2 the book value per share of their investment, not a decrease;
3 (3) Flotation costs consist primarily of the underwriting spread (or fee)
4 rather than out-of-pocket expenses. On a per-share basis, the underwriting spread is
5 the difference between the price the investment banker receives from investors and
6 the price the investment banker pays to the company. Therefore, these are not
7 expenses that must be recovered through the regulatory process. Furthermore, the
8 underwriting spread is known to the investors who are buying the new issue of stock,
9 and who are well aware of the difference between the price they are paying to buy the
10 stock and the price that the company is receiving. The offering price which they pay
11 is what matters when investors decide to buy a stock based on its expected return and
12 risk prospects. Therefore, the Company is not entitled to an adjustment to the
13 allowed return to account for those costs; and
14 (4) Flotation costs, in the form of the underwriting spread, are a form of a
15 transaction cost in the market. They represent the difference between the price paid
16 by investors and the amount received by the issuing company. Whereas LGE
17 believes that it should be compensated for these transaction costs, it has not accounted
18 for *other* market transaction costs in determining its cost of equity. Most notably,
19 brokerage fees that investors pay when they buy shares in the open market are another
20 market transaction cost. Brokerage fees increase the effective stock price paid by
21 investors to buy shares. If the Company had included these brokerage fees or
22 transaction costs in its DCF analysis, the higher effective stock prices paid for stocks
23 would lead to lower dividend yields and equity cost rates. This would result in a

1 downward adjustment to their DCF equity cost rate.

2

3 **E. Other Equity Cost Rate Methods**

4

5 1. Expected Earnings Approach

6

7 **Q. PLEASE DISCUSS MR. MCKENZIE'S EXPECTED EARNINGS ANALYSIS.**

8 A. At pages 52-55 of his testimony and in Exhibit 10, Mr. McKenzie estimates an equity
9 cost rate of 11.3% for his group using an approach he calls the Expected Earnings
10 ("EE") approach. His methodology simply involves using the expected ROE for the
11 companies in the proxy group as estimated by *Value Line*. This approach is
12 fundamentally flawed for several reasons. First, these ROE results include the profits
13 associated with the unregulated operations of the utility proxy groups. More
14 importantly, since Mr. McKenzie has not evaluated the market-to-book ratios for
15 these companies, they cannot indicate whether the past and projected returns on
16 common equity are above or below investors' requirements. As shown in Panel B on
17 page 1 of Exhibit JRW-4, the median market-to-book ratio is 1.95. This demonstrates
18 that the earned returns on equity for the proxy group are above the cost of common
19 equity, which is what we are trying to determine in this proceeding.

20

21 2. DCF Applied to Non-Utility Group

22

23 **Q. PLEASE DISCUSS THE PROBLEM WITH MR. MCKENZIE'S NON-UTILITY**

1 **PROXY GROUP.**

2 A. At pages 59-63 of his testimony and in Exhibit No. 11, Mr. McKenzie estimates an
3 equity cost rate for the Company using a proxy group of twelve non-utility companies.
4 This group includes such companies as Coca-Cola, Costco, General Mills, Kellogg,
5 Kimberly-Clark, Procter & Gamble, and WalMart.

6 This approach is fundamentally flawed for two reasons. First, while many of
7 these companies are large and successful, their lines of business are vastly different from
8 the electric utility business and they do not operate in a highly regulated environment.
9 In addition, and most importantly, the previously discussed upward bias in the EPS
10 growth rate forecasts of Wall Street analysts is particularly severe for non-utility
11 companies and therefore the DCF equity cost rate estimates for this group are
12 particularly overstated.

13

14 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

15 A. Yes.

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

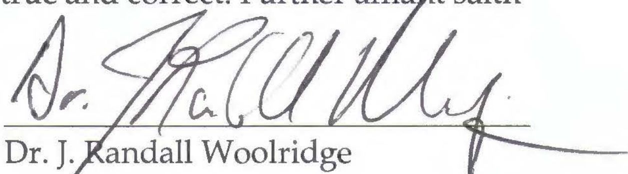
In the Matter of:

ELECTRONIC APPLICATION OF LOUISVILLE GAS & ELECTRIC COMPANY FOR AN ADJUSTMENT OF ITS ELECTRIC AND GAS RATES AND FOR CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY	)))))	CASE NO. 2016-00371

AFFIDAVIT OF Dr. J. Randall Woolridge

Commonwealth of Pennsylvania)

Dr. J. Randall Woolridge, being first duly sworn, states the following: The prepared Pre-Filed Direct Testimony and the Schedules attached thereto constitute the direct testimony of Affiant in the above-styled case. Affiant states that he would give the answers set forth in the Pre-Filed Direct Testimony if asked the questions propounded therein. Affiant further states that, to the best of his knowledge, his statements made are true and correct. Further affiant saith not.



Dr. J. Randall Woolridge

SUBSCRIBED AND SWORN to before me this 2 day of March, 2017.

Mary L. Hart
NOTARY PUBLIC

My Commission Expires: Aug 26, 2017

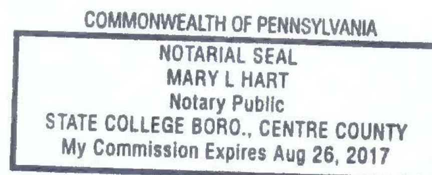


Exhibit JRW--1

Louisville Gas & Electric Company
Recommended Cost of Capital

Panel A
Electric Utility Operations

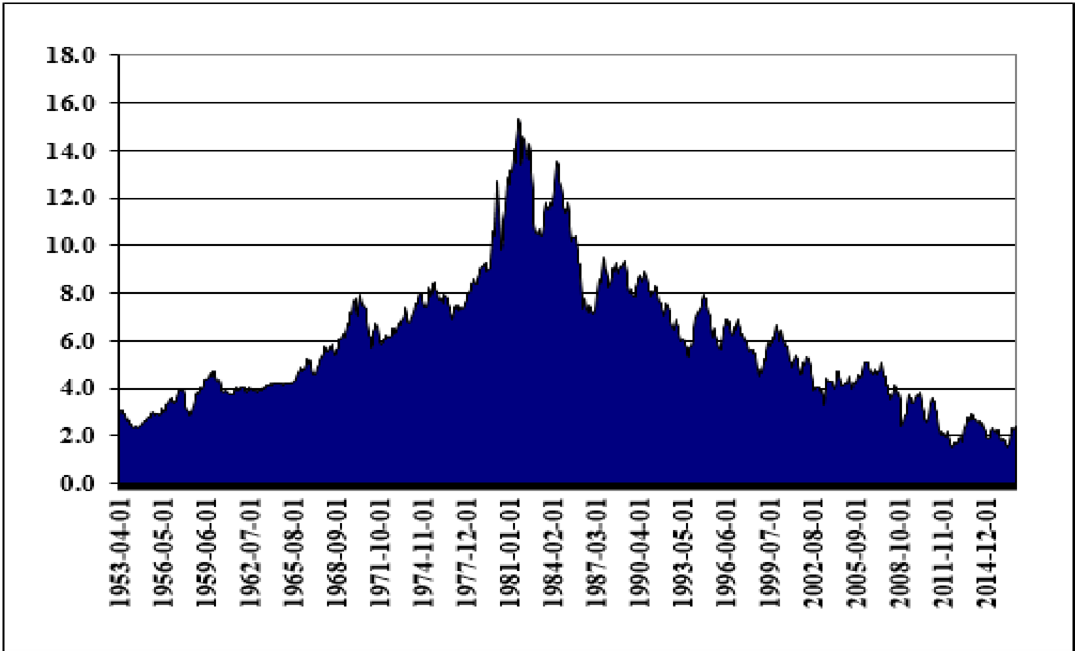
Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Short-Term Debt	4.09%	0.72%	0.03%
Long-Term Debt	45.91%	4.10%	1.88%
Common Equity	50.00%	8.75%	4.37%
Total	100.00%		6.29%

Panel B
Gas Distribution Operations

Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Short-Term Debt	4.09%	0.72%	0.03%
Long-Term Debt	45.91%	4.10%	1.88%
Common Equity	50.00%	8.70%	4.35%
Total	100.00%		6.26%

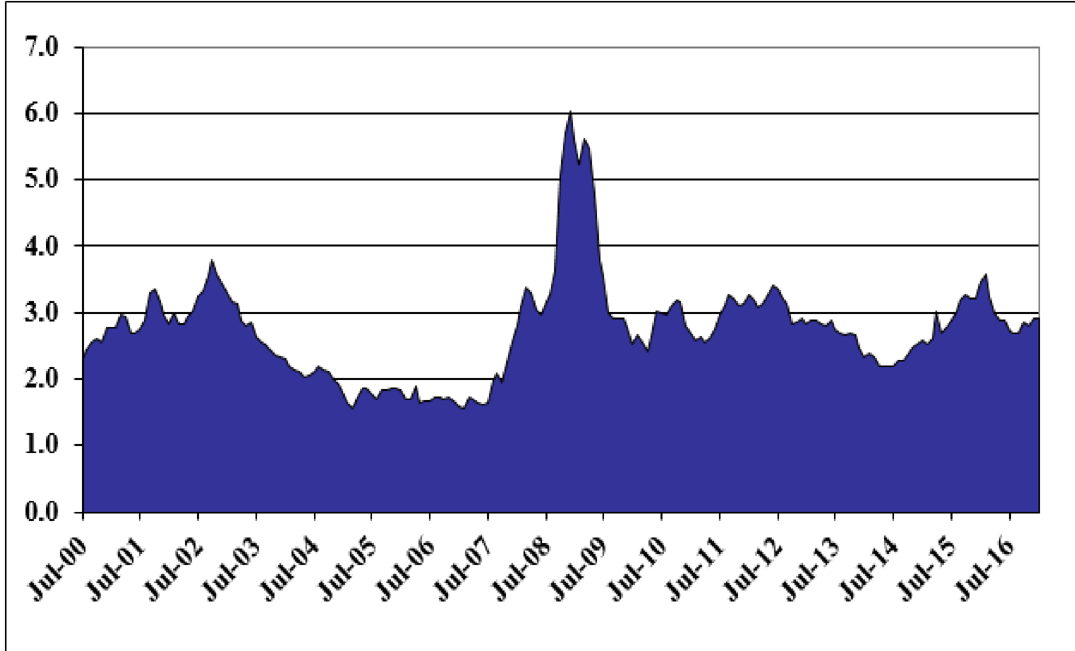
Exhibit JRW--2

Panel A
Ten-Year Treasury Yields
1953-Present



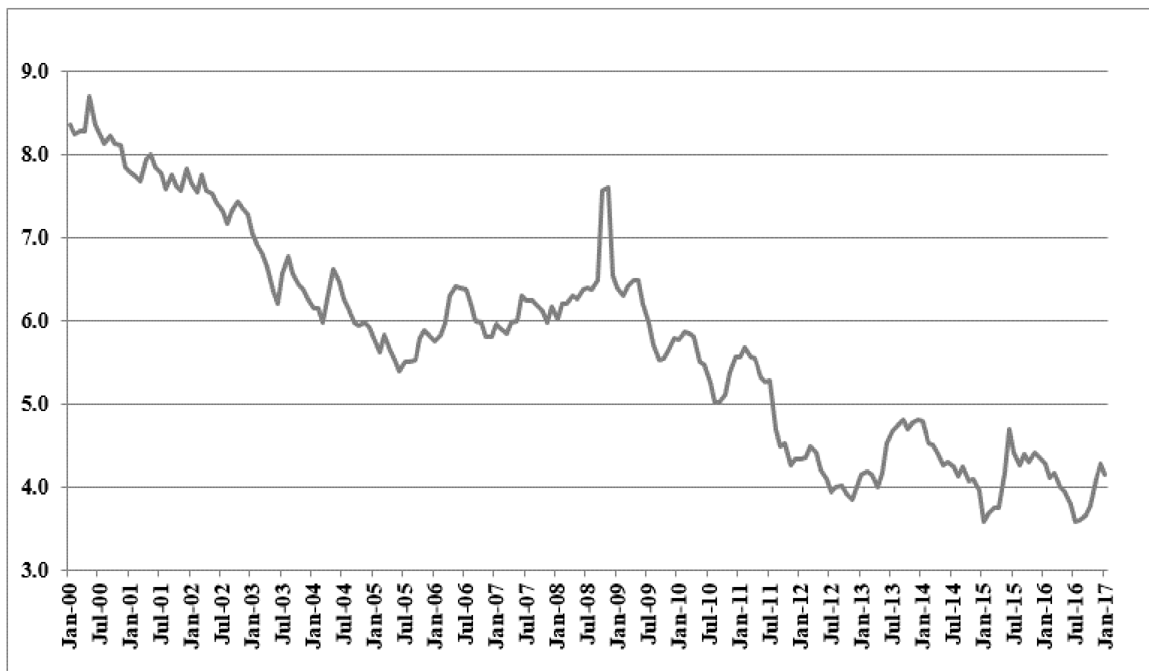
Source: http://research.stlouisfed.org/fred2/data/GS10.txt

Panel B
Long-Term Moody's Baa Yields Minus Ten-Year Treasury Yields
2000-Present

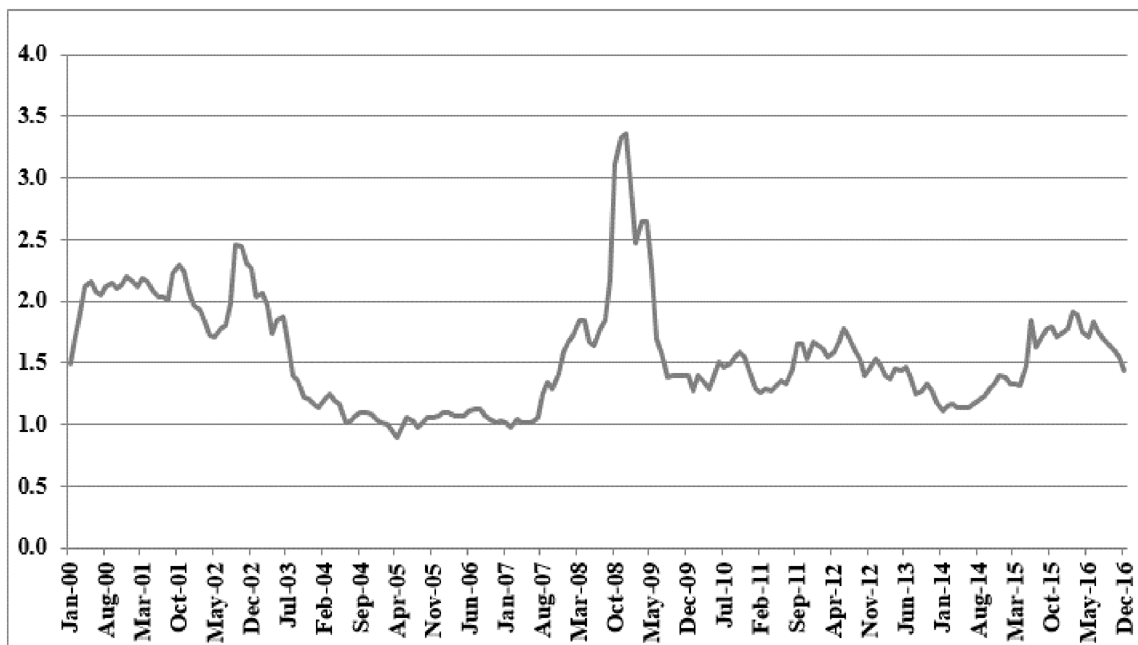


Source: Federal Reserve Bank of St. Louis, FRED Database.

