COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE ELECTRONIC APPLICATION OF DUKE ENERGY KENTUCKY, INC. FOR (1) AN ADJUSTMENT OF THE ELECTRIC RATES; (2) APPROVAL OF AN ENVIRONMENTAL COMPLIANCE PLAN AND SURCHARGE MECHANISM; (3) APPROVAL OF NEW TARIFFS; (4) APPROVAL OF ACCOUNTING PRACTICES TO ESTABLISH REGULATORY ASSETS AND LIABILITIES; AND (5) ALL OTHER REQUIRED APPROVALS AND RELIEF	)	**CASE NO. 2017-00321**

DIRECT TESTIMONY

AND EXHIBITS

OF

RICHARD A. BAUDINO

ON BEHALF OF

OFFICE OF THE ATTORNEY GENERAL

J. KENNEDY AND ASSOCIATES, INC.
ROSWELL, GEORGIA

DECEMBER 29, 2017

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DIRECT TESTIMONY OF RICHARD A. BAUDINO

I. QUALIFICATIONS AND SUMMARY

Q. Please state your name and business address.

A. My name is Richard A. Baudino. My business address is J. Kennedy and Associates, Inc. ("Kennedy and Associates"), 570 Colonial Park Drive, Suite 305, Roswell, Georgia 30075.

Q. What is your occupation and by whom are you employed?

A. I am a consultant with Kennedy and Associates.

Q. Please describe your education and professional experience.

A. I received my Master of Arts degree with a major in Economics and a minor in Statistics from New Mexico State University in 1982. I also received my Bachelor of Arts Degree with majors in Economics and English from New Mexico State in 1979.

I began my professional career with the New Mexico Public Service Commission Staff in October 1982 and was employed there as a Utility Economist. During my employment with the Staff, my responsibilities included the analysis of a broad range of issues in the ratemaking field. Areas in which I testified included cost of service, rate of return, rate design, revenue requirements, analysis of sale/leasebacks of generating plants, utility finance issues, and generating plant phase-ins.

In October 1989, I joined the utility consulting firm of Kennedy and Associates as a Senior Consultant where my duties and responsibilities covered substantially the same areas as those during my tenure with the New Mexico Public Service Commission Staff. I became Manager in July 1992 and was named Director of Consulting in January 1995. Currently, I am a consultant with Kennedy and Associates.

Exhibit No. ___(RAB-1) summarizes my expert testimony experience.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Office of the Attorney General of the Commonwealth of Kentucky (“AG”).

Q. What is the purpose of your Direct Testimony?

A. The purpose of my Direct Testimony is to address the allowed return on equity for the regulated electric operations for Duke Energy of Kentucky, Inc. ("Duke Kentucky", or "Company"). I will also respond to the Direct Testimony of Dr. Roger Morin, witness for Duke Kentucky.

I will also address Duke Kentucky's proposed rider for its proposed Distribution Reliability and Integrity Investment Program ("DCI").

Q. Please summarize your conclusions and recommendations.

A. Based on current financial market conditions, I recommend that the Kentucky Public Service Commission ("KPSC" or "Commission") adopt an 8.80% return on equity for Duke Kentucky in this proceeding. My recommendation is based on the results of a Discounted Cash Flow ("DCF") model analysis. My DCF analysis incorporates my standard approach to estimating the investor required return on equity and includes a proxy group of 19 companies and dividend and earnings growth forecasts from the Value Line Investment Survey, Yahoo! Finance, and Zacks.

I also included two Capital Asset Pricing Model ("CAPM") analyses for additional information. I did not incorporate the results of the CAPM in my recommendation, however the results from the CAPM support my 8.80% ROE recommendation for Duke Kentucky. In fact, my CAPM results are lower than my DCF results.

In Section IV, I respond to the testimony and ROE recommendation of the Company's witness Dr. Morin. I will demonstrate that his recommended ROE of 10.3% overstates the current investor required return for Duke Kentucky. Today's financial environment of low interest rates has been deliberately and methodically supported by Federal Reserve policy actions since 2009. Although the Federal Reserve began to raise short-term interest rates in 2016, both short-term and long-term interest rates

remain low. A 10.3% ROE is simply inconsistent with investor required returns for low-risk utilities like Duke Kentucky.

Finally, in Section V of my Direct Testimony I recommend that the Commission reject the Company's proposed DCI. There are several important policy and practical ratemaking reasons as to why the Commission should reject the DCI.

II. REVIEW OF ECONOMIC AND FINANCIAL CONDITIONS

Q. Mr. Baudino, what has the trend been in long-term capital costs over the last few years?

A. Long-term capital costs as measured by the general level of interest rates in the economy have declined over the last few years. Exhibit No. ___(RAB-2) presents a graphic depiction of the trend in interest rates from January 2008 through November 2017. The interest rates shown in this exhibit are for the 20-year U.S. Treasury Bond and the average public utility bond from the Mergent Bond Record. In January 2008, the average public utility bond yield was 6.08% and the 20-year Treasury Bond yield was 4.35%. As of November 2017, the average public utility bond yield was 3.88%, representing a decline of 220 basis points, or 2.20%, from January 2008. Likewise, the 20-year Treasury bond stood at 2.60% in November 2017, a decline of 1.75% (175 basis points) from January 2008.

Q. Was there a significant change in Federal Reserve policy during the historical period shown in Exhibit No. ___(RAB-2) that affected the general level of interest rates?

A. Yes. In response to the 2007 financial crisis and severe recession that followed in December 2007, the Federal Reserve ("Fed") undertook a series of steps to stabilize the economy, ease credit conditions, and lower unemployment and interest rates. These steps are commonly known as Quantitative Easing ("QE") and were implemented in three distinct stages: QE1, QE2, and QE3. The Fed's stated purpose

of QE was "to support the liquidity of financial institutions and foster improved conditions in financial markets."[1]

QE1 was implemented from November 2008 through approximately March 2010. During this time, the Fed cut its key Federal Funds Rate to nearly 0% and purchased $1.25 trillion of mortgage-backed securities and $175 billion of agency debt purchases.

QE2 was implemented in November 2010 with the Fed announcing that it would purchase an additional $600 billion of Treasury securities by the second quarter of 2011.[2]

Beginning in September 2011, the Fed initiated a "maturity extension program" in which it sold or redeemed $667 billion of shorter-term Treasury securities and used the proceeds to buy longer-term Treasury securities. This program, also known as "Operation Twist," was designed by the Fed to lower long-term interest rates and support the economic recovery.

QE3 began in September 2012 with the Fed announcing an additional bond purchasing program of $40 billion per month of agency mortgage backed securities. The Fed began to pare back its purchases of securities in the last few years. On January 29,

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[1] (http://www.federalreserve.gov/monetarypolicy/bst_crisisresponse.htm).

[2] (http://www.federalreserve.gov/newsevents/press/monetary/20101103a.htm)

2014 the Fed stated that beginning in February 2014 it would reduce its purchases of long-term Treasury securities to $35 billion per month. The Fed continued to reduce these purchases throughout the year and in a press release issued October 29, 2014 announced that it decided to close this asset purchase program in October.[3]

Q. Has the Fed recently indicated any important changes to its monetary policy?

A. Yes. In March 2016, the Fed began to raise its target range for the federal funds rate, increasing it to 1/4% to 1/2% from 0% to 1/4%. The Fed further increased the target range to 1/2% to 3/4% in a press release dated December 14, 2016. On June 14, 2017, the Fed announced a further increase to 1% - 1 ¼%.

On December 13, 2017 the Fed announced yet another increase to the federal funds rate of ¼%. In its announcement, the Fed stated the following:

> Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. Hurricane-related disruptions and rebuilding have affected economic activity, employment, and inflation in recent months but have not materially altered the outlook for the national economy. Consequently, the Committee continues to expect that, with gradual adjustments in the stance of monetary policy, economic activity will expand at a moderate pace and labor market conditions will remain strong. Inflation on a 12-month basis is expected to remain somewhat below 2 percent in the near term but to stabilize around the Committee's 2 percent objective over the medium term. Near-term risks to the economic outlook appear roughly balanced, but the Committee is monitoring inflation developments closely.
>
> In view of realized and expected labor market conditions and inflation, the Committee decided to raise the target range for the federal funds rate to 1-1/4 to 1-1/2 percent. The stance of monetary policy remains accommodative, thereby supporting strong labor market conditions and a sustained return to 2 percent inflation.
>
> In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its objectives of maximum employment and 2 percent inflation.

[3] (http://www.federalreserve.gov/newsevents/press/monetary/20141029a.htm)

This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments. The Committee will carefully monitor actual and expected inflation developments relative to its symmetric inflation goal. *The Committee expects that economic conditions will evolve in a manner that will warrant gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data.* (italics added)[4]

Q. Mr. Baudino, why is it important to understand the Fed's actions since 2008?

A. The Fed's monetary policy actions since 2008 were deliberately undertaken to lower interest rates and support economic recovery. The Fed's actions have been successful in lowering interest rates given that the 20-year Treasury Bond yield in June 2007 was 5.29% and the public utility bond yield was 6.34%. The U.S. economy is currently in a low interest rate environment. As I will demonstrate later in my testimony, low interest rates have also significantly lowered investors' required return on equity for the stocks of regulated utilities.

Q. Are current interest rates indicative of investor expectations regarding the future direction of interest rates?

A. Yes. Securities markets are efficient and most likely reflect investors' expectations about future interest rates. As Dr. Morin pointed out in *New Regulatory Finance:*

> "A considerable body of empirical evidence indicates that U.S. capital markets are efficient with respect to a broad set of information, including historical and publicly available information."[5]

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[4] Federal Reserve press release, December 13, 2017 (https://www.federalreserve.gov/newsevents/pressreleases/monetary20171213a.htm).

[5] Morin, Roger A., *New Regulatory Finance*, Public Utilities Reports, Inc. (2006) at 279.

Dr. Morin also noted the following:

> There is extensive literature concerning the prediction of interest rates. From this evidence, it appears that the no-change model of interest rates frequently provides the most accurate forecasts of future interest rates while at other times, the experts are more accurate. Naïve extrapolations of current interest rates frequently outperform published forecasts. The literature suggests that on balance, the bond market is very efficient in that it is difficult to consistently forecast interest rates with greater accuracy than a no-change model. The latter model provides similar, and in some cases, superior accuracy than professional forecasts.[6]

Despite recent increases in the general level of interest rates since the second half of 2016, the U.S. economy continues to operate in a low interest rate environment. It is important to realize that investor expectations of higher future interest rates, if any, are already embodied in current securities prices, which include debt securities and stock prices.

Moreover, the current low interest rate environment favors lower risk regulated utilities. It would not be advisable for utility regulators to raise ROEs in anticipation of higher interest rates that may or may not occur**.**

Q. How has the increase in interest rates last year affected utility stocks in terms of bond yields and stock prices?

A. Table 1 below tracks movements in the 20-year Treasury bond yield, the Mergent average utility bond yield, and the Dow Jones Utilities Average ("DJUA") from January 2016 through November 2017.

[6] *Ibid* at 172.

TABLE 1

Bond Yields and DJUA

	20-Year Treasury %	Avg. Utility Bond %	DJUA
2016			
January	2.49	4.62	611.35
February	2.20	4.44	620.70
March	2.28	4.40	668.57
April	2.21	4.16	654.44
May	2.22	4.06	659.44
June	2.02	3.93	716.52
July	1.82	3.70	711.42
August	1.89	3.73	666.87
September	2.02	3.80	668.13
October	2.17	3.90	675.23
November	2.54	4.21	632.67
December	2.84	4.39	645.86
2017			
January	2.75	4.24	668.87
February	2.76	4.25	703.16
March	2.83	4.30	697.28
April	2.67	4.19	704.35
May	2.70	4.19	726.62
June	2.54	4.01	706.91
July	2.65	4.06	726.48
August	2.55	3.92	743.24
September	2.53	3.93	723.60
October	2.65	3.97	753.20
November	2.60	3.88	770.39

Table 1 shows that the 20-year Treasury bond yield was slightly higher in November 2017 than it was in January 2016 before the Fed began raising short-term interest rates. However, the yield on the Mergent average public utility bond was substantially lower in November 2017 (3.88%) than in January 2016 (4.62%). Similarly, the DJUA was substantially higher in November 2017 (770.39) than it was in January 2016 (611.35).

I should also add that the Fed's recent increase in the federal funds rate did not significantly affect current long-term interest rates. On December 19, 2017 Moody's Credit Trends reported that the yield on the average utility bond was 3.90%, not significantly different from the yield from November 2017. Likewise, the Federal Reserve reported that the yield on the 20-Year Treasury bond was 2.66% as of December 19, 2017, about the same as the yield in November 2017.

My conclusion from this data is that even though the Federal Reserve has raised short-term interest rates since March 2016, utility bond yields are lower and the DJUA is higher than they were at the beginning of 2016. Utility stocks and bonds have not been adversely affected by the Fed's raising of the federal funds rate.

Q. How does the investment community regard the electric utility industry as a whole?

A. The Value Line Investment Survey's November 17, 2017 summary report on the Electric Utility (East) Industry noted the following regarding interest rates and utility stocks:

> Most electric utility stocks have performed very well in 2017. Price increases of more than 10% are the rule, not the exception. Despite interest-rate increases from the Federal Reserve (and the expectation of more to come), interest rates are still low, by historical standards, and yields on money-market funds, CDs, and savings accounts remain low enough to be unappealing to some income-oriented investors. Electric utility stocks appeal to these accounts thanks to their above-average dividend yields. Indeed, even at a historically low average yield of 3.3%, this figure is still more than a percentage point above the median of all dividend paying issues under our coverage. Another positive factor for stock prices is takeover speculation. Several deals (mostly involving mid-cap utilities) have occurred in recent years. Most stocks in the Electric Utility Industry are trading within their 2020-2022 Target Price Range, and some are above this range.

This Value Line report also provided an updated discussion of electric utilities' involvement with nuclear plants. Value Line singled out Duke Energy, and noted the following:

> Duke Energy, which has utility-owned plants solely, is in the most stable situation, although the company took a modest charge in the third quarter to write off the costs it incurred for a possible new unit.

Q. In 2017, the Edison Electric Institute ("EEI") published its *2016 Financial Review* of the investor-owned electric utility industry. Please summarize EEI's conclusions with respect to credit ratings for the electric utility industry.

A. EEI's report noted the following with respect to the industry's credit ratings:

> "The industry's average credit rating was BBB+ in 2016, remaining for a third straight year above the BBB average that has held since 2004. Ratings activity, at 67 changes, was in line with the industry's annual average of 70 changes per year since 2008. Upgrades were 73.1% of total actions, the third-highest annual figure for upgrades in our dataset. In fact, the last four years have produced the four highest annual upgrade percentages in our historical data. EEI captures upgrades and downgrades at the subsidiary level; multiple actions within a parent holding company are included in the upgrade/downgrade totals. The industry's average credit rating and outlook are based on the unweighted averages of all Standard & Poor's (S&P) parent company ratings and outlooks.
>
> While the industry's average rating was unchanged at BBB+, the underlying data show a modest strengthening. Six companies received upgrades at the parent level while only two were downgraded. Our universe of U.S. "parent" company electric utilities includes a few that are either a subsidiary of an independent power producer, a subsidiary of a foreign-owned company, or that have been acquired by an investment firm; three of the year's upgrades focused on a relationship with that ultimate parent company. Two other upgrades cited a reduced focus on merchant generation and an improved business risk profile. At January 1, 2017, 74.0% of ratings outlooks were "stable", 18.0% were "negative" or "watch-negative", 6.0% were "positive" or "watch-positive", and 2.0% were "developing".

EEI's analysis shows that the investor-owned electric utility industry had strong, stable, and slightly improving credit metrics in 2016.

Q. What are the current credit ratings and bond ratings for Duke Energy Kentucky?

A. Standard and Poor's ("S&P") current credit rating for Duke Kentucky is A- with a stable outlook. Moody's current long-term issuer rating for the Duke Kentucky is Baa1, again with a stable outlook. These credit ratings are relatively consistent with the recent average utility credit rating of BBB+ as reported by EEI. They also show that Duke Kentucky is a strong, investment grade utility company.

Q. Did Duke Energy, the holding company for Duke Kentucky, provide information to its investors that is relevant to the Commission's evaluation of the allowed rate of return for Duke Kentucky?

A. Yes. Please refer to my Exhibit No. ___(RAB-3), which contains excerpts from Duke Energy's presentation entitled *Fall 2017 Investor Meetings.* I obtained this presentation from Duke Energy's web site.

Page 2 of Exhibit No. ___(RAB-3) shows Duke Energy's presentation of its "attractive risk-adjusted total shareholder return" of 8% - 10%. This total return consists of a dividend yield of 4.0% and a growth rate of 4% - 6%. I note that my recommended ROE for Duke Kentucky of 8.80% falls near the middle of this range. Dr. Morin's recommended 10.3% ROE falls just outside the range.

Page 3 of Exhibit No. ___(RAB-3) presents historical adjusted book ROEs. Duke Energy's presentation shows historical ROEs for the Ohio/Kentucky sector of 10.4% - 11.4%, with an expected ROE of 9% - 9.5%.

Finally, page 4 of Exhibit No. ___(RAB-4) shows that Duke Kentucky recently issued long-term debt at rates in the range of 4.11% - 4.26%. These rates are consistent with recent A/Baa bond yields according to data from the Mergent Bond Record.

III. DETERMINATION OF FAIR RATE OF RETURN

Q. Please describe the methods you employed in estimating a fair rate of return for Duke Kentucky.

A. I employed a Discounted Cash Flow ("DCF") analysis using a proxy group of regulated electric utilities. My DCF analysis is my standard constant growth form of the model that employs four different growth rate forecasts from the Value Line Investment Survey, Yahoo! Finance, and Zacks. I also employed Capital Asset Pricing Model ("CAPM") analyses using both historical and forward-looking data. Although I did not rely on the CAPM for my recommended 8.80% ROE for Duke Kentucky, the CAPM provides an alternative approach to estimating the ROE for the Company, albeit a less reliable one.

Q. What are the main guidelines to which you adhere in estimating the cost of equity for a firm?

A. Generally speaking, the estimated cost of equity should be comparable to the returns of other firms with similar risk structures and should be sufficient for the firm to attract capital. These are the basic standards set out by the United States Supreme Court in Federal Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944) and Bluefield W.W. & Improv. Co. v. Public Service Comm'n, 262 U.S. 679 (1922).

From an economist's perspective, the notion of "opportunity cost" plays a vital role in estimating the return on equity. One measures the opportunity cost of an investment

equal to what one would have obtained in the next best alternative. For example, let us suppose that an investor decides to purchase the stock of a publicly traded electric utility. That investor made the decision based on the expectation of dividend payments and perhaps some appreciation in the stock's value over time; however, that investor's opportunity cost is measured by what she or he could have invested in as the next best alternative. That alternative could have been another utility stock, a utility bond, a mutual fund, a money market fund, or any other number of investment vehicles.

The key determinant in deciding whether to invest, however, is based on comparative levels of risk. Our hypothetical investor would not invest in a particular electric company stock if it offered a return lower than other investments of similar risk. The opportunity cost simply would not justify such an investment. Thus, the task for the rate of return analyst is to estimate a return that is equal to the return being offered by other risk-comparable firms.

Q. What are the major types of risk faced by utility companies?

A. In general, risk associated with the holding of common stock can be separated into three major categories: business risk, financial risk, and liquidity risk. Business risk refers to risks inherent in the operation of the business. Volatility of the firm's sales, long-term demand for its product(s), the amount of operating leverage, and quality of management are all factors that affect business risk. The quality of regulation at the state and federal levels also plays an important role in business risk for regulated utility companies.

Financial risk refers to the impact on a firm's future cash flows from the use of debt in the capital structure. Interest payments to bondholders represent a prior call on the firm's cash flows and must be met before income is available to the common shareholders. Additional debt means additional variability in the firm's earnings, leading to additional risk.

Liquidity risk refers to the ability of an investor to quickly sell an investment without a substantial price concession. The easier it is for an investor to sell an investment for cash, the lower the liquidity risk will be. Stock markets, such as the New York and American Stock Exchanges, help ease liquidity risk substantially. Investors who own stocks that are traded in these markets know on a daily basis what the market prices of their investments are and that they can sell these investments fairly quickly. Many electric utility stocks are traded on the New York Stock Exchange and are considered liquid investments.

Q. Are there any sources available to investors that quantify the total risk of a company?

A. Bond and credit ratings are tools that investors use to assess the risk comparability of firms. Bond rating agencies such as Moody's and Standard and Poor's perform detailed analyses of factors that contribute to the risk of an investment. The result of their analyses is a bond and/or credit rating that reflect these risks.

<u>Discounted Cash Flow ("DCF") Model</u>

Q. Please describe the basic DCF approach.

A. The basic DCF approach is rooted in valuation theory. It is based on the premise that the value of a financial asset is determined by its ability to generate future net cash flows. In the case of a common stock, those future cash flows generally take the form of dividends and appreciation in stock price. The value of the stock to investors is the discounted present value of future cash flows. The general equation then is:

$$V = \frac{R}{(1+r)} + \frac{R}{(1+r)^2} + \frac{R}{(1+r)^3} + \cdots \frac{R}{(1+r)^n}$$

Where: *V = asset value*
R = yearly cash flows
r = discount rate

This is no different from determining the value of any asset from an economic point of view; however, the commonly employed DCF model makes certain simplifying assumptions. One is that the stream of income from the equity share is assumed to be perpetual; that is, there is no salvage or residual value at the end of some maturity date (as is the case with a bond). Another important assumption is that financial markets are reasonably efficient; that is, they correctly evaluate the cash flows relative to the appropriate discount rate, thus rendering the stock price efficient relative to other alternatives. Finally, the model I typically employ also assumes a constant growth rate in dividends. The fundamental relationship employed in the DCF method is described by the formula:

$$k = {}^{D_1}/_{P_0} + g$$

Where: *D_1 = the next period dividend*
P_0 = current stock price
g = expected growth rate
k = investor-required return

Under the formula, it is apparent that "k" must reflect the investors' expected return. Use of the DCF method to determine an investor-required return is complicated by the

need to express investors' expectations relative to dividends, earnings, and book value over an infinite time horizon. Financial theory suggests that stockholders purchase common stock on the assumption that there will be some change in the rate of dividend payments over time. We assume that the rate of growth in dividends is constant over the assumed time horizon, but the model could easily handle varying growth rates if we knew what they were. Finally, the relevant time frame is prospective rather than retrospective.