Exhibit JRW--3
Panel A
Long-Term, A-Rated Public Utility Yields



Panel B
Long-Term, A-Rated Public Utility Yields minus -Twenty-Year Treasury Yields



Source: Mergent Bond Record, Federal Reserve Bank of St. Louis, FRED Database.

Exhibit JRW--4

Louisville Gas & Electric Company

Panel A
Electric Proxy Group

Company	Operating Revenue ($mil)	Percent Elec Revenue	Percent Gas Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
ALLETE, Inc. (NYSE-ALE)	1,378.8	66		3,669.1	3,257.6	BBB+	A3	3.9	MN, WI	53.1	9.0	1.76
Alliant Energy Corporation (NYSE-LNT)	3,262.7	77	10	8,970.2	8,679.1	A-	A3	4.1	WI,IA,IL,MN	49.3	10.2	2.3
Ameren Corporation (NYSE-AEE)	6,028.0	86	19	18,799.0	12,886.9	BBB+	Baa1	4.0	IL,MO	47.9	8.3	1.89
American Electric Power Co. (NYSE-AEP)	16,204.6	82		46,133.2	31,371.0	BBB	Baa1	3.9	10 States	46.8	9.9	1.75
Avista Corporation (NYSE-AVA)	1,427.6	69	33	3,898.6	2,511.4	BBB	Baa1	3.4	WA,ID,AK	46.9	7.7	1.59
Black Hills Corporation (NYSE-BKH)	1,573.0	50	45	3,259.1	3,245.5	BBB	Baa1	2.8	NE,IA,CO,WY,AR,SD,MT	43.0	8.8	2.14
CMS Energy Corporation (NYSE-CMS)	6,399.0	69	26	14,705.0	11,973.4	BBB+	Baa2	3.1	MI	29.4	13.2	3.05
Consolidated Edison, Inc. (NYSE-ED)	12,074.0	71	14	32,209.0	21,220.5	A-	A3	3.8	NY,PA	47.8	9.1	1.66
Dominion Resources, Inc. (NYSE-D)	11,733.0	65	1	41,554.0	45,984.2	BBB+	Baa2	3.8	NC,OH,FL,SCKY	30.4	15.0	3.45
DTE Energy Company (NYSE-DTE)	10,243.0	50	13	18,034.0	17,715.6	BBB+	A3	3.7	MI	47.2	9.1	1.99
Duke Energy Corporation (NYSE-DUK)	23,249.0	91	2	75,709.0	54,183.0	A-	A3	3.0	NC,OH,FL,SCKY	47.9	7.2	1.35
Edison International (NYSE-EIX)	11,325.0	100		35,085.0	24,380.4	BBB+	A3	3.7	CA	48.9	11.1	2.62
El Paso Electric Company (NYSE-EE)	875.8	100		2,695.5	1,866.9	BBB	Baa1	2.8	TX,NM	44.3	8.1	1.85
Entergy Corporation (NYSE-ETR)	10,706.5	82	1	27,824.4	12,789.7	BBB	Baa3	2.7	LA,AR,MS,TX	40.3	11.1	1.42
Eversource Energy (NYSE-ES)	7,554.4	89	11	19,892.4	17,900.9	A	Baa1	4.6	CT,NH,MA	50.4	8.4	1.75
FirstEnergy Corporation (NYSE-FE)	14,728.0	71		37,214.0	12,789.3	BBB-	Baa3	2.1	OH,PA,NY,NJ,WV,MD	36.0	6.8	1.03
Hawaiian Electric Inductries (NYSE-HEC)	2,387.3	89		4,377.7	3,655.5	BBB-	NR	5.9	HI	53.2	8.2	1.91
IDACORP, Inc. (NYSE-IDA)	1,252.8	100		3,992.4	4,015.5	BBB	Baa1	3.4	ID	54.1	9.5	1.95
MGE Energy, Inc. (NYSE-MGEE)	536.8	76	24	1,243.4	2,163.3	AA-	A1	6.7	WI	63.6	10.3	3.18
NorthWestern Corporation (NYSE-NWE)	1,251.6	80	20	4,059.5	2,742.6	BBB	A3	2.9	MT,SD,NE	44.0	8.7	1.69
OGE Energy Corp. (NYSE-OGE)	2,175.5	100		7,322.4	6,769.9	A-	A3	4.0	OK,AR	54.7	10.2	2.06
Otter Tail Corporation (NDQ-OTTR)	803.5	52		1,387.8	1,494.5	BBB	A3	3.6	MN,ND,SD	51.1	9.7	2.4
PG&E Corporation (NYSE-PCG)	17,120.0	82	18	46,723.0	31,912.5	BBB	Baa1	1.8	CA	49.1	5.9	1.9
Pinnacle West Capital Corp. (NYSE-PNW)	3,493.9	100		11,808.9	8,738.4	A-	Baa1	4.8	AZ	54.5	9.5	1.9
PNM Resources, Inc. (NYSE-PNM)	1,362.7	100		4,535.4	2,799.8	BBB+	Baa3	2.4	NM,TX	41.4	7.9	1.69
Portland General Electric Company (NYSE-POR)	1,898.0	100		6,012.0	3,897.7	BBB	A3	2.6	OR	50.5	7.6	1.72
PPL Corporation (NYSE-PPL)	7,517.0	60		30,382.0	24,215.9	A-	Baa2	3.7	PA,KY	33.2	16.2	2.41
SCANA Corporation (NYSE-SCG)	4,126.0	61	18	13,425.0	10,038.7	BBB+	Baa3	3.6	SC,NC,GA	45.5	10.0	1.83
Southern Company (NYSE-SO)	18,250.0	94		61,114.0	48,235.6	A-	Baa1	5.0	GA,FL,NJ,IL,VA,TN,MS	42.2	12.0	2.34
WEC Energy Group (NYSE-WEC)	7,472.5	62	28	19,189.7	18,409.9	A-	A3	4.8	WI,IL,MN,MI	45.5	7.4	2.1
Xcel Energy Inc. (NYSE-XEL)	11,106.7	85	14	31,205.9	21,364.5	A-	A3	3.8	MN,WI,ND,SD,MI	43.1	10.0	2
Mean	7,081.2	79	17	20,530.0	15,264.8	BBB+	Baa1	3.7		46.3	9.5	2.02
Median	6,028.0	82	18	14,705.0	11,973.4	BBB+	Baa1	3.7		47.2	9.1	1.90

Data Source: *AUS Utility Reports*; *Value Line Investment Survey*, 2017.

Panel B
McKenzie Proxy Group

Company	Operating Revenue ($mil)	Percent Elec Revenue	Percent Gas Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
Alliant Energy Corporation (NYSE-LNT)	3,262.7	77	10	8,970.2	8,679.1	A-	A3	4.1	WI,IA,IL,MN	49.3	10.2	2.30
Ameren Corporation (NYSE-AEE)	6,028.0	86	19	18,799.0	12,886.9	BBB+	Baa1	4.0	IL,MO	47.9	8.3	1.89
Avangrid Inc (NYSE-AGR)	5,680.0	NA	NA	20,711.0	12,329.3	BBB+	Baa1	3.6		75.4	1.8	0.82
Avista Corporation (NYSE-AVA)	1,427.6	69	33	3,898.6	2,511.4	BBB	Baa1	3.4	WA,ID,AK	46.9	7.7	1.59
Black Hills Corporation (NYSE-BKH)	1,573.0	50	45	3,259.1	3,245.5	BBB	Baa1	2.8	NE,IA,CO,WY,AR,SD,MT	43.0	8.8	2.14
CenterPoint Energy (NYSE-CNP)	7,238.0	42	36	11,537.0	11,378.6	A-	Baa1	2.6	TX,MN,AR,LA,OK	28.2	13.4	3.29
CMS Energy Corporation (NYSE-CMS)	6,399.0	69	26	14,705.0	11,973.4	BBB+	Baa2	3.1	MI	29.4	13.2	3.05
Consolidated Edison, Inc. (NYSE-ED)	12,074.0	71	14	32,209.0	21,220.5	A-	A3	3.8	NY,PA	47.8	9.1	1.66
DTE Energy Company (NYSE-DTE)	10,243.0	50	13	18,034.0	17,715.6	BBB+	A3	3.7	MI	47.2	9.1	1.99
Entergy Corporation (NYSE-ETR)	10,706.5	82	1	27,824.4	12,789.7	BBB	Baa3	2.7	LA,AR,MS,TX	40.3	11.1	1.42
Eversource Energy (NYSE-ES)	7,554.4	89	11	19,892.4	17,900.9	A	Baa1	4.6	CT,NH,MA	50.4	8.4	1.75
Exelon Corp. (NYSE-ES)	27,873.0	43	4	57,439.0	32,526.8	BBB	Baa2	4.1	IL,PA,MD,DC,NJ	49.5	8.8	1.25
NorthWestern Corporation (NYSE-NWE)	1,251.6	80	20	4,059.5	2,742.6	BBB	A3	2.9	MT,SD,NE	44.0	8.7	1.69
PG&E Corporation (NYSE-PCG)	17,120.0	82	18	46,723.0	31,912.5	BBB	Baa1	1.8	CA	49.1	5.9	1.90
PPL Corporation (NYSE-PPL)	7,517.0	60		30,382.0	24,215.9	A-	Baa2	3.7	PA,KY	33.2	16.2	2.41
Public Service Enterprise Grp. (NYSE-PEG)	9,249.0	36	17	26,539.0	21,987.7	BBB+	Baa2	7.6	NJ	56.8	12.9	1.68
SCANA Corporation (NYSE-SCG)	4,126.0	61	18	13,425.0	10,038.7	BBB+	Baa3	3.4	SC,NC,GA	45.5	10.0	1.83
SEMPRA Energy (NYSE-SRE)	10,014.0	36	38	28,039.0	26,052.5	BBB+	Baa1	3.4	CA	44.6	11.1	2.20
Southern Company (NYSE-SO)	18,250.0	94		61,114.0	48,235.6	A-	Baa1	5.2	GA,FL,NJ,IL,VA,TN,MS	42.2	12.0	2.34
Vectren Corporation (NYSE-VVC)	2,353.5	26	32	4,089.5	4,596.0	A-	NR	4.6	IN,OH	48.2	11.7	2.69
WEC Energy Group (NYSE-WEC)	7,472.5	62	28	19,189.7	18,409.9	A-	A3	4.8	WI,IL,MN,MI	45.5	7.4	2.10
Xcel Energy Inc. (NYSE-XEL)	11,106.7	85	14	31,205.9	21,364.5	A-	A3	3.8	MN,WI,ND,SD,MI	43.1	10.0	2.00
Mean	8,469.5	64	21	22,602.9	16,989.5	BBB+	Baa1	3.8		45.8	9.8	2.00
Median	7,472.5	69	18	19,541.1	16,490.2	BBB+	Baa1	3.7		46.2	9.6	1.95

Data Source: *AUS Utility Reports*; *Value Line Investment Survey*, 2017.

Panel C
Gas Proxy Group

Company	Operating Revenue ($mil)	Percent Elec Revenue	Percent Gas Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
Atmos Energy Corporation (NYSE-ATO)	3,349.9		72	8,280.5	7,933.7	A	A2	5.4	Ten States	51.4%	10.1	2.27
Chesapeake Utilities Corporation (NYSE-CPK)	459.2	17	53	855.0	1,056.0	NR	NR	7.7	DE,MD,FL	51.9%	11.2	2.79
New Jersey Resources Corp. (NYSE-NJR)	2,734.0		32	2,128.3	3,270.9	A	A2	7.5	NJ	54.6%	13.9	2.90
NiSource Inc. (NYSE-NI)	4,651.8	37	51	12,111.5	7,154.5	BBB+	NR	2.4	IN,OH,PA,MA,KY,VA,MD	35.6%	5.2	1.87
Northwest Natural Gas Co. (NYSE-NWN)	723.8		91	2,182.7	1,610.8	A+	A3	3.5	OR,WA	47.3%	6.9	2.07
South Jersey Industries, Inc. (NYSE-SJI)	959.6		50	2,448.1	2,629.1	BBB+	A2	6.1	NJ	41.4%	9.5	2.28
Southwest Gas Corporation (NYSE-SWX)	2,463.6		57	3,891.1	3,877.9	A	A3	4.3	AZ,NV,CA	50.1%	8.7	2.47
Spire (NYSE-SR)	1,537.3		100	3,300.9	2,897.4	A-	Baa2	3.7	MO	41.6%	8.2	1.66
Mean	2,109.9		63	4,399.8	3,803.8	A-	A3	5.1		46.7%	9.2	2.29
Median	2,000.5		55	2,874.5	3,084.2	A-	A3	4.9		48.7%	9.1	2.28

Data Source: *AUS Utility Reports*; *Value Line Investment Survey*, 2017.

Exhibit JRW--4

Louisville Gas & Electric Company
***Value Line* Risk Metrics**

Panel A
Electric Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
ALLETE, Inc. (NYSE-ALE)	0.75	A	2	90	95
Alliant Energy Corporation (NYSE-LNT)	0.70	A	2	80	100
Ameren Corporation (NYSE-AEE)	0.65	A	2	90	100
American Electric Power Co. (NYSE-AEP)	0.65	A	2	85	95
Avista Corporation (NYSE-AVA)	0.70	A	2	75	95
Black Hills Corporation (NYSE-BKH)	0.90	A	2	50	80
CMS Energy Corporation (NYSE-CMS)	0.65	B++	2	80	100
Consolidated Edison, Inc. (NYSE-ED)	0.55	A+	1	95	95
Dominion Resources, Inc. (NYSE-D)	0.70	B++	2	85	100
DTE Energy Company (NYSE-DTE)	0.65	B++	2	90	100
Duke Energy Corporation (NYSE-DUK)	0.60	A	2	85	100
Edison International (NYSE-EIX)	0.65	A	2	65	100
El Paso Electric Company (NYSE-EE)	0.70	B++	2	80	90
Entergy Corporation (NYSE-ETR)	0.65	B++	3	65	95
Eversource Energy (NYSE-ES)	0.70	A	1	85	95
FirstEnergy Corporation (NYSE-FE)	0.65	B+	3	45	85
Hawaiian Electric Inductries (NYSE-HEC)	0.70	A	2	75	95
IDACORP, Inc. (NYSE-IDA)	0.75	A	2	90	95
MGE Energy, Inc. (NYSE-MGEE)	0.70	A	1	90	90
NorthWestern Corporation (NYSE-NWE)	0.70	B+	3	90	95
OGE Energy Corp. (NYSE-OGE)	0.90	A	2	80	85
Otter Tail Corporation (NDQ-OTTR)	0.85	B++	2	50	85
PG&E Corporation (NYSE-PCG)	0.65	B+	3	50	95
Pinnacle West Capital Corp. (NYSE-PNW)	0.70	A+	1	90	95
PNM Resources, Inc. (NYSE-PNM)	0.75	B	3	65	90
Portland General Electric Company (NYSE-POR	0.70	B++	2	70	95
PPL Corporation (NYSE-PPL)	0.70	B++	2	65	95
SCANA Corporation (NYSE-SCG)	0.65	B++	2	100	95
Southern Company (NYSE-SO)	0.55	A	2	100	100
WEC Energy Group (NYSE-WEC)	0.60	A+	1	85	95
Xcel Energy Inc. (NYSE-XEL)	0.60	A+	1	100	100
Mean	0.69	A	2.0	79	95

Data Source: *Value Line Investment Survey*, 2017.