Q. What was your first step in conducting your DCF analysis for Duke Kentucky?

A. My first step was to construct a proxy group of companies with a risk profile that is reasonably similar to Duke Kentucky. Since the Company is a subsidiary of Duke Energy, it does not have publicly traded stock. Thus, one cannot estimate a DCF cost of equity on Duke Kentucky directly. It is necessary to use a group of companies that are similarly situated and have reasonably similar risk profiles to the Company.

Q. Please describe your approach for selecting a group of electric companies.

A. For purposes of this case, I relied on the proxy group of companies that Dr. Morin used for his ROE analysis. Dr. Morin discussed his selection criteria on pages 28 through 29 of his Direct Testimony. The main criteria include:

- Companies designated as combination gas and electric utilities by AUS Utility Reports that are also covered by Value Line.
- Elimination of private companies, private partnerships, non-dividend paying companies, and companies that were below investment grade.
- Elimination of companies with less that $1 billion of market capitalization.

Dr. Morin also explained his reasons for eliminating six additional companies on page 29, including companies engaged in recent or ongoing merger activities.

Since the filing of Dr. Morin's testimony, there have been significant events affecting several companies in the proxy group that now warrant their exclusion. First, Avista Corp. announced an agreement for its acquisition by Hydro One, a Canadian company. Thus, Avista should be eliminated from the proxy group. Second, on December 21, 2017 PG&E Corp. announced that it was eliminating its common and preferred stock dividends due to concerns regarding liability connected with California wildfires. PG&E's stock price has plummeted in the last few months as well. Therefore, PG&E Corp. should also be eliminated from the proxy group. Third, SCANA's stock price has fallen significantly over the last few months due to substantial concerns surrounding this company's cancellation of the Summer nuclear power plant. Value Line noted that SCANA's stock price fell 30% since this announced cancellation. Given this substantial change in SCANA's corporate outlook, it should be excluded from the proxy group. Finally, Sempra Energy announced a $9.45 billion acquisition of Oncor in October 2017. This acquisition will significantly affect the stock price and earnings growth for Sempra going forward. Therefore, Sempra should also be excluded from the proxy group.

The resulting proxy group of 19 companies that I used in my analysis is shown in Table 2 below.

TABLE 2

Proxy Group

1	Alliant Energy
2	Ameren Corp.
3	Black Hills
4	CenterPoint Energy
5	Chesapeake Utilities
6	CMS Energy Corp.
7	Consolidated Edison
8	Dominion Energy
9	DTE Energy Co.
10	Duke Energy Corp.
11	Eversource Energy
12	Exelon Corp.
13	Fortis
14	MGE Energy
15	NorthWestern Corp.
16	Pub Sv Enterprise Grp.
17	Vectren Corp.
18	WEC Energy Group
19	Xcel Energy Inc.

Q. What was your first step in determining the DCF return on equity for the comparison group?

A. I first determined the current dividend yield, D_1/P_0, from the basic equation. My general practice is to use six months as the most reasonable period over which to determine the dividend yield. The six-month period I used covered the months from June through November 2017. I obtained historical prices and dividends from Yahoo! Finance. The annualized dividend divided by the average monthly price represents the average dividend yield for each month in the period.

The resulting average dividend yield for the comparison group is 3.11%. These calculations are shown in Exhibit No. ___(RAB-4).

Q. Having established the average dividend yield, how did you determine the investors' expected growth rate for the electric comparison group?

A. The investors' expected growth rate, in theory, correctly forecasts the constant rate of growth in dividends. The dividend growth rate is a function of earnings growth and the payout ratio, neither of which is known precisely for the future. We refer to a perpetual growth rate since the DCF model has no arbitrary cut-off point. We must estimate the investors' expected growth rate because there is no way to know with absolute certainty what investors expect the growth rate to be in the short term, much less in perpetuity.

For my analysis in this proceeding, I used three major sources of analysts' forecasts for growth. These sources are The Value Line Investment Survey, Zacks, and Yahoo! Finance. This is the method I typically use for estimating growth for my DCF calculations.

Q. Please briefly describe Value Line, Zacks, and IBES.

A. The Value Line Investment Survey is a widely used and respected source of investor information that covers approximately 1,700 companies in its Standard Edition and several thousand in its Plus Edition. It is updated quarterly and probably represents the most comprehensive of all investment information services. It provides both historical and forecasted information on a number of important data elements. Value Line neither participates in financial markets as a broker nor works for the utility industry in any capacity of which I am aware.

Zacks gathers opinions from a variety of analysts on earnings growth forecasts for numerous firms including regulated electric utilities. The estimates of the analysts responding are combined to produce consensus average estimates of earnings growth. I obtained Zacks' earnings growth forecasts from its web site. Like Zacks, Yahoo! Finance also compiles and reports consensus analysts' forecasts of earnings growth.

Q. Why did you rely on analysts' forecasts in your analysis?

A. Return on equity analysis is a forward-looking process. Five-year or ten-year historical growth rates may not accurately represent investor expectations for future dividend growth. Analysts' forecasts for earnings and dividend growth provide better proxies for the expected growth component in the DCF model than historical growth rates. Analysts' forecasts are also widely available to investors and one can reasonably assume that they influence investor expectations. In this respect, I agree with Dr. Morin.

Q. Please explain how you used analysts' dividend and earnings growth forecasts in your constant growth DCF analysis.

Q. Columns (1) through (5) of Exhibit No. ____(RAB-5), page 1, shows the forecasted dividend, earnings, and retention growth rates from Value Line and the earnings growth forecasts from Yahoo! Finance and Zacks. In my analysis, I used four of these growth rates: dividend and earnings growth from Value Line and earnings growth from Zacks and Yahoo! Finance. It is important to include dividend growth forecasts in the DCF model since the model calls for forecasted cash flows. Value Line is the only source of which I am aware that forecasts dividend growth and my approach gives this forecast equal weight with each of the three earnings growth forecasts.

I note that I used MGE Energy's Yahoo! Finance earnings forecast as a substitute for Zacks, which did not have an available estimate for MGE Energy. I also used Zacks' earnings forecasts as substitutes for the Yahoo! Finance forecasts for Fortis and Xcel Energy, which were not available.

Q. How did you proceed to determine the DCF return of equity for the proxy group?

A. To estimate the expected dividend yield (D_1), the current dividend yield must be moved forward in time to account for dividend increases over the next twelve months. I estimated the expected dividend yield by multiplying the current dividend yield by one plus one-half the expected growth rate.

Exhibit No. ___(RAB-5), page 2, presents my standard method of calculating dividend yields, growth rates, and return on equity for the comparison group of companies. The DCF Return on Equity Calculation section shows the application of each of four growth rates to the current group dividend yield of 3.11% to calculate the expected dividend yield for the group of 3.20%. I then added the expected growth rates to the expected dividend yield. In evaluating investor expected growth rates, I use both the average and the median values for the comparison group under consideration.

Q. What are the results of your constant growth DCF model?

A. For Method 1 (average growth rates), the results range from 8.07% to 9.16%, with the average of these results being 8.49%. For Method 2 (median growth rates), the results range from 8.19% to 9.21%, with the average of these results being 8.64%.

Capital Asset Pricing Model

Q. Briefly summarize the Capital Asset Pricing Model ("CAPM") approach.

A. The theory underlying the CAPM approach is that investors, through diversified portfolios, may combine assets to minimize the total risk of the portfolio. Diversification allows investors to diversify away all risks specific to a particular company and be left only with market risk that affects all companies. Thus, the CAPM theory identifies two types of risks for a security: company-specific risk and market risk. Company-specific risk includes such events as strikes, management errors, marketing failures, lawsuits, and other events that are unique to a particular firm. Market risk includes inflation, business cycles, war, variations in interest rates, and changes in consumer confidence. Market risk tends to affect all stocks and cannot be diversified away. The idea behind the CAPM is that diversified investors are rewarded with returns based on market risk.

Within the CAPM framework, the expected return on a security is equal to the risk-free rate of return plus a risk premium that is proportional to the security's market, or non-diversifiable, risk. Beta is the factor that reflects the inherent market risk of a security and measures the volatility of a particular security relative to the overall market for securities. For example, a stock with a beta of 1.0 indicates that if the market rises by 15%, that stock will also rise by 15%. This stock moves in tandem with movements in the overall market. Stocks with a beta of 0.5 will only rise or fall 50% as much as the overall market. So with an increase in the market of 15%, this stock will only rise 7.5%. Stocks with betas greater than 1.0 will rise and fall more

than the overall market. Thus, beta is the measure of the relative risk of individual securities vis-à-vis the market.

Based on the foregoing discussion, the equation for determining the return for a security in the CAPM framework is:

$$K = Rf + \beta(MRP)$$

Where: K = *Required Return on equity*
Rf = *Risk-free rate*
MRP = *Market risk premium*
β = *Beta*

This equation tells us about the risk/return relationship posited by the CAPM. Investors are risk averse and will only accept higher risk if they expect to receive higher returns. These returns can be determined in relation to a stock's beta and the market risk premium. The general level of risk aversion in the economy determines the market risk premium. If the risk-free rate of return is 3.0% and the required return on the total market is 15%, then the risk premium is 12%. Any stock's required return can be determined by multiplying its beta by the market risk premium. Stocks with betas greater than 1.0 are considered riskier than the overall market and will have higher required returns. Conversely, stocks with betas less than 1.0 will have required returns lower than the market.

Q. In general, are there concerns regarding the use of the CAPM in estimating the return on equity?

A. Yes. There is some controversy surrounding the use of the CAPM.[7] There is evidence that beta is not the primary factor for determining the risk of a security. For example, Value Line's "Safety Rank" is a measure of total risk, not its calculated beta coefficient. Beta coefficients usually describe only a small amount of total investment risk.

There is also substantial judgment involved in estimating the required market return. In theory, the CAPM requires an estimate of the return on the total market for investments, including stocks, bonds, real estate, etc. It is nearly impossible for the analyst to estimate such a broad-based return. Often in utility cases, a market return is estimated using the S&P 500 or the return on Value Line's stock market composite. However, these are limited sources of information with respect to estimating the investor's required return for all investments. In practice, the total market return estimate faces significant limitations to its estimation and, ultimately, its usefulness in quantifying the investor required ROE.