Panel B
McKenzie Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
Alliant Energy Corporation (NYSE-LNT)	0.70	A	2	80	100
Ameren Corporation (NYSE-AEE)	0.70	A	2	85	95
Avangrid Inc (AGR - NYSE)		B++	2		
Avista Corporation (NYSE-AVA)	0.70	A	2	75	95
Black Hills Corporation (NYSE-BKH)	0.85	A	2	50	80
CenterPoint Energy (NYSE-CNP)	0.85	B+	3	85	90
CMS Energy Corporation (NYSE-CMS)	0.65	B++	2	80	100
Consolidated Edison, Inc. (NYSE-ED)	0.55	A+	1	95	95
DTE Energy Company (NYSE-DTE)	0.65	B++	2	90	100
Entergy Corporation (NYSE-ETR)	0.65	B++	3	65	95
Eversource Energy (NYSE-ES)	0.70	A	1	85	95
Exelon Corp. (NYSE-EXC)	0.70	B++	3	60	85
NorthWestern Corporation (NYSE-NWE)	0.70	B+	3	90	95
PG&E Corporation (NYSE-PCG)	0.65	B+	3	50	95
PPL Corporation (NYSE-PPL)	0.70	B++	2	65	95
Public Service Enterprise Grp. (NYSE-PEG)	0.70	A++	1	65	95
SCANA Corporation (NYSE-SCG)	0.65	B++	2	100	95
SEMPRA Energy (NYSE-SRE)	0.80	A	2	80	95
Southern Company (NYSE-SO)	0.55	A	2	100	100
Vectren Corporation (NYSE-VVC)	0.75	A	2	75	95
WEC Energy Group (NYSE-WEC)	0.60	A+	1	85	95
Xcel Energy Inc. (NYSE-XEL)	0.60	A+	1	100	100
Mean	0.69	A	2.0	79	95

Data Source: *Value Line Investment Survey*, 2017.

Panel C
Gas Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
Atmos Energy Corporation (NYSE-ATO)	0.70	A	1	95	95
Chesapeake Utilities Corporation (NYSE-CPK)	0.65	B++	2	95	80
New Jersey Resources Corp. (NYSE-NJR)	0.80	A+	1	55	85
NiSource Inc. (NYSE-NI)	nmf	B+	3	nmf	nmf
Northwest Natural Gas Co. (NYSE-NWN)	0.65	A	1	85	95
South Jersey Industries, Inc. (NYSE-SJI)	0.80	A	2	80	90
Southwest Gas Corporation (NYSE-SWX)	0.75	B++	3	90	90
Spire (NYSE-SR)	0.70	B++	2	80	100
Mean	0.72	A	1.9	83	91

Data Source: *Value Line Investment Survey*, 2017.

Value Line Risk Metrics

Beta

A relative measure of the historical sensitivity of a stock's price to overall fluctuations in the New York Stock Exchange Composite Index. A of 1.50 indicates a stock tends to rise (or fall) 50% more than the New York Stock Exchange Composite Index. The ''coefficient'' is derived from a regression analysis of the relationship between weekly percent-age changes in the price of a stock and weekly percentage changes in the NYSE Index over a period of five years. In the case of shorter price histories, a smaller time period is used, but two years is the minimum. Betas are adjusted for their long-term tendency to converge toward 1.00.

Financial Strength

A relative measure of of the companies reviewed by Value Line. The relative ratings range from A++ (strongest) down to C (weakest).

Safety Rank

A measurement of potential risk associated with individual common stocks. The Safety Rank is computed by averaging two other Value Line indexes the Price Stability Index and the Financial strength Rating. Safety Ranks range from 1 (Highest) to 5 (Lowest). Conservative investors should try to limit their purchases to equities ranked 1 (Highest) and 2 (Above Average) for Safety. .

Earnings Predictability

A measure of the reliability of an earnings forecast. Earnings Predictability is based upon the stability of year-to-year comparisons, with recent years being weighted more heavily that earlier ones. The most reliable forecasts tend to be those with the highest rating (100); the least reliable, the lowest (5). The earnings stability is derived from the standard deviation of percentage changes in quarterly earnbings over an eight-year period. Special adjustments are made for comparisons around zero and from plus to minus.

Stock Price Stability

A measure of the stability of a stock's price It includes sensitivity to the market (see Beta as well as the stock's inherent volatility. Value Line Stability ratings range from 1 (highest) to 5 (lowest).

Source: *Value Line Investment Analyzer* .

Exhibit JRW--5

Louisville Gas & Electric Company
Capital Structure Ratios and Debt Cost Rates

Panel A -LGE's Proposed Capitalization Ratios and Senior Capital Cost Rates

Capital Source	Capitalization Ratio	Cost Rate
Short-Term Debt	3.82%	0.72%
Long-Term Debt	42.91%	4.12%
Common Equity	53.27%	
Total	100.00%	

LGE SCHEDULE J-1.1/J-1.2

Panel B -PPL's Capitalization Ratios

Capital Source	Capitalization Ratio
Short-Term Debt	4.69%
Long-Term Debt	62.12%
Preferred Stock	0.00%
Common Equity	33.19%
Total	100.00%

Source: *Value Line Investment Survey*

Panel C - Electric Proxy Group Average Capitalization Ratios

Capital Source	Capitalization Ratio
Short-Term Debt	5.45%
Long-Term Debt	47.74%
Preferred Stock	0.51%
Common Equity	46.30%
Total	100.00%

Source: *Value Line Investment Survey*

Panel C - Gas Proxy Group Average Capitalization Ratios

Capital Source	Capitalization Ratio
Short-Term Debt	13.54%
Long-Term Debt	39.73%
Preferred Stock	0.00%
Common Equity	46.73%
Total	100.00%

Source: *Value Line Investment Survey*

Panel D - AG's Recommended Capitalization Ratios

Capital Source	LGE's Recommended	Adjustment Factor	OAG Recommended	Cost Rates
Short-Term Debt	3.82%	1.070	4.09%	0.72%
Long-Term Debt	42.91%	1.070	45.91%	4.10%
Common Equity	53.27%	0.939	50.00%	
Total	100.00%		100.00%	

LOUISVILLE GAS AND ELECTRIC COMPANY
CASE NO. 2016-00371
EMBEDDED COST OF LONG-TERM DEBT
THIRTEEN MONTH AVERAGE
FROM JULY 1, 2017 TO JUNE 30, 2018

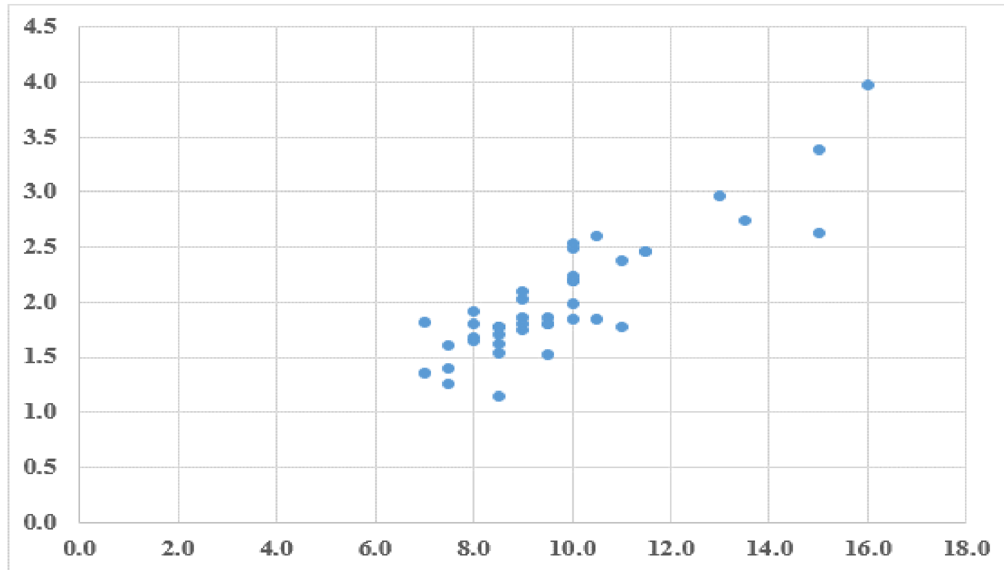
DATA:____BASE PERIOD__X__FORECASTED PERIOD
DATE OF CAPITAL STRUCTURE: 13 MO AVG FOR FORECASTED PERIOD
TYPE OF FILING: __X__ ORIGINAL _____ UPDATED _____ REVISED
WORKPAPER REFERENCE NO(S).:

SCHEDULE J-3
PAGE 3 OF 3
WITNESS: D. K. ARBOUGH

LINE NO.	DEBT ISSUE TYPE	COUPON	DATE ISSUED	MATURITY DA	AVERAGE PRIN	UNAMORT.	UNAMORT. DE	UNAMORT. L	CARRYING VALU	ANNUAL COST INTEREST	AMORT. (I	AMORT. DEE	AMORT. LOS	LETTER O	TOTAL
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H=D+E-F-G)	(I=AxD)	(J)	(K)	(L)	(M)	(N=I+J+K+L+M)
		%			$	$	$	$	$	$	$	$	$	$	$
1	LG&E_PCB Due June 1, 2033	1.25%	Apr. 26, 2007	June 1, 2033	35,200,000		286,605	494,549	34,418,846	440,000		118,359	32,057		590,416
2	LG&E_PCB 4.60% due June 1, 2033	4.60%	Apr. 26, 2007	June 1, 2033	60,000,000		732,934	183,782	59,083,284	2,760,000		47,501	11,913		2,819,415
3	LG&E_PCB Variable due Sep 1, 202	0.97%	Sep. 11, 2001	Sep 1, 2027	10,104,000		199,070		9,904,930	97,630		20,099		30,754	148,483
4	LG&E_PCB Variable due Sep 1, 202	0.64%	Mar. 6, 2002	Sep 1, 2026	22,500,000		86,891	671,193	21,741,916	144,717		9,800	77,384	22,500	254,401
5	LG&E_PCB Variable Series CC due	1.12%	Mar. 6, 2002	Sep 1, 2026	27,500,000		107,616	660,419	26,731,965	307,083		74,121	76,142	-	457,346
6	LG&E_PCB Variable Series DD due	1.37%	Mar. 22, 2002	Nov 1, 2027	35,000,000		73,805	590,571	34,335,623	478,333		70,202	60,013	-	608,549
7	LG&E_PCB Variable Series EE due	1.37%	Mar. 22, 2002	Nov 1, 2027	35,000,000		73,744	588,780	34,337,475	478,333		70,058	59,831	-	608,222
8	LG&E_PCB due Oct 1,2033	1.25%	Nov. 20, 2003	Oct 1,2033	128,000,000		493,257	4,911,908	122,594,834	1,600,000		218,800	313,528	-	2,132,328
9	LG&E_PCB Due May 1, 2027		May 19, 2000	May 1, 2027			-	1,153,032	(1,153,032)	-		-	123,496		123,496
10	LG&E_PCB due Feb 1, 2035	2.20%	Apr. 13, 2005	Feb 1, 2035	40,000,000		119,765	2,077,735	37,802,500	880,000		73,732	125,522		1,079,255
11	LG&E_PCB due June 1, 2033	1.25%	Apr. 26, 2007	June 1, 2033	31,000,000		275,597	475,184	30,249,219	387,500		113,813	30,802		532,115
12	LG&E_PCB due September 1, 2044	0.64%	Sep. 15, 2016	Sep. 1, 2044	125,000,000		847,273	3,717,740	120,434,987	803,984		31,745	240,090	126,736	1,202,554
13	LG&E_FMB due Nov. 15, 2040	5.125%	Nov. 16, 2010	Nov. 15, 2040	285,000,000	(2,364,268)	2,727,536		279,908,196	14,606,250	103,276	119,144			14,828,671
14	LG&E_FMB due Nov 1, 2043	4.65%	Nov. 14, 2013	Nov. 15, 2043	250,000,000	(1,552,413)	2,360,869		246,086,718	11,625,000	59,956	91,179			11,776,134
15	LG&E_FMB due Oct 1, 2025	3.30%	Sep. 28, 2015	Oct 1,2025	300,000,000	(99,878)	1,896,781		298,003,341	9,900,000	12,873	237,370			10,150,244
16	LG&E_FMB due Oct 1, 2045	4.375%	Sep. 28, 2015	Oct 1,2045	250,000,000	(191,853)	2,377,576		247,430,571	10,937,500	6,908	85,610			11,030,018
17	LG&E_2017 Projected Issuance due	2.90%	Sep. 1, 2017	Sep. 1, 2027	192,307,692		1,755,987		190,551,705	6,041,667		179,433			6,221,099
18	Revolving Credit Facility					-	1,855,667	121,791	(1,977,458)	-	-	595,434	40,529	506,944	1,142,906
19	JP Morgan Chase Bank 5.495%			Nov. 1, 2020						4,209,928					4,209,928
20	Morgan Stanley Capital Services 3.657%			Oct. 1, 2033						1,032,472					1,032,472
21	Morgan Stanley Capital Services 3.645%			Oct. 1, 2033						1,028,632					1,028,632
22	Bank of America 3.695%			Oct. 1, 2033						775,721					775,721
23	2013 30-Year - Swap Hedging FMB - 4.65%									(1,433,375)					(1,433,375)
24	2015 10-Year - Swap Hedging FMB -3.30%									1,405,380					1,405,380
25	2015 30-Year - Swap Hedging FMB - 4.375%									986,056					986,056
26	Bank of America Swap payment amortization reduction									(216,339)					(216,339)
27			TOTALS		1,826,611,692	(4,208,411)	16,270,975	15,646,685	1,790,485,621	69,276,473	183,013	2,156,400	1,191,308	686,934	73,494,128
28															
29			**EMBEDDED COST OF LONG-TERM DEBT (N / H)**												**4.10%**

Exhibit JRW--6
Electric Utilities
Panel A

Market-to-Book

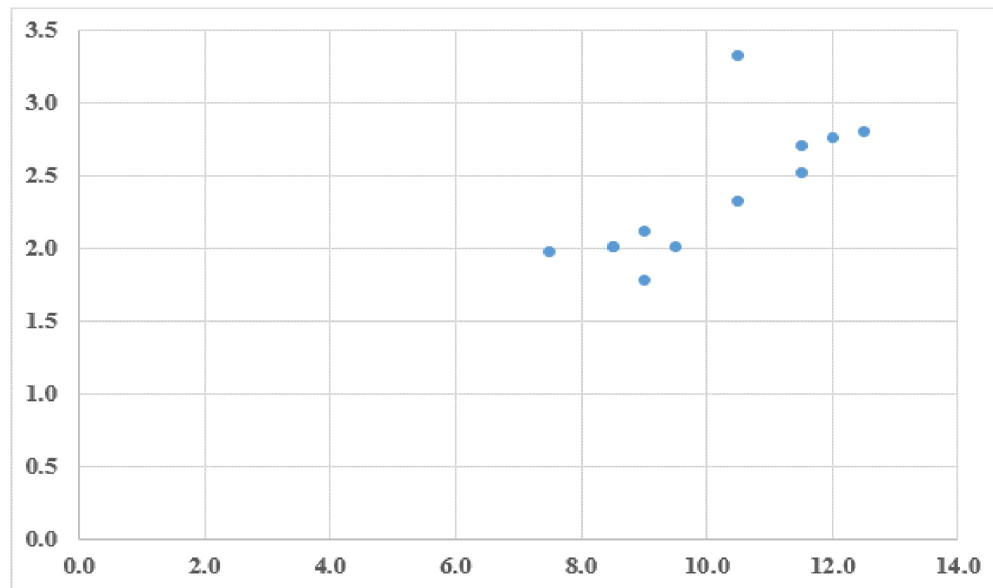


Expected Return on Equity
R-Square = .77, N=42

Source: *Value Line Investment Survey* , 2016.

Panel B
Gas Companies

Market-to-Book

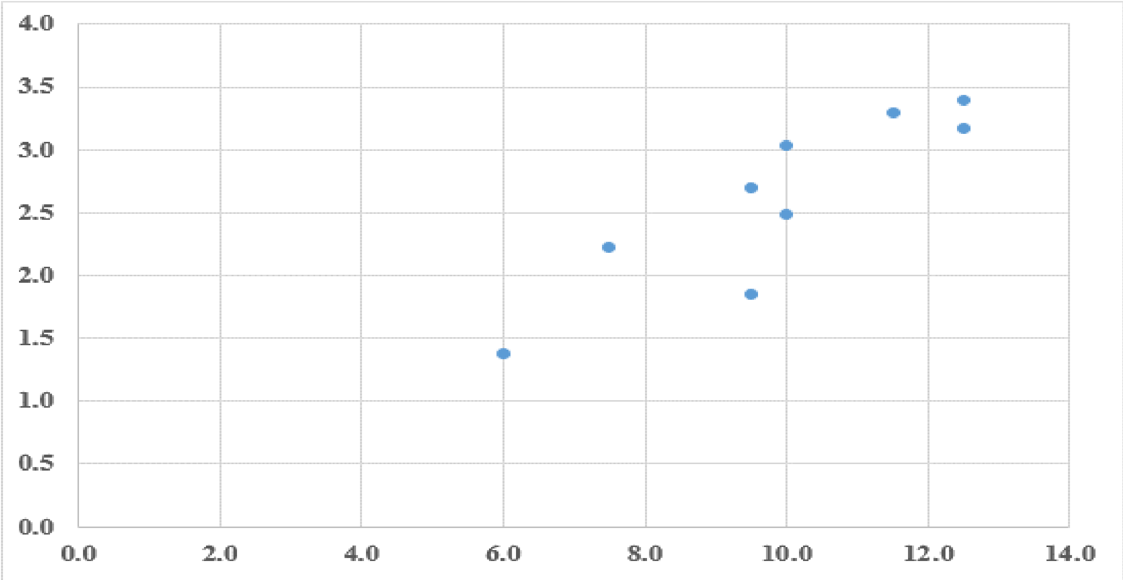


Expected Return on Equity
R-Square = .56, N=12

Source: *Value Line Investment Survey* , 2016.

Exhibit JRW--6
Water Companies
Panel C

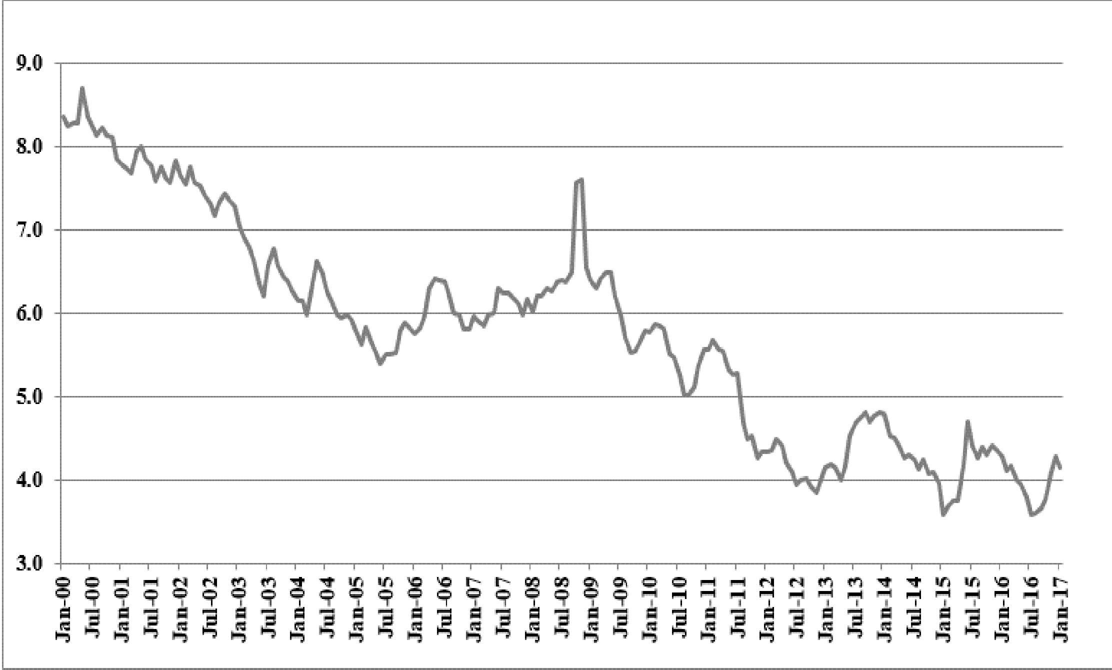
Market-to-Book



Expected Return on Equity
R-Square = .75, N=9

Source: *Value Line Investment Survey*, 2016.

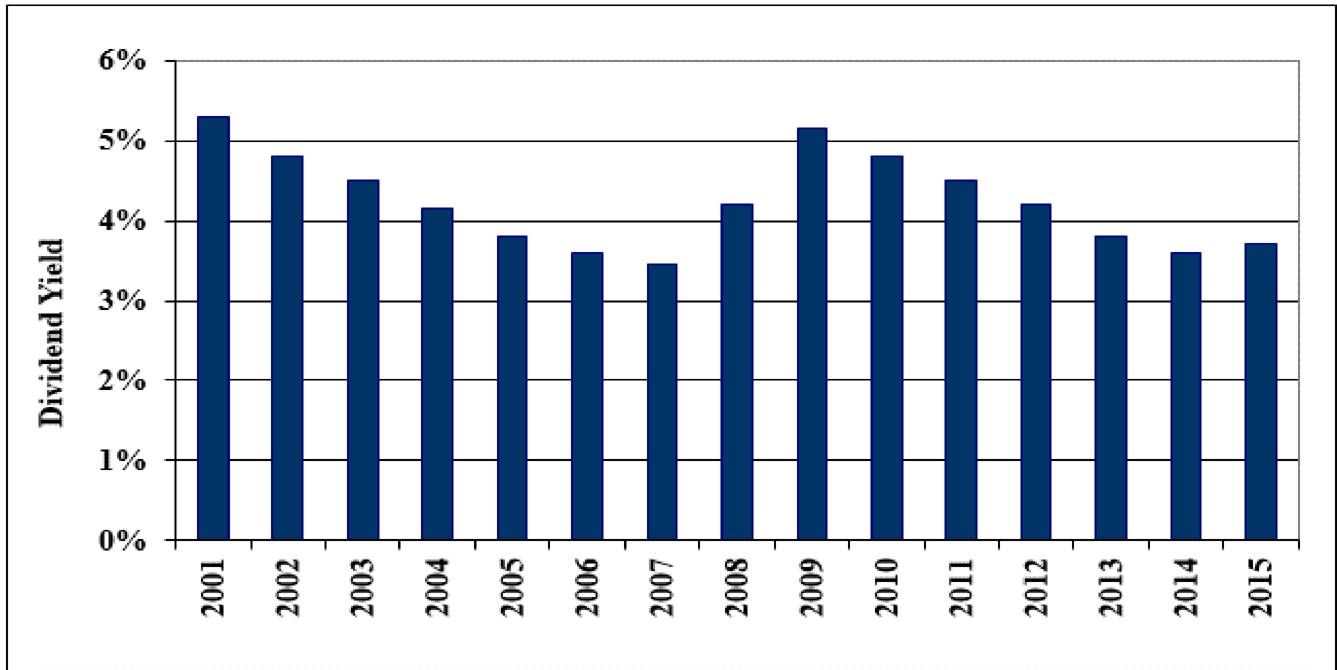
Exhibit JRW--7
Long-Term 'A' Rated Public Utility Bonds



Data Source: Mergent Bond Record

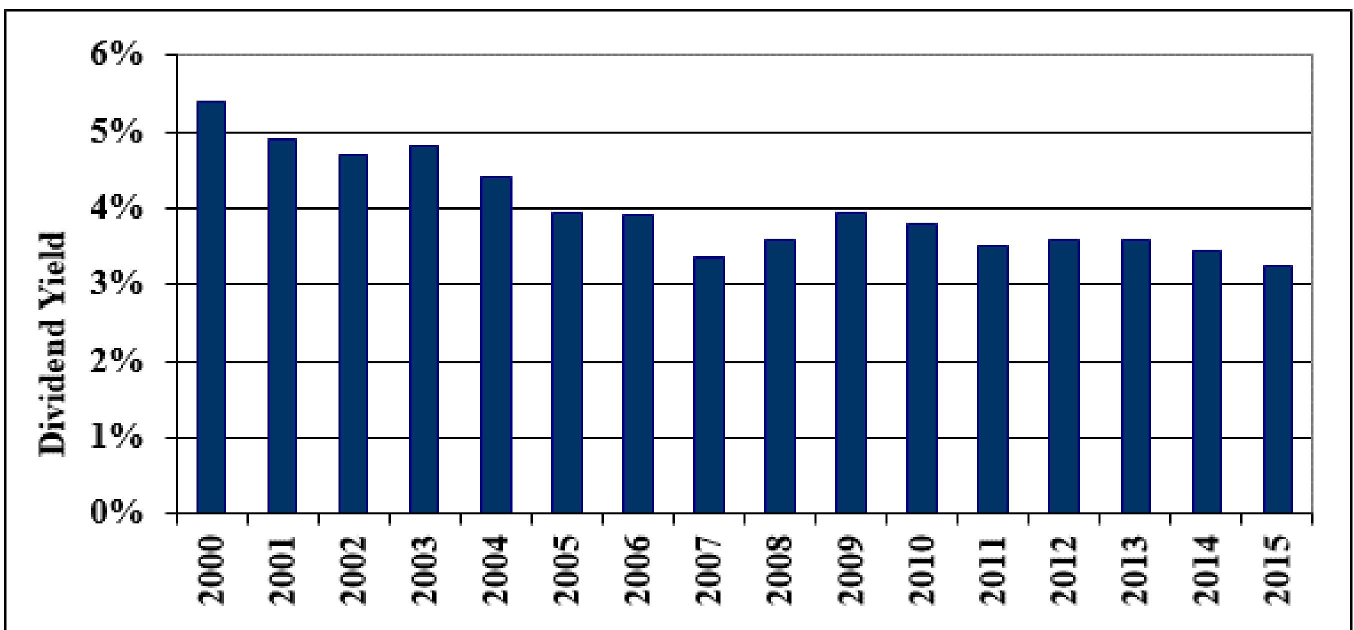
Exhibit JRW--7

Panel A
Electric Utility Average Dividend Yield



Data Source: ***Value Line Investment Survey.***

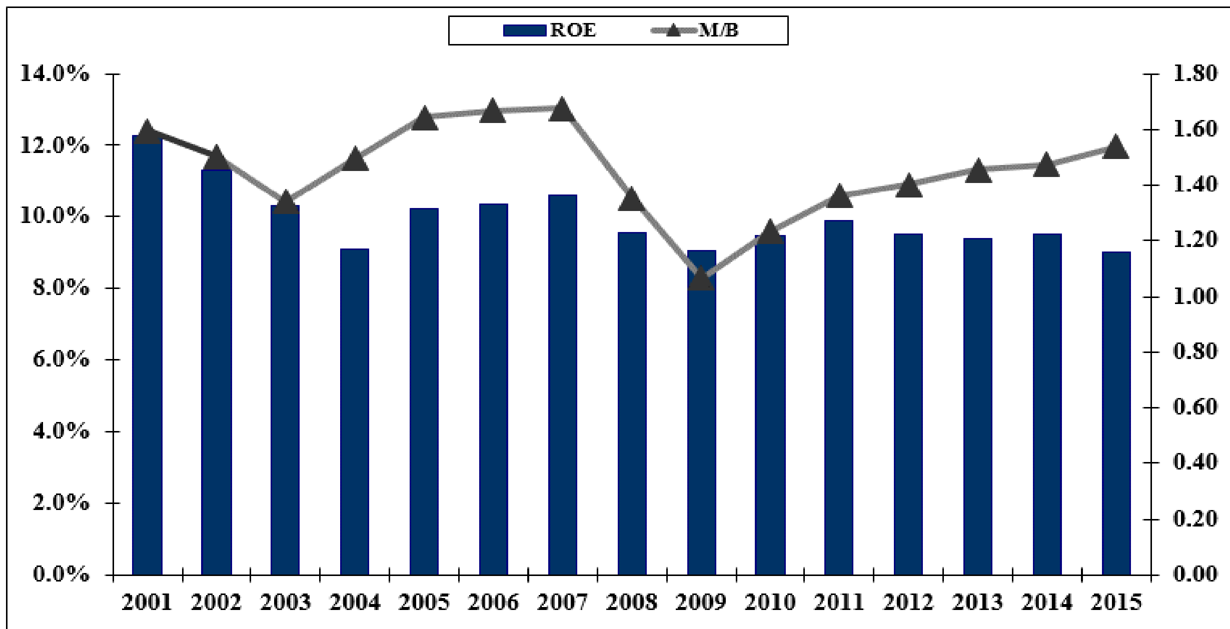
Panel B
Gas Distribution Dividend Yields