In the final analysis, a considerable amount of judgment must be employed in determining the risk-free rate and market return portions of the CAPM equation. The analyst's application of judgment can significantly influence the results obtained from the CAPM. My experience with the CAPM indicates that it is prudent to use a wide variety of data in estimating investor-required returns. Of course, the range of results

[7] For a more complete discussion of some of the controversy surrounding the use of the CAPM, refer to *A Random Walk Down Wall Street* by Burton Malkiel, pp. 206 - 211, 2007 edition.

may also vary widely, which underscores the difficulty in obtaining a reliable estimate from the CAPM.

Q. How did you estimate the market return portion of the CAPM?

A. The first source I used was the Value Line Investment Analyzer, Plus Edition, for November 30, 2017. This edition covers several thousand stocks. The Value Line Investment Analyzer provides a summary statistical report detailing, among other things, forecasted growth rates for earnings and book value for the companies Value Line follows as well as the projected total annual return over the next 3 to 5 years. I present these growth rates and Value Line's projected annual return on page 2 of Exhibit No. ___(RAB-6). I included median earnings and book value growth rates. The estimated market returns using Value Line's market data range from 8.80% to 9.90%. The average of these market returns is 9.35%.

Q. Why did you use median growth rate estimates rather than the average growth rate estimates for the Value Line companies?

A. Using median growth rates is likely a more accurate method of estimating the central tendency of Value Line's large data set compared to the average growth rates. Average earnings and book value growth rates may be unduly influenced by very high or very low 3 - 5-year growth rates that are unsustainable in the long run. For example, Value Line's Statistical Summary shows both the highest and lowest value for earnings and book value growth forecasts. For earnings growth, Value Line showed the highest earnings growth forecast to be 90.5% and the lowest growth rate to be -26.5%. The highest book value growth rate was 96.5% and the lowest was -26%. None of these levels of growth is compatible with long-run growth prospects for the market. The

median growth rate is not influenced by such extremes because it represents the middle value of a very wide range of earnings growth rates.

Q. Please continue with your market return analysis.

A. I also considered a supplemental check to the Value Line projected market return estimates. Duff and Phelps compiled a study of historical returns on the stock market in its 2017 SBBI Yearbook. Some analysts employ this historical data to estimate the market risk premium of stocks over the risk-free rate. The assumption is that a risk premium calculated over a long period is reflective of investor expectations going forward. Exhibit No. ___(RAB-7) presents the calculation of the market returns using the historical data.

Q. Please explain how this historical risk premium is calculated.

A. Exhibit No. ___(RAB-7) shows both the geometric and arithmetic average of yearly historical stock market returns over the historical period from 1926 - 2016. The average annual income return for 20-year Treasury bond is subtracted from these historical stocks returns to obtain the historical market risk premium of stock returns over long-term Treasury bond income returns. The historical market risk premium range is 5.0% - 7.0%.

Q. Did you add an additional measure of the historical risk premium in this case?

A. Yes. Duff and Phelps reported the results of a study by Dr. Roger Ibbotson and Dr. Peng Chen indicating that the historical risk premium of stock returns over long-term government bond returns has been significantly influenced upward by substantial

growth in the price/earnings ("P/E") ratio for stocks from 1980 through 2001.[8] Duff and Phelps noted that this growth in the P/E ratio for stocks was subtracted out of the historical risk premium because "it is not believed that P/E will continue to increase in the future." The adjusted historical arithmetic market risk premium is 5.97%, which I have also included in Exhibit No. ___(RAB-7). This risk premium estimate falls near the middle of the market risk premium range.

Q. How did you determine the risk free rate?

A. I used the average yields on the 20-year Treasury bond and five-year Treasury note over the six-month period from June through November 2017. This was the latest month-end available data from the Federal Reserve's Selected Interest Rates (Daily) H.15 web site during the preparation of my Direct Testimony. The 20-year and 30-year Treasury bonds are often used by rate of return analysts as the risk-free rate, but they contain a significant amount of interest rate risk. The five-year Treasury note carries less interest rate risk than the 20-year bond and is more stable than three-month Treasury bills. Therefore, I have employed both securities as proxies for the risk-free rate of return in my forward-looking CAPM analysis in Exhibit No. ___(RAB-6). This approach provides a reasonable range over which the CAPM return on equity may be estimated.

Q. How did you determine the value for beta?

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[8] *2017 SBBI Yearbook*, Duff and Phelps, pp. 10-28 through 10-30.

A. I obtained the betas for the companies in the proxy group from most recent Value Line reports. The average of the Value Line betas for the proxy group is 0.69.

Q. Please summarize the CAPM results.

A. For my forward-looking CAPM return on equity estimates, the CAPM results are 7.01% - 7.23%. Using historical risk premiums, the CAPM results are 6.02% - 7.39%.

Conclusions and Recommendations

Q. Please summarize the cost of equity results for your DCF and CAPM analyses.

A. Table 3 below summarizes my return on equity results using the DCF and CAPM for my proxy group of companies.

TABLE 3
SUMMARY OF ROE ESTIMATES

Baudino DCF Methodology:	
Average Growth Rates	
- High	9.16%
- Low	8.07%
- Average	8.49%
Median Growth Rates:	
- High	9.21%
- Low	8.19%
- Average	8.64%
CAPM:	
- 5-Year Treasury Bond	7.01%
- 20-Year Treasury Bond	7.23%
- Historical Returns	6.02% - 7.39%

Q. What is your recommended return on equity for Duke Kentucky?

A. I recommend that the KPSC adopt an 8.80% return on equity for Duke Kentucky. My recommendation is slightly higher than the proxy group DCF results for Methods 1 and 2. In this case, the low end for Method 1 (8.07%) appears to be understated given the range of the other DCF results and, therefore, I have not considered it in my recommendation. The remaining DCF estimates reflect investor expected growth in the range of 5.0% - 6.0% and a DCF range of about 8.20% - 9.20%. My 8.80% is near the midpoint of that range.

Q. Mr. Baudino, are you concerned that your recommended cost of equity is too low?

A. No, not at all. The preponderance of market evidence I examined fully supports my ROE recommendation for the Company in this proceeding. As I described in Section II of my testimony, the U. S. economy is in a low interest rate environment, one that has been supported in a deliberate and considered fashion by Federal Reserve monetary policy. Both my DCF and CAPM ROE estimates show that the investor required ROE for Duke Kentucky, as well as other regulated electric and gas utilities, reflects this low interest rate environment.

IV. RESPONSE TO DUKE ENERGY ROE TESTIMONY

Q. Have you reviewed the Direct Testimony of Dr. Morin?

A. Yes.

Q. Please summarize your conclusions with respect to his testimony and return on equity recommendation.

A. Dr. Morin's recommended 10.3% ROE is overstated, inconsistent with the current low interest rate environment, and not supported by my review of current market evidence.

DCF Model

Q. Briefly summarize Dr. Morin's approach to the DCF model.

A. Dr. Morin's approach was quite similar to mine. He used earnings forecasts from Value Line and Zacks to estimate the investor expected growth component. He also used Value Line's reported dividend yield and multiplied that yield by 1+g to obtain the expected dividend yield in the DCF equation.

Dr. Morin rejected the use of forecasted dividend growth, citing concerns over slower dividend growth over the near term that did not reflect long-run expected earnings growth. Dr. Morin also cited academic studies that supported the use of earnings growth forecasts as superior proxies for investor expected growth.

Dr. Morin also rejected the use of 1 + ½ *g for estimating the expected dividend yield. He also included an adjustment for flotation costs in the DCF model. Dr. Morin's recommended DCF results ranged from 9.03% - 9.44%.

Q. If one excludes flotation costs, how do Dr. Morin's DCF results compare with yours?

A. Our results are quite similar if one excludes flotation costs. Dr. Morin's DCF cost of equity results excluding flotation costs fall in the range of 8.86% - 9.27%. This range is very close to my recommended ROE of 8.80%.

Q. Should flotation costs be included in the cost of equity?

A. No. A flotation cost adjustment attempts to recognize and collect the costs of issuing common stock. Such costs typically include legal, accounting, and printing costs as well as broker fees and discounts. In my opinion, it is likely that flotation costs are already accounted for in current stock prices and that adding an adjustment for flotation costs amounts to double counting. A DCF model using current stock prices should already account for investor expectations regarding the collection of flotation costs. Multiplying the dividend yield by a 4% flotation cost adjustment, for example, essentially assumes that the current stock price is wrong and that it must be adjusted downward to increase the dividend yield and the resulting cost of equity. This is not an appropriate assumption regarding investor expectations. Current stock prices most likely already account for flotation costs, to the extent that such costs are even accounted for by investors.

Q. Are Dr. Morin's concerns regarding the use of forecasted dividend growth warranted?

A. No, not at this time. Value Line's forecasted dividend growth rates for the companies in the proxy group are not at all out of line with the earnings growth forecasts from Value Line, Zacks, and Yahoo! Finance. In addition, dividends are the cash flows investors receive from their investments in utility stocks and if credible dividend growth forecasts are available, such as those from Value Line, then they certainly

should be included in the DCF model. I agree with Dr. Morin's position with respect to the importance of earnings growth forecasts and their influence on investor expectations. That is why I gave 75% weight to earnings growth forecasts in my formulation of the DCF model.

Q. You used 1 + .5*g to calculate the expected dividend yield in the DCF equation. Does this approach understate the expected dividend yield compared to the 1 + g approach?

A. No, and in fact the two approaches do not yield significantly different results, although the 1+g approach results in a slightly higher expected dividend yield. Using 1+.5*g assumes that the growth in dividends received by an investor occurs mid-year, rather than throughout the entire year. The 1+g approach assumes that the investor receives the full amount of growth throughout the next year. Given the timing of dividend increases and the level of the current dividend, the investor may or may not actually receive four quarters of growth in the dividend payment during the next year. Thus, applying one-half of the expected growth rate to the current quarterly dividend recognizes that the investor may not actually receive a full year of increased dividend payments from the time the DCF calculation was made.

CAPM and ECAPM

Q. On page 32 of his Direct Testimony, Dr. Morin recommended using a forecasted interest rate of 4.4% for the risk free rate of return. Is it appropriate to use forecasted interest rates for purposes of estimating the current ROE for Duke Kentucky?

A. No, definitely not. Current interest rates and bond yields embody all the relevant market data and expectations of investors, including expectations of changing future interest rates. Current interest rates present tangible market evidence of investor return

requirements today, and these are the interest rates and bond yields that should be used in the CAPM, ECAPM, and in the bond yield plus risk premium analyses. To the extent that investors give forecasted interest rates any weight at all, they are already incorporated in current securities prices.

Q. Please explain in more detail why the Commission should reject the forecasted Treasury yield recommended by Dr. Morin.

A. As I stated in Section II my Direct Testimony, current interest rates embody investor expectations based on their assessments of all available market information. This includes the interest rate forecasts cited by Dr. Morin as well as statements and actions from the Federal Reserve. The KPSC should not invest in the interest rate forecasts cited by Dr. Morin in determining a fair rate of return for Duke Kentucky in this proceeding.