Data Source: ***Value Line Investment Survey.***

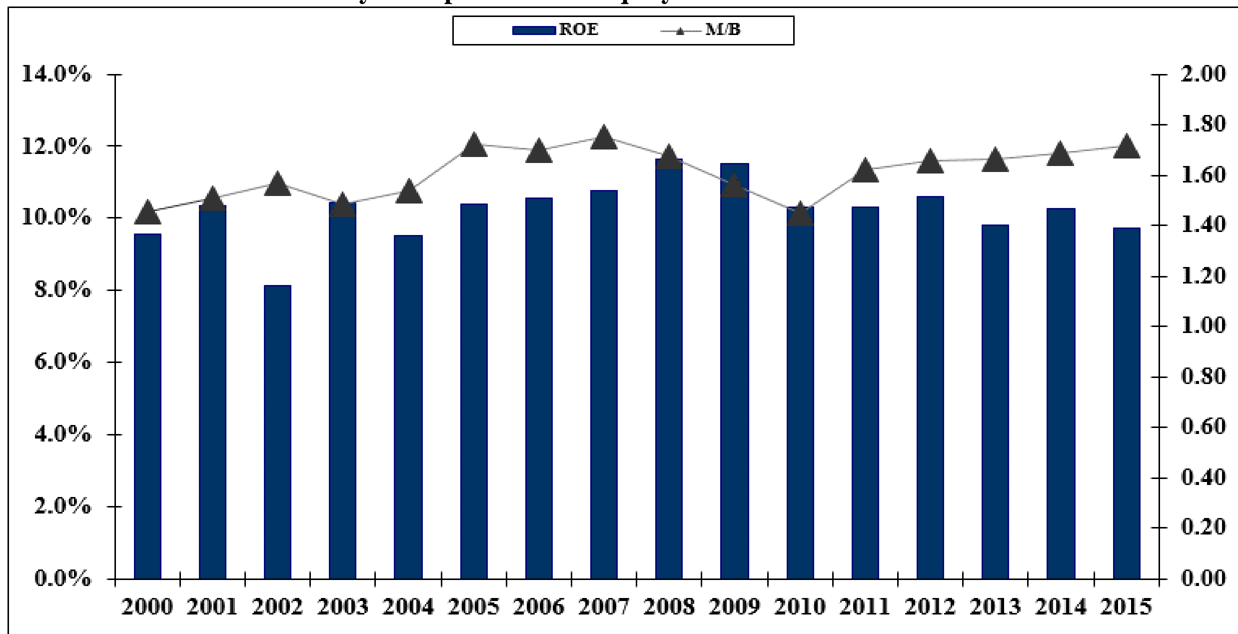
Exhibit JRW--7

Panel A
Electric Utility Average Return on Equity and Market-to-Book Ratios



Data Source: ***Value Line Investment Survey.***

Panel B
Gas Proxy Group Return on Equity and Market-to-Book Ratios



Data Source: ***Value Line Investment Survey.***

Exhibit JRW--8

Industry Average Betas

Industry Name	Beta	Industry Name	Beta	Industry Name	Beta
Petroleum (Producing)	1.67	Newspaper	1.17	Retail (Softlines)	1.02
Natural Gas (Div.)	1.54	E-Commerce	1.16	Telecom. Utility	1.02
Metals & Mining (Div.)	1.53	Air Transport	1.16	Telecom. Services	1.01
Maritime	1.49	Financial Svcs. (Div.)	1.15	IT Services	1.01
Oilfield Svcs/Equip.	1.49	Entertainment	1.15	Healthcare Information	1.00
Steel	1.47	Diversified Co.	1.15	Drug	1.00
Homebuilding	1.41	Computer Software	1.14	Information Services	0.99
Engineering & Const	1.35	Furn/Home Furnishings	1.14	Funeral Services	0.99
Building Materials	1.34	Entertainment Tech	1.14	Retail Store	0.98
Heavy Truck & Equip	1.32	Trucking	1.13	Investment Co.(Foreign)	0.97
Metal Fabricating	1.32	Computers/Peripherals	1.13	Medical Services	0.97
Oil/Gas Distribution	1.31	Publishing	1.13	Med Supp Non-Invasive	0.96
Railroad	1.31	Precision Instrument	1.13	Med Supp Invasive	0.95
Chemical (Diversified)	1.30	Retail (Hardlines)	1.12	Environmental	0.94
Auto Parts	1.28	Paper/Forest Products	1.12	Precious Metals	0.94
Petroleum (Integrated)	1.26	Wireless Networking	1.12	Pharmacy Services	0.93
Insurance (Life)	1.26	Educational Services	1.12	Cable TV	0.92
Pipeline MLPs	1.26	Bank (Midwest)	1.10	R.E.I.T.	0.91
Hotel/Gaming	1.25	Internet	1.10	Beverage	0.90
Electrical Equipment	1.25	Semiconductor Equip	1.10	Thrift	0.89
Chemical (Specialty)	1.24	Retail Building Supply	1.09	Food Processing	0.88
Semiconductor	1.22	Foreign Electronics	1.09	Restaurant	0.88
Power	1.21	Apparel	1.08	Reinsurance	0.87
Telecom. Equipment	1.20	Bank	1.07	Household Products	0.85
Biotechnology	1.20	Advertising	1.07	Insurance (Prop/Cas.)	0.85
Automotive	1.20	Industrial Services	1.07	Investment Co.	0.84
Human Resources	1.20	Recreation	1.06	Retail/Wholesale Food	0.83
Office Equip/Supplies	1.19	Retail Automotive	1.06	Tobacco	0.79
Electronics	1.19	Shoe	1.05	Natural Gas Utility	0.76
Public/Private Equity	1.18	Packaging & Container	1.05	Water Utility	0.73
Machinery	1.17	Aerospace/Defense	1.02	Electric Util. (Central)	0.73
Chemical (Basic)	1.17	Toiletries/Cosmetics	1.02	Electric Utility (West)	0.70
				Electric Utility (East)	0.65

Exhibit JRW--9
DCF Model

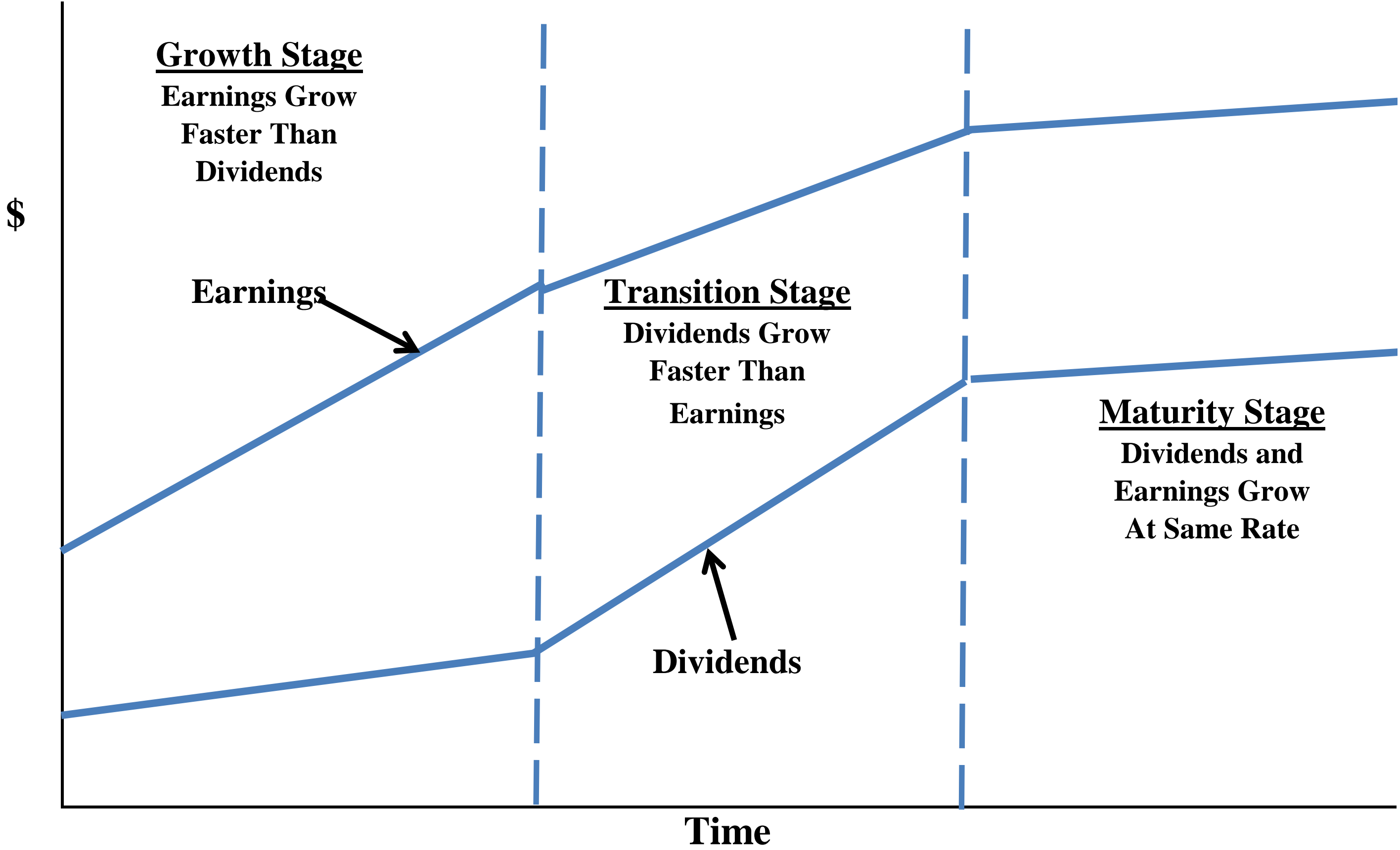


Exhibit JRW--9

DCF Model
Consensus Earnings Estimates
Alliant Energy Corp. (LNT)
www.reuters.com
1/27/2017

Line	Date	# of Estimates	Mean	High	Low
1	Quarter Ending Mar-17	2	0.43	0.45	0.41
2	Quarter Ending Jun-17	2	0.33	0.36	0.30
3	Year Ending Dec-17	9	2.00	2.01	1.97
4	LT Growth Rate (%)	1	6.00	6.00	6.00

Exhibit JRW--10

Louisville Gas & Electric Company
Discounted Cash Flow Analysis

Panel A
Electric Proxy Group

Dividend Yield*	3.45%
Adjustment Factor	1.025
Adjusted Dividend Yield	3.54%
Growth Rate**	5.00%
Equity Cost Rate	8.55%

* Page 2 of Exhibit JRW--10
** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW--10

Panel B
McKenzie Proxy Group

Dividend Yield*	3.45%
Adjustment Factor	1.026875
Adjusted Dividend Yield	3.54%
Growth Rate**	5.38%
Equity Cost Rate	8.90%

* Page 2 of Exhibit JRW--10
** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW--10

Panel C
Gas Proxy Group

Dividend Yield*	2.85%
Adjustment Factor	1.02875
Adjusted Dividend Yield	2.93%
Growth Rate**	5.75%
Equity Cost Rate	8.70%

* Page 2 of Exhibit JRW--10
** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW--10

Exhibit JRW--10

Louisville Gas & Electric Company
Monthly Dividend Yields

Panel A
Electric Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
ALLETE, Inc. (NYSE-ALE)	$ 2.14	3.4%	3.5%	3.5%
Alliant Energy Corporation (NYSE-LNT)	$ 1.26	3.4%	3.4%	3.4%
Ameren Corporation (NYSE-AEE)	$ 1.76	3.4%	3.5%	3.5%
American Electric Power Co. (NYSE-AEP)	$ 2.36	3.8%	3.8%	3.7%
Avista Corporation (NYSE-AVA)	$ 1.37	3.5%	3.4%	3.4%
Black Hills Corporation (NYSE-BKH)	$ 1.68	2.7%	2.8%	2.8%
Consolidated Edison, Inc. (NYSE-ED)	$ 2.76	3.8%	3.8%	3.7%
CMS Energy Corporation (NYSE-CMS)	$ 1.33	3.2%	3.2%	3.2%
Dominion Resources, Inc. (NYSE-D)	$ 3.02	4.0%	4.1%	4.1%
DTE Energy Company (NYSE-DTE)	$ 3.30	3.4%	3.5%	3.5%
Duke Energy Corporation (NYSE-DUK)	$ 3.42	4.4%	4.5%	4.3%
Edison International (NYSE-EIX)	$ 2.17	3.0%	3.1%	3.0%
El Paso Electric Company (NYSE-EE)	$ 1.24	2.7%	2.7%	2.7%
Entergy Corporation (NYSE-ETR)	$ 3.48	4.8%	4.8%	4.7%
Eversource Energy (NYSE-ES)	$ 1.78	3.2%	3.3%	3.3%
FirstEnergy Corporation (NYSE-FE)	$ 1.44	4.7%	4.5%	4.4%
Hawaiian Electric Inductries (NYSE-HEC)	$ 1.24	3.7%	4.0%	4.0%
IDACORP, Inc. (NYSE-IDA)	$ 2.20	2.8%	2.8%	2.9%
MGE Energy, Inc. (NYSE-MGEE)	$ 1.23	1.9%	2.0%	2.1%
NorthWestern Corporation (NYSE-NWE)	$ 2.00	3.5%	3.5%	3.5%
OGE Energy Corp. (NYSE-OGE)	$ 1.21	3.6%	3.8%	3.9%
Otter Tail Corporation (NDQ-OTTR)	$ 1.25	3.2%	3.4%	3.6%
PG&E Corporation (NYSE-PCG)	$ 1.96	3.2%	3.3%	3.2%
Pinnacle West Capital Corp. (NYSE-PNW)	$ 2.62	3.4%	3.5%	3.5%
PNM Resources, Inc. (NYSE-PNM)	$ 0.97	2.9%	3.0%	3.0%
Portland General Electric Company (NYSE-POR)	$ 1.28	3.0%	3.0%	3.0%
PPL Corporation (NYSE-PPL)	$ 1.52	4.4%	4.5%	4.4%
SCANA Corporation (NYSE-SCG)	$ 2.30	3.2%	3.2%	3.2%
Southern Company (NYSE-SO)	$ 2.24	4.6%	4.6%	4.5%
WEC Energy Group (NYSE-WEC)	$ 2.08	3.6%	3.6%	3.5%
Xcel Energy Inc. (NYSE-XEL)	$ 1.36	3.3%	3.4%	3.3%
Mean		3.5%	3.5%	3.5%
Median		3.4%	3.5%	3.5%

Data Sources: http://quote.yahoo.com, January 27, 2017.

Panel B
McKenzie Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
Alliant Energy Corporation (NYSE-LNT)	$ 1.26	3.4%	3.4%	3.4%
Ameren Corporation (NYSE-AEE)	$ 1.76	3.4%	3.5%	3.5%
Avangrid Inc (NYSE-AGR)	$ 1.73	4.5%	4.5%	4.3%
Avista Corporation (NYSE-AVA)	$ 1.37	3.5%	3.4%	3.4%
Black Hills Corporation (NYSE-BKH)	$ 1.68	2.7%	2.8%	2.8%
CenterPoint Energy (NYSE-CNP)	$ 1.07	4.3%	4.5%	4.6%
CMS Energy Corporation (NYSE-CMS)	$ 2.76	3.8%	3.8%	3.7%
Consolidated Edison, Inc. (NYSE-ED)	$ 1.33	3.2%	3.2%	3.2%
DTE Energy Company (NYSE-DTE)	$ 3.30	3.4%	3.5%	3.5%
Entergy Corporation (NYSE-ETR)	$ 3.48	4.8%	4.8%	4.7%
Eversource Energy (NYSE-ES)	$ 1.78	3.2%	3.3%	3.3%
Exelon Corp. (NYSE-EXC)	$ 1.31	3.7%	3.9%	3.8%
NorthWestern Corporation (NYSE-NWE)	$ 2.00	3.5%	3.5%	3.5%
PG&E Corporation (NYSE-PCG)	$ 1.96	3.2%	3.3%	3.2%
PPL Corporation (NYSE-PPL)	$ 1.52	4.4%	4.5%	4.4%
Public Service Enterprise Grp. (NYSE-PEG)	$ 1.64	3.8%	3.9%	3.8%
SCANA Corporation (NYSE-SCG)	$ 2.30	3.2%	3.2%	3.2%
SEMPRA Energy (NYSE-SRE)	$ 3.02	3.0%	3.0%	2.9%
Southern Company (NYSE-SO)	$ 2.24	4.6%	4.6%	4.5%
Vectren Corporation (NYSE-VVC)	$ 1.68	3.2%	3.3%	3.4%
WEC Energy Group (NYSE-WEC)	$ 2.08	3.6%	3.6%	3.5%
Xcel Energy Inc. (NYSE-XEL)	$ 1.36	3.3%	3.4%	3.3%
Mean		3.6%	3.7%	3.6%
Median		3.4%	3.5%	3.5%

Data Sources: http://quote.yahoo.com, January 27, 2017.

Panel C
Gas Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
Atmos Energy Corporation (NYSE-ATO)	$ 1.80	2.4%	2.5%	2.4%
Chesapeake Utilities Corporation (NYSE-CPK)	$ 1.22	1.8%	1.9%	1.9%
New Jersey Resources Corp. (NYSE-NJR)	$ 1.02	2.8%	2.9%	2.9%
NiSource Inc. (NYSE-NI)	$ 0.64	2.9%	2.9%	2.7%
Northwest Natural Gas Co. (NYSE-NWN)	$ 1.88	3.2%	3.2%	3.2%
South Jersey Industries, Inc. (NYSE-SJI)	$ 1.09	3.3%	3.5%	3.6%
Southwest Gas Corporation (NYSE-SWX)	$ 1.80	2.3%	2.5%	2.5%
Spire (NYSE-SR)	$ 2.10	3.3%	3.3%	3.3%
Mean		2.7%	2.8%	2.8%
Median		2.8%	2.9%	2.8%

Data Sources: http://quote.yahoo.com, February 17, 2017.

Exhibit JRW--10

Louisville Gas & Electric Company
DCF Equity Cost Growth Rate Measures
***Value Line* Historic Growth Rates**

Panel A
Electric Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
ALLETE, Inc. (NYSE-ALE)	4.5	9.5	5.5	5.0	2.5	6.0
Alliant Energy Corporation (NYSE-LNT)	6.0	7.0	4.0	7.0	6.5	4.0
Ameren Corporation (NYSE-AEE)	-2.5	-4.5	-0.5	-4.0	-3.0	-3.0
American Electric Power Co. (NYSE-AEP)	2.5	3.0	5.0	3.5	4.0	5.0
Avista Corporation (NYSE-AVA)	7.5	9.5	4.0	4.0	9.0	4.0
Black Hills Corporation (NYSE-BKH)	4.0	2.5	3.0	15.0	2.0	1.5
CMS Energy Corporation (NYSE-CMS)	13.0		2.5	8.5	16.5	4.0
Consolidated Edison, Inc. (NYSE-ED)	3.5	1.0	4.0	3.0	1.5	3.5
Dominion Resources, Inc. (NYSE-D)	5.5	6.5	2.5	1.5	7.0	1.5
DTE Energy Company (NYSE-DTE)	4.5	3.0	4.0	6.5	5.0	4.0
Duke Energy Corporation (NYSE-DUK)				3.0	2.5	3.0
Edison International (NYSE-EIX)	6.5	9.5	6.0	3.5	4.0	1.5
El Paso Electric Company (NYSE-EE)	12.0		8.0	4.0		7.5
Entergy Corporation (NYSE-ETR)	3.0	6.0	3.5	-3.0	1.5	3.5
Eversource Energy (NYSE-ES)	9.5	9.5	6.0	6.0	11.0	9.0
FirstEnergy Corporation (NYSE-FE)	-2.0	-1.0	1.0	-12.0	-7.5	1.5
Hawaiian Electric Inductries (NYSE-HEC)	1.0		1.5	8.5		2.5
IDACORP, Inc. (NYSE-IDA)	9.5	2.5	5.0	8.0	8.0	6.0
MGE Energy, Inc. (NYSE-MGEE)	7.0	2.0	6.0	6.5	2.5	5.5
NorthWestern Corporation (NYSE-NWE)		13.0	4.0	7.0	4.5	7.0
OGE Energy Corp. (NYSE-OGE)	7.5	3.5	8.5	6.5	6.0	8.5
Otter Tail Corporation (NDQ-OTTR)	-0.5	1.0	0.5	15.5	0.5	-3.5
PG&E Corporation (NYSE-PCG)	0.5		7.0	-5.5	1.5	3.5
Pinnacle West Capital Corp. (NYSE-PNW)	4.5	2.5	2.0	8.5	2.0	3.5
PNM Resources, Inc. (NYSE-PNM)	1.0	1.0	1.5	23.5	7.0	3.0
Portland General Electric Company (NYSE-POR)				6.5	2.5	3.0
PPL Corporation (NYSE-PPL)	2.5	5.5	5.5	4.0	1.5	4.0
SCANA Corporation (NYSE-SCG)	3.5	3.5	5.0	4.5	2.5	5.0
Southern Company (NYSE-SO)	3.0	4.0	5.0	3.5	3.5	4.0
WEC Energy Group (NYSE-WEC)	8.5	14.0	7.5	8.0	18.5	7.5
Xcel Energy Inc. (NYSE-XEL)	5.0	4.0	4.5	6.0	4.5	4.5
Mean	4.7	4.7	4.2	5.2	4.4	3.9
Median	4.5	3.5	4.0	6.0	3.5	4.0
Data Source: *Value Line Investment Survey.*	Average of Median Figures =			4.3		

Panel B
McKenzie Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
Alliant Energy Corporation (NYSE-LNT)	6.0	7.0	4.0	7.0	6.5	4.0
Ameren Corporation (NYSE-AEE)	-2.5	-4.5	-0.5	-4.0	-3.0	-3.0
Avangrid (NYSE-AGR)						
Avista Corporation (NYSE-AVA)	7.5	9.5	4.0	4.0	9.0	4.0
Black Hills Corporation (NYSE-BKH)	4.0	2.5	3.0	15.0	2.0	1.5
CenterPoint Energy (NYSE-CNP)	3.5	8.5	8.0	2.0	4.0	7.5
CMS Energy Corporation (NYSE-CMS)	13.0		2.5	8.5	16.5	4.0
Consolidated Edison, Inc. (NYSE-ED)	3.5	1.0	4.0	3.0	1.5	3.5
DTE Energy Company (NYSE-DTE)	4.5	3.0	4.0	6.5	5.0	4.0
Entergy Corporation (NYSE-ETR)	3.0	6.0	3.5	-3.0	1.5	3.5
Eversource Energy (NYSE-ES)	9.5	9.5	6.0	6.0	11.0	9.0
Exelon Corp. (NYSE-EXC)	-2.0	0.5	7.0	-10.5	-9.0	7.5
NorthWestern Corporation (NYSE-NWE)		13.0	4.0	7.0	4.5	7.0
PG&E Corporation (NYSE-PCG)	0.5		7.0	-5.5	1.5	3.5
PPL Corporation (NYSE-PPL)	2.5	5.5	5.5	4.0	1.5	4.0
Public Service Enterprise Grp. (NYSE-PEG)	5.5	3.0	7.5	-0.5	2.5	7.0
SCANA Corporation (NYSE-SCG)	3.5	3.5	5.0	4.5	2.5	5.0
SEMPRA Energy (NYSE-SRE)	3.0	9.5	8.5	1.5	12.0	5.5
Southern Company (NYSE-SO)	3.0	4.0	5.0	3.5	3.5	4.0
Vectren Corporation (NYSE-VVC)	2.5	2.5	3.0	3.5	2.0	2.5
WEC Energy Group (NYSE-WEC)	8.5	14.0	7.5	8.0	18.5	7.5
Xcel Energy Inc. (NYSE-XEL)	5.0	4.0	4.5	6.0	4.5	4.5
Mean	4.2	5.4	4.9	3.2	4.7	4.6
Median	3.5	4.0	4.5	4.0	3.5	4.0
Data Source: *Value Line Investment Survey.*	Average of Median Figures =			3.9		

Panel C
Gas Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
Atmos Energy Corporation (NYSE-ATO)	5.5	2	5	7	2.5	5
Chesapeake Utilities Corporation (NYSE-CPK)	8	3.5	9	10	5	8
New Jersey Resources Corp. (NYSE-NJR)	7.5	7	8	6.5	7	6.5
NiSource Inc. (NYSE-NI)	-1	-0.5	-0.5	3.5	0.5	-1
Northwest Natural Gas Co. (NYSE-NWN)	1	3.5	3	-5	3	2.5
South Jersey Industries, Inc. (NYSE-SJI)	7	9	8	4	9.5	8.5
Southwest Gas Corporation (NYSE-SWX)	8.5	6	5.5	10	9	5.5
Spire (NYSE-SR)	3.5	3	7.5	1.5	3.5	8.5
Mean	5.0	4.2	5.7	4.7	5.0	5.4
Median	6.3	3.5	6.5	5.3	4.3	6.0
Data Source: *Value Line Investment Survey.*	Average of Median Figures =			5.3		

Exhibit JRW--10

Louisville Gas & Electric Company
DCF Equity Cost Growth Rate Measures
***Value Line* Projected Growth Rates**

Panel A
Electric Proxy Group

	Value Line			*Value Line*		
	Projected Growth			Sustainable Growth		
	Est'd. '13-'15 to '19-'21					
Company	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
ALLETE, Inc. (NYSE-ALE)	4.0	3.5	3.5	9.0%	38.0%	3.4%
Alliant Energy Corporation (NYSE-LNT)	6.0	4.5	4.0	12.5%	39.0%	4.9%
Ameren Corporation (NYSE-AEE)	6.0	4.0	3.5	9.5%	37.0%	3.5%
American Electric Power Co. (NYSE-AEP)	5.0	5.0	3.0	10.5%	36.0%	3.8%
Avista Corporation (NYSE-AVA)	3.0	3.0	3.0	8.0%	31.0%	2.5%
Black Hills Corporation (NYSE-BKH)	7.5	6.0	4.5	11.0%	47.0%	5.2%
CMS Energy Corporation (NYSE-CMS)	6.0	6.5	6.5	13.5%	39.0%	5.3%
Consolidated Edison, Inc. (NYSE-ED)	3.0	3.0	3.5	8.5%	35.0%	3.0%
Dominion Resources, Inc. (NYSE-D)	5.5	8.0	2.5	19.0%	13.0%	2.5%
DTE Energy Company (NYSE-DTE)	6.0	6.5	4.5	10.5%	36.0%	3.8%
Duke Energy Corporation (NYSE-DUK)	5.0	3.5	2.0	8.5%	30.0%	2.6%
Edison International (NYSE-EIX)	3.5	10.0	5.0	11.5%	44.0%	5.1%
El Paso Electric Company (NYSE-EE)	4.0	7.0	4.0	9.5%	43.0%	4.1%
Entergy Corporation (NYSE-ETR)	0.5	2.5	2.0	9.5%	33.0%	3.1%
Eversource Energy (NYSE-ES)	7.0	5.5	4.0	10.0%	45.0%	4.5%
FirstEnergy Corporation (NYSE-FE)	5.0	1.0	1.5	8.5%	44.0%	3.7%
Hawaiian Electric Inductries (NYSE-HEC)	4.0	1.0	3.5	9.0%	31.0%	2.8%
IDACORP, Inc. (NYSE-IDA)	3.0	7.5	4.0	9.0%	40.0%	3.6%
MGE Energy, Inc. (NYSE-MGEE)	7.0	4.0	5.0	13.0%	56.0%	7.3%
NorthWestern Corporation (NYSE-NWE)	6.5	5.5	5.0	10.0%	42.0%	4.2%
OGE Energy Corp. (NYSE-OGE)	3.0	9.5	3.5	11.5%	26.0%	3.0%
Otter Tail Corporation (NDQ-OTTR)	6.0	1.5	5.5	10.0%	36.0%	3.6%
PG&E Corporation (NYSE-PCG)	11.0	7.0	4.5	10.0%	38.0%	3.8%
Pinnacle West Capital Corp. (NYSE-PNW)	4.0	5.0	3.5	10.0%	36.0%	3.6%
PNM Resources, Inc. (NYSE-PNM)	9.0	10.0	3.5	9.5%	45.0%	4.3%
Portland General Electric Company (NYSE-POR)	4.0	6.0	3.5	8.5%	38.0%	3.2%
PPL Corporation (NYSE-PPL)	nmf	3.0	nmf	14.0%	34.0%	4.8%
SCANA Corporation (NYSE-SCG)	4.5	4.5	5.0	10.0%	43.0%	4.3%
Southern Company (NYSE-SO)	4.5	3.5	6.0	11.0%	30.0%	3.3%
WEC Energy Group (NYSE-WEC)	6.0	7.0	7.0	11.0%	33.0%	3.6%
Xcel Energy Inc. (NYSE-XEL)	5.5	6.0	4.0	10.5%	36.0%	3.8%
Mean	5.2	5.2	4.0	10.5%	37.2%	3.9%
Median	5.0	5.0	4.0	10.0%	37.0%	3.7%
Average of Median Figures =		4.7			Median =	3.7%

* 'Est'd. '13-'15 to '19-'21' is the estimated growth rate from the base period 2013 to 2015 until the future period 2019 to 2021.
Data Source: *Value Line Investment Survey.*

Panel B
McKenzie Proxy Group

	Value Line			*Value Line*		
	Projected Growth			Sustainable Growth		
	Est'd. '13-'15 to '19-'21					
Company	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
Alliant Energy Corporation (NYSE-LNT)	6.0	4.5	4.0	12.5%	39.0%	4.9%
Ameren Corporation (NYSE-AEE)	6.0	4.0	3.5	9.5%	37.0%	3.5%
Avangrid (NYSE-AGR)				5.0%	32.0%	1.6%
Avista Corporation (NYSE-AVA)	3.0	3.0	3.0	8.0%	31.0%	2.5%
Black Hills Corporation (NYSE-BKH)	7.5	6.0	4.5	11.0%	47.0%	5.2%
CenterPoint Energy (NYSE-CNP)	2.0	4.5	-1.0	15.5%	15.0%	2.3%
CMS Energy Corporation (NYSE-CMS)	6.0	6.5	6.5	13.5%	39.0%	5.3%
Consolidated Edison, Inc. (NYSE-ED)	3.0	3.0	3.5	8.5%	35.0%	3.0%
DTE Energy Company (NYSE-DTE)	6.0	6.5	4.5	10.5%	36.0%	3.8%
Entergy Corporation (NYSE-ETR)	0.5	2.5	2.0	9.5%	33.0%	3.1%
Eversource Energy (NYSE-ES)	7.0	5.5	4.0	10.0%	45.0%	4.5%
Exelon Corp. (NYSE-EXC)	5.0	4.0	4.0	9.5%	51.0%	4.8%
NorthWestern Corporation (NYSE-NWE)	6.5	5.5	5.0	10.0%	42.0%	4.2%
PG&E Corporation (NYSE-PCG)	11.0	7.0	4.5	10.0%	38.0%	3.8%
PPL Corporation (NYSE-PPL)	nmf	3.0	nmf	14.0%	34.0%	4.8%
Public Service Enterprise Grp. (NYSE-PEG)	2.5	5.0	3.5	11.5%	41.0%	4.7%
SCANA Corporation (NYSE-SCG)	4.5	4.5	5.0	10.0%	43.0%	4.3%
SEMPRA Energy (NYSE-SRE)	8.0	7.0	3.5	13.5%	46.0%	6.2%
Southern Company (NYSE-SO)	4.5	3.5	6.0	11.0%	28.0%	3.1%
Vectren Corporation (NYSE-VVC)	9.0	5.0	5.0	13.0%	42.0%	5.5%
WEC Energy Group (NYSE-WEC)	6.0	7.0	7.0	11.0%	33.0%	3.6%
Xcel Energy Inc. (NYSE-XEL)	5.5	6.0	4.0	11.0%	38.0%	4.2%
Mean	5.5	4.9	4.1	10.8%	37.5%	4.0%
Median	6.0	5.0	4.0	10.8%	38.0%	4.2%
Average of Median Figures =		5.0			Median =	4.2%

* 'Est'd. '13-'15 to '19-'21' is the estimated growth rate from the base period 2013 to 2015 until the future period 2019 to 2021.
Data Source: *Value Line Investment Survey.*