There is evidence that economists have systematically overestimated interest rates in recent years. Jared Bernstein wrote the following in a recent article in the New York Times[9]:

> In the early 1980s, forecasters did a good job of predicting the path of bond rates, though their job was a bit easier than usual because rates were so highly elevated that it was a pretty sure bet they'd be headed back down. ("Regression to the mean," for all you statistics fans.)
>
> But since the mid-1990s, government forecasters have consistently overestimated this critical variable.
>
> This "consistently" point is essential. Most economic forecasts are off one way or the other — too high or too low, but they tend to be pretty much balanced in either direction. But on the 10-year bond rate, the errors are systemic.

[9] "We Keep Flunking Forecasts on Interest Rates, Distorting the Budget Outlook", Jared Bernstein, *New York Times*, Feb. 23, 2015.

Forecasters are regularly overestimating and thus regularly overstating, all else being equal, future interest payments on the debt.

Another article by Akin Oyedele entitled "Interest Rate Forecasters Are Shockingly Wrong Almost All Of The Time"[10] showed that from June 2010 through June 2015 interest rate forecasts were wrong most of the time. Mr. Oyedele noted that 2014 "was particularly bad, when strategists became too optimistic that the Federal Reserve would hike rates."

Q. Is there support for the position that today's currently low interest rates are part of a long-term trend?

A. Yes. In a weekly blog at the Brookings Institution, former Federal Reserve Chairman Ben Bernanke wrote the following:[11]

> Interest rates around the world, both short-term and long-term, are exceptionally low these days. The U.S. government can borrow for ten years at a rate of about 1.9 percent, and for thirty years at about 2.5 percent. Rates in other industrial countries are even lower: For example, the yield on ten-year government bonds is now around 0.2 percent in Germany, 0.3 percent in Japan, and 1.6 percent in the United Kingdom. In Switzerland, the ten-year yield is currently slightly negative, meaning that lenders must pay the Swiss government to hold their money! The interest rates paid by businesses and households are relatively higher, primarily because of credit risk, but are still very low on an historical basis.
>
> Low interest rates are not a short-term aberration, but part of a long-term trend. As the figure below shows, ten-year government bond yields in the United States were relatively low in the 1960s, rose to a peak above 15 percent in 1981, and have been declining ever since. That pattern is partly explained by the rise and fall of inflation, also shown in the figure. All else equal, investors demand higher yields when inflation is high to compensate them for the declining purchasing power of the dollars with which they expect to be repaid. But yields on inflation-protected bonds are also very low today; the real or inflation-adjusted return on lending to the U.S. government for five years is currently about *minus* 0.1 percent.
>
> Why are interest rates so low? Will they remain low? What are the implications for

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[10] Akin Oyedele, "Interest Rate Forecasters Are Shockingly Wrong Almost All of the Time", *Business Insider*, July 18, 2015.

[11] 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/

the economy of low interest rates?

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—not by the Fed.

Q. What does a 4.4% forecasted interest rate suggest with regards to investors holding 30-year Treasury bonds currently?

A. It suggests that investors today are expecting to incur huge losses in the value of their investments in long-term Treasury bonds, which makes no economic sense whatsoever.

The price of a bond moves in the opposite direction of its yield. In other words, given a certain current bond coupon and price, if the required yield on that bond increases then the price of the bond goes down. Alternatively, if the required yield declines, then the price of the bond increases. This relationship can be illustrated with the following simplified example. Assume a current 30-year Treasury bond has a coupon of $2.75 and a price of $100, resulting in a current yield of 2.75%. This is the approximate current yield for 30-year Treasury bonds in the market at the time I prepared this testimony. If interest rates were to rise in the economy such that the required yield on the 30-year Treasury increased to 4.4%, then the price of our existing 30-year Treasury bond would fall to $62.50 from $100, given the coupon of $2.75. This represents a loss to our current bond investor of 37.5%.

The point here is that if investors were certain that there would soon be a substantial increase in interest rates, the rational response would be to immediately discount what they were willing to pay currently for the 30-year Treasury bond rather than pay $100 and suffer certain significant losses to the value of their bonds. The fact that the 30-Year Treasury bond is currently yielding about 2.75% suggests that investors do not expect Treasury Bonds yields to drastically increase and, as a result, cause dramatic losses in their investments.

Q. How does Dr. Morin's forecasted Treasury yield of 4.4% compare with the recent bond yields on debt issued by Duke Kentucky?

A. I cited yields of 4.1% - 4.26% on long-term debt recently issued by Duke Kentucky in Section II of my Direct Testimony. Dr. Morin's forecasted yield on the 30-year Treasury bond of 4.4% is even higher than the current debt yield for Duke Kentucky, debt that is much riskier than the long-term Treasury bond backed by the full faith and credit of the U.S. government.

Clearly, Dr. Morin's recommended 4.4% forecasted interest rate fails to properly reflect investor expectations in today's market. It results in inflated results for his CAPM, ECAPM, and historical risk premium studies.

Q. Please compare and comment upon Dr. Morin's CAPM recommendation of 9.3% and your CAPM results based on historical risk premiums.

A. If we compare our results using the arithmetic historical risk premium of 7.0%, our results range from 7.41% - 9.3%. The major factor driving the difference here is Dr. Morin's use of the 4.4% forecasted Treasury yield versus my use of a current 20-year

Treasury bond yield. I strongly recommend against the Commission using a forecasted Treasury yield in this case. However, if the Commission wishes to consider forecasted bond yields, then I recommend it consider the range of results using both current and forecasted Treasury bond yields. The midpoint of this range is 8.4%.

Q. Beginning on page 44 of his Direct Testimony, Dr. Morin described the Empirical CAPM ("ECAPM") analysis. Is this a reasonable method to use to estimate the investor required ROE for Duke Kentucky?

A. No. The ECAPM is supposed to account for the possibility that the CAPM understates the return on equity for companies with betas less than 1.0. The use of an adjustment factor to "correct" the CAPM results for companies with betas less than 1.0 suggests that published betas by such sources as Value Line are incorrect and that investors should not rely on them in formulating the CAPM. Further, Dr. Morin did not present evidence that investors use the adjustment figure he calculated (alpha) in his ECAPM.

Dr. Morin's ECAPM also suffers from the defect of using his recommended forecasted long-term Treasury yield. If one inserts the December 14, 2017 30-year Treasury yield into his ECAPM equation, the result is as follows:

2.75% + .25(7.0%) + .75*.70 * (7.0%) = 8.18% ECAPM ROE

Historical Risk Premium Estimates

Q. Please summarize Dr. Morin's historical risk premium approach.

A. Dr. Morin presented his historical risk premium approach beginning on page 48 of his Direct Testimony. Dr. Morin calculated an historical risk premium using the actual realized return on equity for the S&P Utility Index and then subtracting the long-term

Treasury bond return for each year over the period 1930 – 2015. This historical risk premium was 6.1%. When added to Dr. Morin's recommended forecasted Treasury bond yield of 4.4%, his recommended cost of equity was 10.5% without flotation costs.

Q. Please respond to the Company witnesses' risk premium analysis.

A. Generally, the bond yield plus risk premium approach is imprecise and can only provide very general guidance on the current authorized ROE for a regulated electric utility. Risk premiums can change substantially over time and with varying risk perceptions of investors. As such, this approach is a "blunt instrument", if you will, for estimating the ROE in regulated proceedings. In my view, a properly formulated DCF model using current stock prices and growth forecasts is far more reliable and accurate than the bond yield plus risk premium approach, which relies on an historical risk premium analysis over a certain historical period.

Q. Does Dr. Morin's historical risk premium analysis suffer from the use of a forecasted Treasury bond yield?

A. Yes, most definitely. If the Commission wishes to consider Dr. Morin's historical risk premium analysis, then the current yield on the 30-year Treasury bond should also be used. Using this current yield and the historical risk premium calculated by Dr. Morin, the resulting ROE estimate would be:

2.75% + 6.1% = 8.85% ROE

The resulting ROE in this case is nearly the same as my recommended ROE of 8.8%. This result shows the magnitude of the overstatement in Dr. Morin's ROE calculations when current, not forecasted, interest rates are used.

Allowed Risk Premium Estimates

Q. Please summarize Dr. Morin's allowed risk premium ROE analysis.

A. Dr. Morin developed an historical risk premium using Commission-allowed returns for regulated utility companies from 1986 through 2016. He also used regression analysis to estimate the value of the inverse relationship between interest rates and risk premiums during that period. On page 53 of his Direct Testimony, Dr. Morin calculated the risk premium ROE to be 10.5%.

Once again, Dr. Morin's 10.5% risk premium ROE was inflated by using a forecasted Treasury bond yield of 4.4%. If one uses the approximate current yield on the 30-year Treasury, the resulting ROE is as follows:

8.19 – (0.4705 * 2.75%) + 2.75% = 9.65% ROE

I strongly recommend that the Commission reject this unreasonable forecasted Treasury bond yield used by Dr. Morin.

Dr. Morin's ROE Conclusions

Q. On page 63 of his Direct Testimony, Dr. Morin used the upper half of his ROE range to support his recommended ROE for Duke Kentucky. Should the Commission consider only the upper half of an ROE range of results in determining the ROE for Duke Kentucky in this case?

A. No. My review of Duke Kentucky's current credit ratings suggests that Duke Kentucky does not merit any additional increment to its ROE for alleged additional risk. As I stated in Section II, Duke Kentucky's current credit ratings are A- from Standard and Poor's and Baa1 from Moody's. These current ratings are consistent with current industry credit ratings and demonstrate that Duke Kentucky is a strong, investment grade utility company. Nothing in these credit ratings support adding an additional increment to Duke Kentucky's ROE compared to the proxy group used by Dr. Morin and myself.

Q. Should the Commission give Duke Kentucky a higher authorized ROE because of its ongoing construction program?

A. Definitely not. The Commission already provides Duke Kentucky the opportunity to file its rate case using a future test period, which in this case includes the 12-month period ending March 31, 2019. Duke Kentucky can include forecasted capitalization up to that date, which assists the Company in mitigating regulatory lag. It would not be fair to ratepayers to inflate the ROE to cover Duke Kentucky's future investments that have not been reviewed by the Commission for prudence and for being used and useful. If Duke Kentucky's ongoing construction program causes the Company's ROE to decline in the future, it can always file a rate case with the Commission to address the situation.

Q. Should the Commission allow a higher ROE to Duke Kentucky due to its small size?

A. No. Dr. Morin provided no evidence to suggest that a size premium applies to smaller regulated utility companies, which on average are quite different from the groups of companies included in the Duff and Phelps' research on size premiums. I reviewed the discussion of size premiums from Chapter 7 of the *2017 SBBI Yearbook*, the source I used for my historical CAPM analyses. The data from Duff and Phelps shows the following betas for groups of smaller capitalization stocks[12]:

Mid-level capitalization	1.12
Low capitalization	1.22
Micro-capitalization	1.35

The groups of smaller capitalization stocks have much higher betas than regulated utility companies. The average beta for my proxy group is 0.69, which is far below even the mid-level capitalization groups of stocks studies by Duff and Phelps. The low and micro capitalization stocks have even higher betas. This shows that the many unregulated stocks included in the Duff and Phelps study are far more risky than regulated utilities like Duke Kentucky. I recommend that the Commission reject Dr. Morin's argument regarding Duke Kentucky's small size as a basis for increasing the ROE.

Q. Is asset concentration for Duke Kentucky a sufficient basis for a higher than average ROE?

A. No. Once again, any additional risk from Duke Kentucky's generation mix would have been factored into the Company's current credit ratings, which are A-/Baa1 as I noted earlier.

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[12] *2017 SBBI Yearbook*, Duff and Phelps, pg. 7-16.

V. DUKE KENTUCKY'S PROPOSED DCI

Q. Did you review the Company's proposed Distribution Capital Investment ("DCI") rider?

A. Yes. Duke Kentucky witnesses Anthony J. Platz and William Wathen provided detailed descriptions of the Company's proposed DCI and support as to why the Commission should approve it. Duke witness Lawler presented a template for rider DCI in her Direct Testimony.

Q. What is your recommendation regarding the proposed DCI?

A. The Commission should reject Duke Kentucky's proposed DCI. There are several important policy and practical reasons why the DCI should not be approved. I will present these reasons later in my testimony after I provide a summary of the proposed DCI.

Q. Please provide an overview of Duke Kentucky's proposed DCI.

A. According to Mr. Wathen, the purpose of the DCI "is to provide a mechanism for the Company to accelerate deployment of programs to improve its electric delivery system integrity or reliability as well as a means for the Company to more timely recover its capital invested for these project, thereby reducing regulatory lag that would otherwise occur through pure base rate recovery of these types of program costs and that must compete with other projects funded through the Company's base rates."[13] If the DCI is approved, Duke would make annual filings to establish new DCI rates based on

[13] Wathen Direct at 26, lines 8 through 14.

incremental investment in eligible plant as determined by the Commission. Initially, Mr. Platz testified that the Company will include costs associated with its Targeted Underground Program ("TUG"). However, Mr. Wathen also explained that the Company may propose new programs for inclusion in the rider. The rate of return would be set at the overall pre-tax rate of return approved by the Commission in this case. The revenue requirement for the rider would be rolled into base rates in a future rate proceeding. Duke commits that if the Company has not had another electric base rate case filing within three years after the implementation of rider DCI, then it will submit testimony supporting the continuation of the approved rate of return or propose a new rate of return for the Commission to consider for the rider.

Mr. Platz provided details regarding the Company's proposed TUG beginning on page 25 of his Direct Testimony. Mr. Platz explained that this program will "identify specific areas of its distribution system that experience higher than acceptable frequency of outages and replace overhead wires with underground cables in an effort to harden the system, thereby increasing overall reliability."[14] Mr. Platz provided estimated expenditures for this program on Tables 3 and 4 of his Direct Testimony.

Mr. Platz also testified that although "*Duke Energy Kentucky cannot guarantee that system reliability or customer satisfaction scores will improve due to a particular program or initiative, or that a particular level of system performance will result from*

[14] Platz Direct Testimony at 25, lines 13 through 15.

implementing its infrastructure improvement plans, doing nothing is sure to erode current levels."[15] (italics added)

Q. In general terms, please explain why the Company's proposed DCI should be rejected.

A. As a general matter, automatic capital and/or investment adjustment clauses such as the DCI are poor policy. This sort of automatic adjustment clause that allows the pass-through of capital costs simply does not allow the requisite amount of regulatory scrutiny that a full base rate proceeding provides. In a base rate case, the Commission, its Staff, and other parties have time to conduct a detailed examination and review all the elements of a utility's revenue requirement to ensure that the costs ratepayers are required to pay are prudently incurred. Duke Kentucky's proposed DCI would enable the Company to pass though significant new costs without this type of regulatory scrutiny. Although the utility and its shareholders would certainly benefit from increased cash flows from the DCI, ratepayers are far less assured that costs subject to this treatment are prudently incurred. Thus, the DCI effectively shifts the risk of investment from the utility and its management and shareholders to ratepayers.

Q. Does the Company's proposed DCI provide for a reasonable review process to ensure that eligible costs are prudently incurred?

A. No. Duke Kentucky's proposed DCI lacks any mechanism for Commission review to

[15] Platz Direct Testimony at 32-33, lines 22 through 23 and 1 through 2.

determine if costs passed through the DCI have been prudently incurred. Mr. Platz testified that rider DCI would be trued-up for actual costs and audited by the Commission to ensure that the Company is not over- or under-earning.[16] However proposed rider DCI fails to include a prudence review process. Simple auditing and revenue reconciliation cannot assure customers that the costs for which they are being charged through the DCI are reasonable and prudent. Further, this simple reconciliation process does not provide for any input from intervenors.

Q. Did Duke Kentucky quantify any customer benefits from the proposed DCI or from its proposed TUG?

A. No. In fact, the earlier quote from Mr. Platz's testimony suggests that the Company cannot guarantee there will be any reliability or other benefits to customers from its TUG.

Q. How should Duke Kentucky quantify the system benefits to customers from distribution system reliability programs like the Targeted Underground Program?

A. Two of the most common measures of distribution system reliability are the System Average Interruption Duration Index ("SAIDI") and the System Average Interruption Frequency Index ("SAIFI"). In simple terms, SAIDI measures the average outage duration for each customer. SAIFI measures how frequently a customer is interrupted during a period of time, usually a year. Neither Mr. Platz nor Mr. Wathen, or any

[16] Platz Direct Testimony at page 36, lines 7 through 9.

other Duke witness provided any analyses of whether SAIDI and SAIFI indices would improve from the Targeted Underground Program in direct testimony.

Q. Did Duke Kentucky provide SAIFI and SAIDI measures in response to discovery from the AG?

A. Yes. Duke Kentucky provided forecasted SAIFI and SAIDI measures in response to AG-DR-1-89. Please refer to Exhibit No. ____(RAB-8), which includes Duke Kentucky's forecasted SAIFI and SAIDI ratios from 2017 through 2028 as provided in an attachment to the response. This attachment provides forecasted values with and without the undergrounding program that Duke Kentucky is requesting be included in the DCI. The frequency of system outages as measured by SAIFI is basically unchanged if the undergrounding program in undertaken. This means that there is no significant system-wide impact from undergrounding on the frequency of outages on Duke Kentucky's distribution system.

Duke Kentucky also forecasted slight improvements in SAIDI, which measures the duration of an outage, or the amount of time that a customer's service would be interrupted during an outage. By 2028, the Company forecasted that system-wide SAIDI would improve by 6 minutes with the inclusion of the TUG, from 66 to 60 minutes.

Duke Kentucky also forecasted the impact of the program in terms of analyses of what it termed "major event days" ("MED") of outages on its system. The Company stated that it expected a 15% - 20% reduction in MED outage events and a 15% - 20% reduction in MED outage duration.

Q. Is the Targeted Underground Program something that Duke Kentucky should be doing as part of its normal budgeting and system operations?

A Yes, this appears to be the case. On page 25, lines 13 through 14, Mr. Platz noted that this program identifies areas of the Company's distribution system "that experience higher than acceptable frequency of outages." Indeed, if the areas identified by the Company are experiencing outage rates that are unacceptable, then those areas should be considered high priority for Duke Kentucky and should be fully addressed by the Company whether or not it has a DCI in place. Duke Kentucky customers are entitled to expect reliable service at just and reasonable rates and it is the Company's responsibility to ensure those outcomes for its customers.

Q. Has Duke Kentucky shown a financial need for its proposed DCI?

A. No. Duke Kentucky did not present any financial analyses and/or projections showing that it needed the proposed DCI to support ongoing financing of its Targeted Underground Program or other programs that the Company may include in future DCI filings.

Q. Has Duke Kentucky been able to make continuing investments in its distribution system without the need of its proposed DCI?

A, Yes. According to the Direct Testimony of Mr. James Henning, "Duke Energy Kentucky has regularly made prudent investments in it distribution system, as needed for its continued safe, reliable, and efficient operation." Duke Ketucky has been able to make these investments despite not having filed a rate case in over eleven years

according to Mr. Wathen.[17] Quite frankly, Duke Kentucky failed to make the case that it needs a DCI to continue to make these distribution system investments for its customers.

Q. Is there a choice for the Commission between the DCI and "doing nothing?"

A. No. The DCI and rider have been proposed by the Company as a means to "accelerate deployment of programs to improve its electric delivery system integrity or reliability as well as a means for the Company to more timely recover its capital invested for these project."[18] As a prudently operated regulated utility, the Company presently and continually works to "identify specific areas of its distribution system that experience higher than acceptable frequency of outages" to improve service reliability.[19] It then utilizes the budgeting process to prioritize and select the specific projects that it will undertake.

The DCI will not change the essential process already in place. However, the DCI will "accelerate" the Company's spend rate and will increase rates more quickly than if the DCI is rejected, both of which are acknowledged by Mr. Wathen and Mr. Platz.

Q. Is there a behavioral aspect that will change if the DCI and rider are adopted?

A. Yes. Presently, the Company is constrained and must prioritize its capital spending

[17] Wathen Direct Testimony at 26, lines 20 through 21.

[18] Wathen Direct at 26.

[19] Platz Direct at 25.

between rate cases in order to maintain its earned return. This occurs as a natural result of regulatory lag and works to the benefit of Duke Kentucky's customers. As a general matter, the base ratemaking structure requires the Company to focus on specific reliability projects with higher priority or value and minimizes growth in costs that must be recovered from customers.

In contrast, if the DCI and rider are adopted, these incentives are largely removed through the elimination of regulatory lag. The DCI and rider will provide the Company incentives to expand the universe of reliability projects to include those with lower priority or value. The greater the spend rate, the greater the Company's top line revenues and bottom line earnings, but at the expense of more rapid increases in customer rates. This will provide the Company a strong incentive to expand the projects and/or types of costs that can be included in the DCI and rider well beyond the initial TUG.

Q. The proposed DCI would allow the Company to include additional programs in the future. Does this aspect of the DCI pose additional concerns?

A. Yes, it certainly does. It appears that the TUG would only be the first program included in the proposed DCI. Duke would be free to request that future programs be included in the DCI, subject to Commission approval. Costs would certainly increase over time as the Company included more of these distribution programs, which would not be subject to the same prudence and cost scrutiny that would be available in a base rate proceeding.

Q. On page 26, lines 14 through 15 of his Direct Testimony Mr. Wathen testified that minimizing regulatory lag "also allows the Company and all stakeholders to avoid the expense of multiple rate cases." Do you agree with this statement?

A. No. First, given the fact that it has been over 11 years since the Company filed its last base rate case and that the Company made ongoing "prudent investments" in its distribution system over that time, it is by no means clear how much expense ratepayers would save from the alleged future multiple rate cases mentioned by Mr. Wathen. Second, base rate cases afford ratepayers added insurance that the costs of Duke's distribution system investments are prudently incurred. The Company's proposed DCI does not offer the same assurance. Further, the Company is afforded recovery for reasonably incurred rate case expenses when it does file for a rate increase.