Panel C
Gas Proxy Group

	Value Line			*Value Line*		
	Projected Growth			Sustainable Growth		
	Est'd. '13-'15 to '19-'21					
Company	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
Atmos Energy Corporation (NYSE-ATO)	6.5	6.5	3.5	11.5%	48.0%	5.5%
Chesapeake Utilities Corporation (NYSE-CPK)	8.5	6.0	6.5	13.0%	60.0%	7.8%
New Jersey Resources Corp. (NYSE-NJR)	3.0	3.5	7.0	12.0%	50.0%	6.0%
NiSource Inc. (NYSE-NI)	1.5	-2.5	-4.5	11.0%	43.0%	4.7%
Northwest Natural Gas Co. (NYSE-NWN)	7.0	2.0	1.5	10.5%	35.0%	3.7%
South Jersey Industries, Inc. (NYSE-SJI)	3.0	6.5	8.0	8.0%	25.0%	2.0%
Southwest Gas Corporation (NYSE-SWX)	7.0	8.5	4.0	11.5%	48.0%	5.5%
Spire (NYSE-SR)	9.0	3.5	4.5	9.0%	45.0%	4.1%
Mean	5.7	4.3	3.8	10.8%	44.3%	4.9%
Median	6.8	4.8	4.3	11.3%	46.5%	5.1%
Average of Median Figures =		5.3			Median =	5.1%

* 'Est'd. '13-'15 to '19-'21' is the estimated growth rate from the base period 2013 to 2015 until the future period 2019 to 2021.
Data Source: *Value Line Investment Survey.*

Exhibit JRW--10

Louisville Gas & Electric Company
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Panel A
Electric Proxy Group

Company	Yahoo	Reuters	Zacks	Mean
ALLETE, Inc. (NYSE-ALE)	5.0%	5.0%	5.5%	5.2%
Alliant Energy Corporation (NYSE-LNT)	6.0%	6.0%	5.5%	5.8%
Ameren Corporation (NYSE-AEE)	5.9%	5.9%	6.5%	6.1%
American Electric Power Co. (NYSE-AEP)	1.8%	1.5%	5.6%	3.0%
Avista Corporation (NYSE-AVA)	5.7%	NA	5.3%	5.5%
Black Hills Corporation (NYSE-BKH)	8.4%	8.4%	6.2%	7.7%
Consolidated Edison, Inc. (NYSE-ED)	2.0%	2.0%	3.1%	2.4%
CMS Energy Corporation (NYSE-CMS)	7.3%	7.3%	6.0%	6.8%
Dominion Resources, Inc. (NYSE-D)	6.0%	6.0%	5.7%	5.9%
DTE Energy Company (NYSE-DTE)	5.5%	5.5%	5.8%	5.6%
Duke Energy Corporation (NYSE-DUK)	1.8%	2.0%	4.7%	2.8%
Edison International (NYSE-EIX)	1.9%	1.9%	6.3%	3.4%
El Paso Electric Company (NYSE-EE)	6.5%	6.5%	5.5%	6.2%
Entergy Corporation (NYSE-ETR)	-8.2%	-8.2%	-1.4%	-5.9%
Eversource Energy (NYSE-ES)	6.3%	5.8%	6.3%	6.1%
FirstEnergy Corporation (NYSE-FE)	-5.2%	-5.2%	-0.4%	-3.6%
Hawaiian Electric Inductries (NYSE-HEC)	2.8%	2.8%	4.0%	3.2%
IDACORP, Inc. (NYSE-IDA)	4.1%	4.1%	4.4%	4.2%
MGE Energy, Inc. (NYSE-MGEE)	4.0%	NA	NA	4.0%
NorthWestern Corporation (NYSE-NWE)	4.3%	4.3%	5.0%	4.6%
OGE Energy Corp. (NYSE-OGE)	4.0%	4.0%	5.3%	4.4%
Otter Tail Corporation (NDQ-OTTR)	6.0%	NA	NA	6.0%
PG&E Corporation (NYSE-PCG)	5.7%	5.7%	4.0%	5.1%
Pinnacle West Capital Corp. (NYSE-PNW)	5.3%	5.3%	4.9%	5.2%
PNM Resources, Inc. (NYSE-PNM)	6.9%	6.9%	6.5%	6.7%
Portland General Electric Company (NYSE-POR)	6.6%	6.6%	6.1%	6.4%
PPL Corporation (NYSE-PPL)	2.4%	2.4%	3.3%	2.7%
SCANA Corporation (NYSE-SCG)	5.7%	5.6%	5.7%	5.6%
Southern Company (NYSE-SO)	3.1%	3.6%	4.1%	3.6%
WEC Energy Group (NYSE-WEC)	6.7%	6.7%	6.0%	6.5%
Xcel Energy Inc. (NYSE-XEL)	N/A	5.7%	5.4%	5.5%
Mean	4.1%	4.1%	4.9%	4.4%
Median	5.4%	5.4%	5.5%	5.2%

Data Sources: www.reuters.com, www.zacks.com, http://quote.yahoo.com, January 27, 2017.

Panel B
McKenzie Proxy Group

Company	Yahoo	Reuters	Zacks	Mean
Alliant Energy Corporation (NYSE-LNT)	6.0%	6.0%	5.5%	5.8%
Ameren Corporation (NYSE-AEE)	5.9%	5.9%	6.5%	6.1%
Avangrid (NYSE-AGR)	8.0%	NA	8.0%	8.0%
Avista Corporation (NYSE-AVA)	5.7%	NA	5.3%	5.5%
Black Hills Corporation (NYSE-BKH)	8.4%	8.4%	6.2%	7.7%
CenterPoint Energy (NYSE-CNP)	6.6%	6.6%	5.0%	6.1%
Consolidated Edison, Inc. (NYSE-ED)	2.0%	2.0%	3.1%	2.4%
CMS Energy Corporation (NYSE-CMS)	7.3%	7.3%	6.0%	6.8%
DTE Energy Company (NYSE-DTE)	5.5%	5.5%	5.8%	5.6%
Entergy Corporation (NYSE-ETR)	-8.2%	-8.2%	-1.4%	-5.9%
Eversource Energy (NYSE-ES)	6.3%	5.8%	6.3%	6.1%
Exelon Corp. (NYSE-EXC)	6.0%	5.0%	4.3%	5.1%
NorthWestern Corporation (NYSE-NWE)	4.3%	4.3%	5.0%	4.6%
PG&E Corporation (NYSE-PCG)	5.7%	5.7%	4.0%	5.1%
PPL Corporation (NYSE-PPL)	2.4%	2.4%	3.3%	2.7%
Public Service Enterprise Grp. (NYSE-PEG)	1.2%	1.2%	2.4%	1.6%
SCANA Corporation (NYSE-SCG)	5.7%	5.6%	5.7%	5.6%
SEMPRA Energy (NYSE-SRE)	6.5%	7.7%	7.4%	7.2%
Southern Company (NYSE-SO)	3.1%	3.6%	4.1%	3.6%
Vectren Corporation (NYSE-VVC)	4.6%	4.6%	5.3%	4.8%
WEC Energy Group (NYSE-WEC)	6.7%	6.7%	6.0%	6.5%
Xcel Energy Inc. (NYSE-XEL)	N/A	5.7%	5.4%	5.5%
Mean	4.7%	4.6%	5.0%	4.8%
Median	5.7%	5.6%	5.4%	5.6%

Data Sources: www.reuters.com, www.zacks.com, http://quote.yahoo.com, January 27, 2017.

Panel C
Gas Proxy Group

Company	Yahoo	Reuters	Zacks	Mean
Atmos Energy Corporation (NYSE-ATO)	6.9%	6.9%	7.0%	6.9%
Chesapeake Utilities Corporation (NYSE-CPK)	5.8%	NA	6.0%	5.9%
New Jersey Resources Corp. (NYSE-NJR)	6.0%	6.0%	6.0%	6.0%
NiSource Inc. (NYSE-NI)	9.2%	NA	7.2%	8.2%
Northwest Natural Gas Co. (NYSE-NWN)	4.4%	4.4%	4.3%	4.4%
South Jersey Industries, Inc. (NYSE-SJI)	6.0%	NA	10.0%	8.0%
Southwest Gas Corporation (NYSE-SWX)	4.0%	4.0%	4.5%	4.2%
Spire (NYSE-SR)	4.0%	4.0%	4.1%	4.0%
Mean	5.8%	5.1%	6.1%	6.0%
Median	5.9%	4.4%	6.0%	6.0%

Data Sources: www.reuters.com, www.zacks.com, http://quote.yahoo.com, February 17, 2017.

Exhibit JRW--10

Louisville Gas & Electric Company
DCF Growth Rate Indicators

Electric, McKenzie, and Gas Proxy Groups

Growth Rate Indicator	Electric Proxy Group	McKenzie Proxy Group	Gas Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	4.3%	3.9%	5.3%
Projected *Value Line* Growth in EPS, DPS, and BVPS	4.7%	5.0%	5.3%
Sustainable Growth ROE * Retention Rate	3.7%	4.2%	5.1%
Projected EPS Growth from Yahoo, Zacks, and Reuters - Mean/Median	4.4%/5.2%	4.8%/5.6%	6.0%/6.0%

Exhibit JRW--11

Louisville Gas & Electric Company
Capital Asset Pricing Model

Panel A
Electric Proxy Group

Risk-Free Interest Rate	4.00%
Beta*	0.70
Ex Ante Equity Risk Premium**	5.50%
CAPM Cost of Equity	7.9%

* See page 3 of Exhibit JRW--11

** See pages 5 and 6 of Exhibit JRW--11

Panel B
McKenzie Proxy Group

Risk-Free Interest Rate	4.00%
Beta*	0.70
Ex Ante Equity Risk Premium**	5.50%
CAPM Cost of Equity	7.9%

* See page 3 of Exhibit JRW--11

** See pages 5 and 6 of Exhibit JRW--11

Panel C
Gas Proxy Group

Risk-Free Interest Rate	4.00%
Beta*	0.70
Ex Ante Equity Risk Premium**	5.50%
CAPM Cost of Equity	7.9%

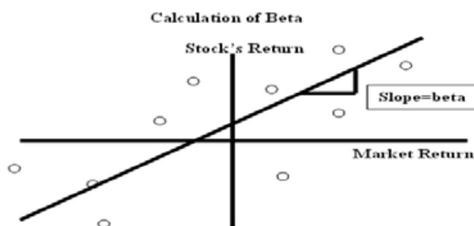
* See page 3 of Exhibit JRW--11

** See pages 5 and 6 of Exhibit JRW--11

Exhibit JRW--11

Thirty-Year U.S. Treasury Yields
2011-2016

Source: Federal Reserve Bank of St. Louis, FRED Database.



Panel A
Electric Proxy Group

Company Name	Beta
ALLETE, Inc. (NYSE-ALE)	0.75
Alliant Energy Corporation (NYSE-LNT)	0.70
Ameren Corporation (NYSE-AEE)	0.65
American Electric Power Co. (NYSE-AEP)	0.65
Avista Corporation (NYSE-AVA)	0.70
Black Hills Corporation (NYSE-BKH)	0.90
CMS Energy Corporation (NYSE-CMS)	0.65
Consolidated Edison, Inc. (NYSE-ED)	0.55
Dominion Resources, Inc. (NYSE-D)	0.70
DTE Energy Company (NYSE-DTE)	0.65
Duke Energy Corporation (NYSE-DUK)	0.60
Edison International (NYSE-EIX)	0.65
El Paso Electric Company (NYSE-EE)	0.70
Entergy Corporation (NYSE-ETR)	0.65
Eversource Energy (NYSE-ES)	0.70
FirstEnergy Corporation (NYSE-FE)	0.65
Hawaiian Electric Inductries (NYSE-HEC)	0.70
IDACORP, Inc. (NYSE-IDA)	0.75
MGE Energy, Inc. (NYSE-MGEE)	0.70
NorthWestern Corporation (NYSE-NWE)	0.70
OGE Energy Corp. (NYSE-OGE)	0.90
Otter Tail Corporation (NDQ-OTTR)	0.85
PG&E Corporation (NYSE-PCG)	0.65
Pinnacle West Capital Corp. (NYSE-PNW)	0.70
PNM Resources, Inc. (NYSE-PNM)	0.75
Portland General Electric Company (NYSE-POR)	0.70
PPL Corporation (NYSE-PPL)	0.70
SCANA Corporation (NYSE-SCG)	0.65
Southern Company (NYSE-SO)	0.55
WEC Energy Group (NYSE-WEC)	0.60
Xcel Energy Inc. (NYSE-XEL)	0.60
Mean	0.69
Median	0.70

Data Source: *Value Line Investment Survey*, 2017.

Panel B
McKenzie Proxy Group

Company Name	Beta
Alliant Energy Corporation (NYSE-LNT)	0.70
Ameren Corporation (NYSE-AEE)	0.70
Avangrid Inc (AGR - NYSE)	
Avista Corporation (NYSE-AVA)	0.70
Black Hills Corporation (NYSE-BKH)	0.85
CenterPoint Energy (NYSE-CNP)	0.85
CMS Energy Corporation (NYSE-CMS)	0.65
Consolidated Edison, Inc. (NYSE-ED)	0.55
DTE Energy Company (NYSE-DTE)	0.65
Entergy Corporation (NYSE-ETR)	0.65
Eversource Energy (NYSE-ES)	0.70
Exelon Corp. (NYSE-EXC)	0.70
NorthWestern Corporation (NYSE-NWE)	0.70
PG&E Corporation (NYSE-PCG)	0.65
PPL Corporation (NYSE-PPL)	0.70
Public Service Enterprise Grp. (NYSE-PEG)	0.70
SCANA Corporation (NYSE-SCG)	0.65
SEMPRA Energy (NYSE-SRE)	0.80
Southern Company (NYSE-SO)	0.55
Vectren Corporation (NYSE-VVC)	0.75
WEC Energy Group (NYSE-WEC)	0.60
Xcel Energy Inc. (NYSE-XEL)	0.60
Mean	0.69
Median	0.70

Data Source: *Value Line Investment Survey*, 2017.

Panel C
Gas Proxy Group

Company	Beta
Atmos Energy Corporation (NYSE-ATO)	0.70
Chesapeake Utilities Corporation (NYSE-CPK)	0.65
New Jersey Resources Corp. (NYSE-NJR)	0.80
NiSource Inc. (NYSE-NI)	nmf
Northwest Natural Gas Co. (NYSE-NWN)	0.65
South Jersey Industries, Inc. (NYSE-SJI)	0.80
Southwest Gas Corporation (NYSE-SWX)	0.75
Spire (NYSE-SR)	0.70
Mean	0.72
Median	0.70

Data Source: *Value Line Investment Survey*, 2017.

Exhibit JRW--11
Risk Premium Approaches

	Historical Ex Post Returns	**Surveys**	**Expected Return Models and Market Data**
Means of Assessing The Market Risk Premium	Historical Average Stock Minus Bond Returns	Surveys of CFOs, Financial Forecasters, Companies, Analysts on Expected Returns and Market Risk Premiums	Use Market Prices and Market Fundamentals (such as Growth Rates) to Compute Expected Returns and Market Risk Premiums
Problems/Debated Issues	Time Variation in Required Returns, Measurement and Time Period Issues, and Biases such as Market and Company Survivorship Bias	Questions Regarding Survey Histories, Responses, and Representativeness Surveys may be Subject to Biases, such as Extrapolation	Assumptions Regarding Expectations, Especially Growth

Source: Adapted from Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management* , (Winter 2003).

Exhibit JRW--8

Capital Asset Pricing Model
Equity Risk Premium

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Median
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2017	1928-2016	Historical Stock Returns - Bond Returns	Arithmetic				6.24%	
					Geometric				4.62%	
	Dimson, Marsh, Staunton	2015	1900-2014	Historical Stock Returns - Bond Returns	Arithmetic					
					Geometric				4.40%	
	Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4.50%	
	Shiller	2006	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				7.00%	
					Geometric				5.50%	
	Siegel	2005	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				6.10%	
					Geometric				4.60%	
	Dimson, Marsh, and Staunton	2006	1900-2005	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
	Goyal & Welch	2006	1872-2004	Historical Stock Returns - Bond Returns					4.77%	
	Median									5.14%
Ex Ante Models (Puzzle Research)										
	Claus Thomas	2001	1985-1998	Abnormal Earnings Model					3.00%	
	Arnott and Bernstein	2002	1810-2001	Fundamentals - Div Yld + Growth					2.40%	
	Constantinides	2002	1872-2000	Historical Returns & Fundamentals - P/D & P/E					6.90%	
	Cornell	1999	1926-1997	Historical Returns & Fundamental GDP/Earnings		3.50%	5.50%	4.50%	4.50%	
	Easton, Taylor, et al	2002	1981-1998	Residual Income Model					5.30%	
	Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2.55%	4.32%		3.44%	
	Harris & Marston	2001	1982-1998	Fundamental DCF with Analysts' EPS Growth					7.14%	
	Best & Byrne	2001								
	McKinsey	2002	1962-2002	Fundamental (P/E, D/P, & Earnings Growth)		3.50%	4.00%		3.75%	
	Siegel	2005	1802-2001	Historical Earnings Yield	Geometric				2.50%	
	Grabowski	2006	1926-2005	Historical and Projected		3.50%	6.00%	4.75%	4.75%	
	Maheu & McCurdy	2006	1885-2003	Historical Excess Returns, Structural Breaks,		4.02%	5.10%	4.56%	4.56%	
	Bostock	2004	1960-2002	Bond Yields, Credit Risk, and Income Volatility		3.90%	1.30%	2.60%	2.60%	
	Bakshi & Chen	2005	1982-1998	Fundamentals - Interest Rates					7.31%	
	Donaldson, Kamstra, & Kramer	2006	1952-2004	Fundamental, Dividend yld., Returns,, & Volatility		3.00%	4.00%	3.50%	3.50%	
	Campbell	2008	1982-2007	Historical & Projections (D/P & Earnings Growth)		4.10%	5.40%		4.75%	
	Best & Byrne	2001	Projection	Fundamentals - Div Yld + Growth					2.00%	
	Fernandez	2007	Projection	Required Equity Risk Premium					4.00%	
	DeLong & Magin	2008	Projection	Earnings Yield - TIPS					3.22%	
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2017	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Damodaran	2017	Projection	Fundamentals - Implied from FCF to Equity Model (Net Cash Yield)					5.10%	
	Social Security									
	Office of Chief Actuary		1900-1995							
	John Campbell	2001	1860-2000	Historical & Projections (D/P & Earnings Growth)	Arithmetic	3.00%	4.00%	3.50%	3.50%	
			Projected for 75 Years		Geometric	1.50%	2.50%	2.00%	2.00%	
	Peter Diamond	2001	Projected for 75 Years	Fundamentals (D/P, GDP Growth)		3.00%	4.80%	3.90%	3.90%	
	John Shoven	2001	Projected for 75 Years	Fundamentals (D/P, P/E, GDP Growth)		3.00%	3.50%	3.25%	3.25%	
	Median									4.00%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2017	10-Year Projection	About 20 Financial Forecastsers					1.90%	
	Duke - CFO Magazine Survey	2016	10-Year Projection	Approximately 500 CFOs					3.47%	
	Welch - Academics	2008	30-Year Projection	Random Academics		5.00%	5.74%	5.37%	5.37%	
	Fernandez - Academics, Analysts, and Compan	2016	Long-Term	Survey of Academics, Analysts, and Companies					5.30%	
	Median									5.30%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Woolridge		2015	Current Supply Model (D/P & Earnings Growth)					4.50%	
	Median									4.12%
Mean										**4.64%**
Median										**4.63%**

Exhibit JRW--8

Capital Asset Pricing Model
Equity Risk Premium

Summary of 2010-16 Equity Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Average
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2017	1928-2016	Historical Stock Returns - Bond Returns	Arithmetic				6.24%	
					Geometric				4.62%	
	Dimson, Marsh, Staunton	2015	1900-2014	Historical Stock Returns - Bond Returns	Arithmetic					
					Geometric				4.40%	
	Median									5.13%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2017	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Damodaran	2017	Projection	Fundamentals - Implied from FCF to Equity Model (Net Cash Yield)					5.10%	
	Median									5.50%
Surveys										
	Duarte & Rosa - NY Fed	2015	Projection	Projections from 29 Models					5.70%	
	Survey of Financial Forecasters	2017	10-Year Projection	About 20 Financial Forecastsers					1.90%	
	Duke - CFO Magazine Survey	2016	10-Year Projection	Approximately 500 CFOs					3.47%	
	Fernandez - Academics, Analysts, and Companies	2016	Long-Term	Survey of Academics, Analysts, and Companies					5.30%	
	Median									4.39%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Woolridge	2015	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				4.50%	
	Median									4.12%
Mean										**4.78%**
Median										**4.76%**

Exhibit JRW--12

Louisville Gas & Electric Company
Company's Proposed Cost of Capital

Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Short-Term Debt	3.82%	0.72%	0.03%
Long-Term Debt	42.91%	4.12%	1.77%
Common Equity	53.27%	10.23%	5.45%
Total	100.00%		7.23%

SUMMARY OF RESULTS

	Average		Midpoint
DCF			
Value Line	9.5%		9.7%
IBES	9.3%		10.2%
Zacks	9.2%		10.4%
Internal br + sv	8.4%		8.9%
CAPM			
Current Bond Yield	9.2%		9.9%
Projected Bond Yield	9.6%		9.9%
Empirical CAPM			
Current Bond Yield	9.8%		10.0%
Projected Bond Yield	10.1%		10.3%
Utility Risk Premium			
Current Bond Yield		10.0%	
Projected Bond Yields		11.1%	
Expected Earnings			
Industry		10.7%	
Proxy Group	11.3%		12.2%
Recommended Cost of Equity Range			
Cost of Equity Range	9.5%	--	10.7%
Flotation Cost Adjustment			
Dividend Yield		3.7%	
Flotation Cost Percentage		3.6%	
Adjustment		0.13%	
Return on Equity			
Range	9.63%	--	10.83%
Midpoint		10.23%	

	Company	Earnings Growth			br+sv	
		V Line	IBES	Zacks	Growth	
1	Alliant Energy	9.1%	9.7%	9.2%	8.1%	
2	Ameren Corp.	9.6%	8.8%	9.7%	7.2%	
3	Avangrid, Inc.	NA	13.2%	13.2%	NA	
4	Avista Corp.	8.4%	8.4%	8.7%	7.1%	
5	Black Hills Corp.	10.5%	9.7%	8.9%	10.7%	
6	CenterPoint Energy	6.6% *	9.9%	10.1%	7.4%	
7	CMS Energy Corp.	9.1%	10.4%	9.7%	8.7%	
8	Consolidated Edison	6.2% *	5.8% *	6.5% *	6.9% *	
9	DTE Energy Co.	9.3%	8.9%	9.1%	7.8%	
10	Entergy Corp.	6.6% *	2.0% *	0.1% *	8.2%	
11	Eversource Energy	9.5%	8.9%	9.5%	7.5%	
12	Exelon Corp.	10.9%	6.5% *	7.5%	9.7%	
13	NorthWestern Corp.	10.1%	8.6%	8.6%	8.2%	
14	PG&E Corp.	15.3% *	9.0%	7.6%	8.4%	
15	PPL Corp.	NA	7.1%	8.2%	9.2%	
16	Pub Sv Enterprise Grp.	7.0%	5.5% *	8.5%	8.8%	
17	SCANA Corp.	7.9%	9.4%	8.8%	8.0%	
18	Sempra Energy	11.0%	10.7%	10.0%	8.8%	
19	Southern Company	8.5%	7.6%	8.4%	8.6%	
20	Vectren Corp.	12.4%	8.4%	8.7%	9.7%	
21	WEC Energy Group	9.5%	10.2%	9.7%	6.9% *	
22	Xcel Energy Inc.	9.0%	8.8%	8.9%	7.7%	
Reported DCF Equity Cost Rates						**Average**
	Average (b)	**9.5%**	**9.3%**	**9.2%**	**8.4%**	
	Midpoint (c)	**9.7%**	**10.2%**	**10.4%**	**8.9%**	
Actual DCF Equity Cost Rates						**Average**
	Average	**9.3%**	**8.5%**	**8.6%**	**8.3%**	**8.7%**
	Median	**9.2%**	**8.8%**	**8.8%**	**8.2%**	**8.8%**

* Color Coded Numbers have been eliminated by Mr. McKenzie.

Growth Rates

GDP, S&P 500 Price, EPS, and DPS

	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS	
1960	543.3	58.11	3.10	1.98	
1961	563.3	71.55	3.37	2.04	
1962	605.1	63.10	3.67	2.15	
1963	638.6	75.02	4.13	2.35	
1964	685.8	84.75	4.76	2.58	
1965	743.7	92.43	5.30	2.83	
1966	815.0	80.33	5.41	2.88	
1967	861.7	96.47	5.46	2.98	
1968	942.5	103.86	5.72	3.04	
1969	1019.9	92.06	6.10	3.24	
1970	1075.9	92.15	5.51	3.19	
1971	1167.8	102.09	5.57	3.16	
1972	1282.4	118.05	6.17	3.19	
1973	1428.5	97.55	7.96	3.61	
1974	1548.8	68.56	9.35	3.72	
1975	1688.9	90.19	7.71	3.73	
1976	1877.6	107.46	9.75	4.22	
1977	2086.0	95.10	10.87	4.86	
1978	2356.6	96.11	11.64	5.18	
1979	2632.1	107.94	14.55	5.97	
1980	2862.5	135.76	14.99	6.44	
1981	3211.0	122.55	15.18	6.83	
1982	3345.0	140.64	13.82	6.93	
1983	3638.1	164.93	13.29	7.12	
1984	4040.7	167.24	16.84	7.83	
1985	4346.7	211.28	15.68	8.20	
1986	4590.2	242.17	14.43	8.19	
1987	4870.2	247.08	16.04	9.17	
1988	5252.6	277.72	24.12	10.22	
1989	5657.7	353.40	24.32	11.73	
1990	5979.6	330.22	22.65	12.35	
1991	6174.0	417.09	19.30	12.97	
1992	6539.3	435.71	20.87	12.64	
1993	6878.7	466.45	26.90	12.69	
1994	7308.8	459.27	31.75	13.36	
1995	7664.1	615.93	37.70	14.17	
1996	8100.2	740.74	40.63	14.89	
1997	8608.5	970.43	44.09	15.52	
1998	9089.2	1229.23	44.27	16.20	
1999	9660.6	1469.25	51.68	16.71	
2000	10284.8	1320.28	56.13	16.27	
2001	10621.8	1148.09	38.85	15.74	
2002	10977.5	879.82	46.04	16.08	
2003	11510.7	1111.91	54.69	17.88	
2004	12274.9	1211.92	67.68	19.41	
2005	13093.7	1248.29	76.45	22.38	
2006	13855.9	1418.30	87.72	25.05	
2007	14477.6	1468.36	82.54	27.73	
2008	14718.6	903.25	65.39	28.05	
2009	14418.7	1115.10	59.65	22.31	
2010	14964.4	1257.64	83.66	23.12	
2011	15517.9	1257.60	97.05	26.02	
2012	16155.3	1426.19	102.47	30.44	
2013	16691.5	1848.36	107.45	36.28	
2014	17393.1	2058.90	113.01	39.44	
2015	18036.6	2043.94	106.32	43.16	
2016	18566.9	2238.83	108.86	45.03	**Average**
Growth Rates	**6.51**	**6.74**	**6.56**	**5.74**	**6.39**

Data Sources: GDPA -http://research.stlouisfed.org/fred2/series/GDPA/downloaddata

Panel A
Historic GDP Growth Rates

10-Year Average		2.97%
20-Year Average		4.23%
30-Year Average		4.77%
40-Year Average		5.90%
50-Year Average		6.45%

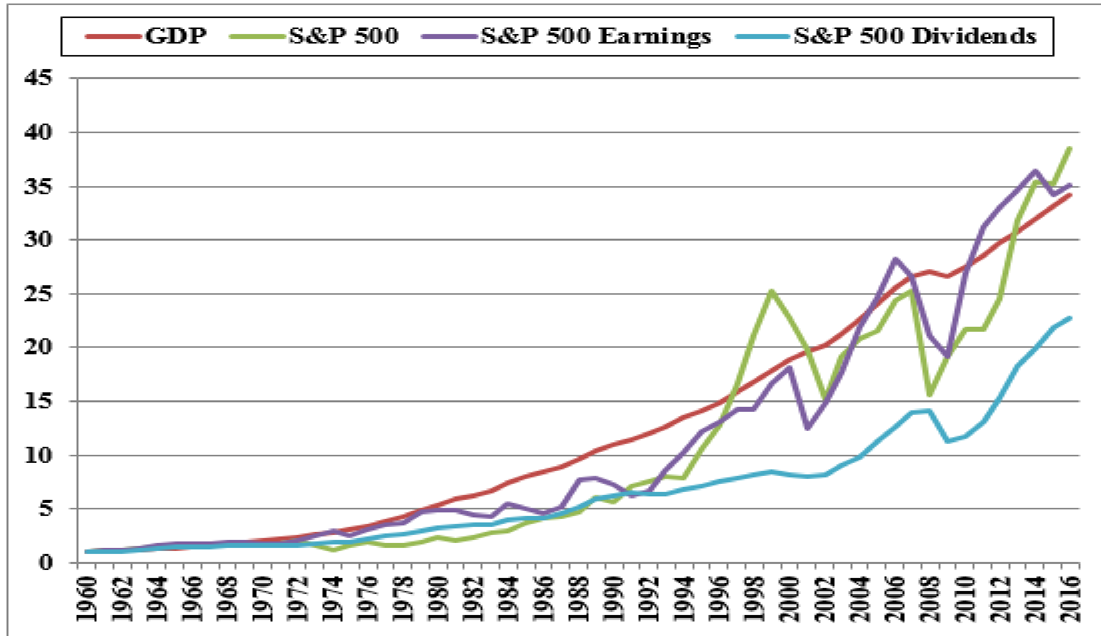
Calculated using GDP data on Page 1 of Exhibit JRW--14

Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	2016-2026	4.1%
Survey of Financial Forecasters	Ten Year	4.7%
Social Security Administration	2016-2090	4.4%
Energy Information Administration	2015-2040	4.3%

Sources:
https://www.cbo.gov/publication/51129
http://www.eia.gov/forecasts/aeo/tables_ref.cfm Table 20
http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters
http://www.ssa.gov/oact/tr/2016/X1_trLOT.html. See Table VI-G4.

Long-Term Growth of GDP, S&P 500, S&P 500 EPS, and S&P 500 DPS



	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS
Growth Rates	6.51%	6.74%	6.56%	5.74%