Q. Has the Commission previously approved a DCI-type mechanism for a jurisdictional electric utility?

A. According to the Company's response to Staff-DR-02-055, Duke Kentucky was not aware of any similar ratemaking mechanisms approved by the Commission for jurisdictional electric utilities.

Q. If the Commission were to consider adoption of a mechanism similar to the proposed DCI, what elements should be included in such a proposal?

A. There are several key elements that the Commission should consider in adopting any automatic capital adjustment program such as the DCI.

First, I recommend that the Commission place a yearly cap on rate increases associated

with such a rate mechanism. In order to limit the effect on customers from a newly approved DCI-type mechanism, a 2.5% yearly increase over current authorized tariff rates is reasonable.

Second, I recommend that the Commission place a cumulative cap on rate increases from the rate mechanism between base rate cases. I recommend a reasonable total rate increase cap of 5% to protect customers from the kind of open ended rate increases that would result from Duke Kentucky's proposed DCI.

Third, the Commission should include offsets that reflect the build-up of accumulated depreciation and accumulated deferred income taxes ("ADIT") associated with investments included in a DCI-type of mechanism during the period that the mechanism is in effect. This treatment reflects the way these investments would be treated in rate base during a base rate proceeding. In addition, the Commission should include an incremental offset for the increase in accumulated depreciation and ADIT on total distribution plant. This reflects the fact that total distribution plant will continue to depreciate between rate cases. If the Commission allows Duke Kentucky to flow through costs of new plant with a DCI-type mechanism, it should also recognize the reduction in distribution plant rate base between rate cases, which would serve to lower rates for customers. Finally, Duke Kentucky should be required to reflect the retirement of overhead distribution plant that will be replaced by new underground facilities, along with the reduction in associated depreciation expense.

Fourth, the Company should only be allowed to include actual investment costs after

the year they are closed to plant in service. The Company should not be allowed to include any projected costs in the DCI.

Fifth, I recommend that a DCI-like mechanism be limited to a three-year pilot program. Duke Kentucky's current DCI proposal has no specified endpoint, except that the costs collected through the DCI would be rolled into base rates in the Company's next base rate proceeding. I recommend that this program end after three years and that the Company be required to file a full base rate case at that time. At some point, the Commission should assess the workability and reasonableness of the DCI-type mechanism within a full base rate case proceeding. This ensures that the Commission, its Staff, and other parties can review the reasonableness of cost recovery from ratepayers.

Q. Does this complete your Direct Testimony?

A. Yes.

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE ELECTRONIC APPLICATION OF DUKE ENERGY KENTUCKY, INC. FOR (1) AN ADJUSTMENT OF THE ELECTRIC RATES; (2) APPROVAL OF AN ENVIRONMENTAL COMPLIANCE PLAN AND SURCHARGE MECHANISM; (3) APPROVAL OF NEW TARIFFS; (4) APPROVAL OF ACCOUNTING PRACTICES TO ESTABLISH REGULATORY ASSETS AND LIABILITIES; AND (5) ALL OTHER REQUIRED APPROVALS AND RELIEF	)	**CASE NO. 2017-00321**

EXHIBITS

OF

RICHARD A. BAUDINO

ON BEHALF OF

OFFICE OF THE ATTORNEY GENERAL

J. KENNEDY AND ASSOCIATES, INC.
ROSWELL, GEORGIA

DECEMBER 29, 2017

AFFIDAVIT

STATE OF GEORGIA)

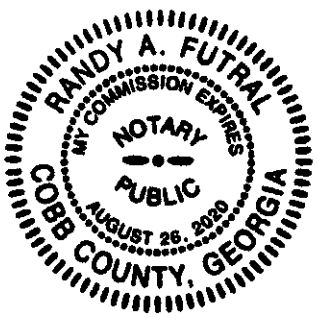
COUNTY OF FULTON)

RICHARD A. BAUDINO, being duly sworn, deposes and states: that the attached is his sworn testimony and that the statements contained are true and correct to the best of his knowledge, information and belief.

Richard A. Baudino

Sworn to and subscribed before me on this
28th day of December 2017.

Notary Public



RESUME OF RICHARD A. BAUDINO

EDUCATION

New Mexico State University, M.A.
Major in Economics
Minor in Statistics

New Mexico State University, B.A.
Economics
English

Thirty-two years of experience in utility ratemaking and the application of principles of economics to the regulation of electric, gas, and water utilities. Broad based experience in revenue requirement analysis, cost of capital, rate of return, cost and revenue allocation, and rate design.

REGULATORY TESTIMONY

Preparation and presentation of expert testimony in the areas of:

Cost of Capital for Electric, Gas and Water Companies
Electric, Gas, and Water Utility Cost Allocation and Rate Design
Revenue Requirements
Gas and Electric industry restructuring and competition
Fuel cost auditing
Ratemaking Treatment of Generating Plant Sale/Leasebacks

RESUME OF RICHARD A. BAUDINO

EXPERIENCE

1989 to Present: **Kennedy and Associates: Director of Consulting, Consultant** - Responsible for consulting assignments in revenue requirements, rate design, cost of capital, economic analysis of generation alternatives, electric and gas industry restructuring/competition and water utility issues.

1982 to 1989: **New Mexico Public Service Commission Staff: Utility Economist** - Responsible for preparation of analysis and expert testimony in the areas of rate of return, cost allocation, rate design, finance, phase-in of electric generating plants, and sale/leaseback transactions.

CLIENTS SERVED

Regulatory Commissions

Louisiana Public Service Commission
Georgia Public Service Commission
New Mexico Public Service Commission

Other Clients and Client Groups

Ad Hoc Committee for a Competitive Electric Supply System
Air Products and Chemicals, Inc.
Arkansas Electric Energy Consumers
Arkansas Gas Consumers
AK Steel
Armco Steel Company, L.P.
Assn. of Business Advocating Tariff Equity
Atmos Cities Steering Committee
Canadian Federation of Independent Businesses
CF&I Steel, L.P.
Cities of Midland, McAllen, and Colorado City
Climax Molybdenum Company
Cripple Creek & Victor Gold Mining Co.
General Electric Company
Holcim (U.S.) Inc.
IBM Corporation
Industrial Energy Consumers
Kentucky Industrial Utility Consumers
Kentucky Office of the Attorney General
Lexington-Fayette Urban County Government
Large Electric Consumers Organization
Newport Steel
Northwest Arkansas Gas Consumers
Maryland Energy Group
Occidental Chemical
PSI Industrial Group
Large Power Intervenors (Minnesota)
Tyson Foods
West Virginia Energy Users Group
The Commercial Group
Wisconsin Industrial Energy Group
South Florida Hospital and Health Care Assn.
PP&L Industrial Customer Alliance
Philadelphia Area Industrial Energy Users Gp.
West Penn Power Intervenors
Duquesne Industrial Intervenors
Met-Ed Industrial Users Gp.
Penelec Industrial Customer Alliance
Penn Power Users Group
Columbia Industrial Intervenors
U.S. Steel & Univ. of Pittsburg Medical Ctr.
Multiple Intervenors
Maine Office of Public Advocate
Missouri Office of Public Counsel
University of Massachusetts - Amherst
WCF Hospital Utility Alliance
West Travis County Public Utility Agency
Steering Committee of Cities Served by Oncor
Utah Office of Consumer Services
Healthcare Council of the National Capital Area
Vermont Department of Public Service

Expert Testimony Appearances
of
Richard A. Baudino
As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
10/83	1803, 1817	NM	New Mexico Public Service Commission	Southwestern Electric Coop.	Rate design.
11/84	1833	NM	New Mexico Public Service Commission Palo Verde	El Paso Electric Co.	Service contract approval, rate design, performance standards for nuclear generating system
1983	1835	NM	New Mexico Public Service Commission	Public Service Co. of NM	Rate design.
1984	1848	NM	New Mexico Public Service Commission	Sangre de Cristo Water Co.	Rate design.
02/85	1906	NM	New Mexico Public Service Commission	Southwestern Public Service Co.	Rate of return.
09/85	1907	NM	New Mexico Public Service Commission	Jornada Water Co.	Rate of return.
11/85	1957	NM	New Mexico Public Service Commission	Southwestern Public Service Co.	Rate of return.
04/86	2009	NM	New Mexico Public Service Commission	El Paso Electric Co.	Phase-in plan, treatment of sale/leaseback expense.
06/86	2032	NM	New Mexico Public Service Commission	El Paso Electric Co.	Sale/leaseback approval.
09/86	2033	NM	New Mexico Public Service Commission	El Paso Electric Co.	Order to show cause, PVNGS audit.
02/87	2074	NM	New Mexico Public Service Commission	El Paso Electric Co.	Diversification.
05/87	2089	NM	New Mexico Public Service Commission	El Paso Electric Co.	Fuel factor adjustment.
08/87	2092	NM	New Mexico Public Service Commission	El Paso Electric Co.	Rate design.
10/87	2146	NM	New Mexico Public Service Commission	Public Service Co. of New Mexico	Financial effects of restructuring, reorganization.
07/88	2162	NM	New Mexico Public Service Commission	El Paso Electric Co.	Revenue requirements, rate design, rate of return.

Expert Testimony Appearances
of
Richard A. Baudino
As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
01/89	2194	NM	New Mexico Public Service Commission	Plains Electric G&T Cooperative	Economic development.
1/89	2253	NM	New Mexico Public Service Commission	Plains Electric G&T Cooperative	Financing.
08/89	2259	NM	New Mexico Public Service Commission	Homestead Water Co.	Rate of return, rate design.
10/89	2262	NM	New Mexico Public Service Commission	Public Service Co. of New Mexico	Rate of return.
09/89	2269	NM	New Mexico Public Service Commission	Ruidoso Natural Gas Co.	Rate of return, expense from affiliated interest.
12/89	89-208-TF	AR	Arkansas Electric Energy Consumers	Arkansas Power & Light Co.	Rider M-33.
01/90	U-17282	LA	Louisiana Public Service Commission	Gulf States Utilities	Cost of equity.
09/90	90-158	KY	Kentucky Industrial Utility Consumers	Louisville Gas & Electric Co.	Cost of equity.
09/90	90-004-U	AR	Northwest Arkansas Gas Consumers	Arkansas Western Gas Co.	Cost of equity, transportation rate.
12/90	U-17282 Phase IV	LA	Louisiana Public Service Commission	Gulf States Utilities	Cost of equity.
04/91	91-037-U	AR	Northwest Arkansas Gas Consumers	Arkansas Western Gas Co.	Transportation rates.
12/91	91-410-EL-AIR	OH	Air Products & Chemicals, Inc., Armco Steel Co., General Electric Co., Industrial Energy Consumers	Cincinnati Gas & Electric Co.	Cost of equity.
05/92	910890-EI	FL	Occidental Chemical Corp.	Florida Power Corp.	Cost of equity, rate of return.
09/92	92-032-U	AR	Arkansas Gas Consumers	Arkansas Louisiana Gas Co.	Cost of equity, rate of return, cost-of-service.
09/92	39314	ID	Industrial Consumers for Fair Utility Rates	Indiana Michigan Power Co.	Cost of equity, rate of return.

Expert Testimony Appearances
of
Richard A. Baudino
As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
09/92	92-009-U	AR	Tyson Foods	General Waterworks	Cost allocation, rate design.
01/93	92-346	KY	Newport Steel Co.	Union Light, Heat & Power Co.	Cost allocation.
01/93	39498	IN	PSI Industrial Group	PSI Energy	Refund allocation.
01/93	U-10105	MI	Association of Businesses Advocating Tariff Equality (ABATE)	Michigan Consolidated Gas Co.	Return on equity.
04/93	92-1464-EL-AIR	OH	Air Products and Chemicals, Inc., Armco Steel Co., Industrial Energy Consumers	Cincinnati Gas & Electric Co.	Return on equity.
09/93	93-189-U	AR	Arkansas Gas Consumers	Arkansas Louisiana Gas Co.	Transportation service terms and conditions.
09/93	93-081-U	AR	Arkansas Gas Consumers	Arkansas Louisiana Gas Co.	Cost-of-service, transportation rates, rate supplements; return on equity; revenue requirements.
12/93	U-17735	LA	Louisiana Public Service Commission Staff	Cajun Electric Power Cooperative	Historical reviews; evaluation of economic studies.
03/94	10320	KY	Kentucky Industrial Utility Customers	Louisville Gas & Electric Co.	Trimble County CWIP revenue refund.
4/94	E-015/ GR-94-001	MN	Large Power Intervenors	Minnesota Power Co.	Evaluation of the cost of equity, capital structure, and rate of return.
5/94	R-00942993	PA	PG&W Industrial Intervenors	Pennsylvania Gas & Water Co.	Analysis of recovery of transition costs.
5/94	R-00943001	PA	Columbia Industrial Intervenors	Columbia Gas of Pennsylvania charge proposals.	Evaluation of cost allocation, rate design, rate plan, and carrying
7/94	R-00942986	PA	Armco, Inc., West Penn Power Industrial Intervenors	West Penn Power Co.	Return on equity and rate of return.
7/94	94-0035-E-42T	WV	West Virginia Energy Users' Group	Monongahela Power Co.	Return on equity and rate of return.

Expert Testimony Appearances
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As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
8/94	8652	MD	Westvaco Corp. Co.	Potomac Edison	Return on equity and rate of return.
9/94	930357-C	AR	West Central Arkansas Gas Consumers	Arkansas Oklahoma Gas Corp.	Evaluation of transportation service.
9/94	U-19904	LA	Louisiana Public Service Commission	Gulf States Utilities	Return on equity.
9/94	8629	MD	Maryland Industrial Group	Baltimore Gas & Electric Co.	Transition costs.
11/94	94-175-U	AR	Arkansas Gas Consumers	Arkla, Inc.	Cost-of-service, rate design, rate of return.
3/95	RP94-343-000	FERC	Arkansas Gas Consumers	NorAm Gas Transmission	Rate of return.
4/95	R-00943271	PA	PP&L Industrial Customer Alliance	Pennsylvania Power & Light Co.	Return on equity.
6/95	U-10755	MI	Association of Businesses Advocating Tariff Equity	Consumers Power Co.	Revenue requirements.
7/95	8697	MD	Maryland Industrial Group	Baltimore Gas & Electric Co.	Cost allocation and rate design.
8/95	95-254-TF U-2811	AR	Tyson Foods, Inc.	Southwest Arkansas Electric Cooperative	Refund allocation.
10/95	ER95-1042 -000	FERC	Louisiana Public Service Commission	Systems Energy Resources, Inc.	Return on Equity.
11/95	I-940032	PA	Industrial Energy Consumers of Pennsylvania	State-wide - all utilities	Investigation into Electric Power Competition.
5/96	96-030-U	AR	Northwest Arkansas Gas Consumers	Arkansas Western Gas Co.	Revenue requirements, rate of return and cost of service.
7/96	8725	MD	Maryland Industrial Group	Baltimore Gas & Electric Co.,Potomac Electric Power Co. and Constellation Energy Corp.	Return on Equity.
7/96	U-21496	LA	Louisiana Public Service Commission	Central Louisiana Electric Co.	Return on equity, rate of return.
9/96	U-22092	LA	Louisiana Public Service Commission	Entergy Gulf States, Inc.	Return on equity.

Expert Testimony Appearances
of
Richard A. Baudino
As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
1/97	RP96-199-000	FERC	The Industrial Gas Users Conference	Mississippi River Transmission Corp.	Revenue requirements, rate of return and cost of service.
3/97	96-420-U	AR	West Central Arkansas Gas Corp.	Arkansas Oklahoma Gas Corp.	Revenue requirements, rate of return, cost of service and rate design.
7/97	U-11220	MI	Association of Business Advocating Tariff Equity	Michigan Gas Co. and Southeastern Michigan Gas Co.	Transportation Balancing Provisions.
7/97	R-00973944	PA	Pennsylvania American Water Large Users Group	Pennsylvania-American Water Co.	Rate of return, cost of service, revenue requirements.
3/98	8390-U	GA	Georgia Natural Gas Group and the Georgia Textile Manufacturers Assoc.	Atlanta Gas Light	Rate of return, restructuring issues, unbundling, rate design issues.
7/98	R-00984280	PA	PG Energy, Inc. Intervenors	PGE Industrial	Cost allocation.
8/98	U-17735	LA	Louisiana Public Service Commission	Cajun Electric Power Cooperative	Revenue requirements.
10/98	97-596	ME	Maine Office of the Public Advocate	Bangor Hydro-Electric Co.	Return on equity, rate of return.
10/98	U-23327	LA	Louisiana Public Service Commission	SWEPCO, CSW and AEP	Analysis of proposed merger.
12/98	98-577	ME	Maine Office of the Public Advocate	Maine Public Service Co.	Return on equity, rate of return.
12/98	U-23358	LA	Louisiana Public Service Commission	Entergy Gulf States, Inc.	Return on equity, rate of return.
3/99	98-426	KY	Kentucky Industrial Utility Customers, Inc.	Louisville Gas and Electric Co	Return on equity.
3/99	99-082	KY	Kentucky Industrial Utility Customers, Inc.	Kentucky Utilities Co.	Return on equity.
4/99	R-984554	PA	T. W. Phillips Users Group	T. W. Phillips Gas and Oil Co.	Allocation of purchased gas costs.
6/99	R-0099462	PA	Columbia Industrial Intervenors	Columbia Gas of Pennsylvania	Balancing charges.
10/99	U-24182	LA	Louisiana Public Service Commission	Entergy Gulf States,Inc.	Cost of debt.

Expert Testimony Appearances
of
Richard A. Baudino
As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
10/99	R-00994782	PA	Peoples Industrial Intervenors	Peoples Natural Gas Co.	Restructuring issues.
10/99	R-00994781	PA	Columbia Industrial Intervenors	Columbia Gas of Pennsylvania	Restructuring, balancing charges, rate flexing, alternate fuel.
01/00	R-00994786	PA	UGI Industrial Intervenors	UGI Utilities, Inc.	Universal service costs, balancing, penalty charges, capacity Assignment.
01/00	8829	MD & United States	Maryland Industrial Gr.	Baltimore Gas & Electric Co.	Revenue requirements, cost allocation, rate design.
02/00	R-00994788	PA	Penn Fuel Transportation	PFG Gas, Inc., and	Tariff charges, balancing provisions.
05/00	U-17735	LA	Louisiana Public Service Comm.	Louisiana Electric Cooperative	Rate restructuring.
07/00	2000-080	KY	Kentucky Industrial Utility Consumers	Louisville Gas and Electric Co.	Cost allocation.
07/00	U-21453 U-20925 (SC), U-22092 (SC) (Subdocket E)	LA	Louisiana Public Service Commission	Southwestern Electric Power Co.	Stranded cost analysis.
09/00	R-00005654	PA	Philadelphia Industrial And Commercial Gas Users Group.	Philadelphia Gas Works	Interim relief analysis.
10/00	U-21453 U-20925 (SC), U-22092 (SC) (Subdocket B)	LA	Louisiana Public Service Commission	Entergy Gulf States, Inc.	Restructuring, Business Separation Plan.
11/00	R-00005277 (Rebuttal)	PA	Penn Fuel Transportation Customers	PFG Gas, Inc. and North Penn Gas Co.	Cost allocation issues.
12/00	U-24993	LA	Louisiana Public Service Commission	Entergy Gulf States, Inc.	Return on equity.
03/01	U-22092	LA	Louisiana Public Service Commission	Entergy Gulf States, Inc.	Stranded cost analysis.
04/01	U-21453 U-20925 (SC), U-22092 (SC) (Subdocket B) (Addressing Contested Issues)	LA	Louisiana Public Service Commission	Entergy Gulf States, Inc.	Restructuring issues.
04/01	R-00006042	PA	Philadelphia Industrial and Commercial Gas Users Group	Philadelphia Gas Works	Revenue requirements, cost allocation and tariff issues.

Expert Testimony Appearances
of
Richard A. Baudino
As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
11/01	U-25687	LA	Louisiana Public Service Commission	Entergy Gulf States, Inc.	Return on equity.
03/02	14311-U	GA	Georgia Public Service Commission	Atlanta Gas Light	Capital structure.
08/02	2002-00145	KY	Kentucky Industrial Utility Customers	Columbia Gas of Kentucky	Revenue requirements.
09/02	M-00021612	PA	Philadelphia Industrial And Commercial Gas Users Group	Philadelphia Gas Works	Transportation rates, terms, and conditions.
01/03	2002-00169	KY	Kentucky Industrial Utility Customers	Kentucky Power	Return on equity.
02/03	02S-594E	CO	Cripple Creek & Victor Gold Mining Company	Aquila Networks – WPC	Return on equity.
04/03	U-26527	LA	Louisiana Public Service Commission	Entergy Gulf States, Inc.	Return on equity.
10/03	CV020495AB	GA	The Landings Assn., Inc.	Utilities Inc. of GA	Revenue requirement & overcharge refund
03/04	2003-00433	KY	Kentucky Industrial Utility Customers	Louisville Gas & Electric	Return on equity, Cost allocation & rate design
03/04	2003-00434	KY	Kentucky Industrial Utility Customers	Kentucky Utilities	Return on equity
4/04	04S-035E	CO	Cripple Creek & Victor Gold Mining Company, Goodrich Corp., Holcim (U.S.) Inc., and The Trane Co.	Aquila Networks – WPC	Return on equity.
9/04	U-23327, Subdocket B	LA	Louisiana Public Service Commission	Southwestern Electric Power Company	Fuel cost review
10/04	U-23327 Subdocket A	LA	Louisiana Public Service Commission	Southwestern Electric Power Company	Return on Equity
06/05	050045-EI	FL	South Florida Hospital and HeallthCare Assoc.	Florida Power & Light Co.	Return on equity
08/05	9036	MD	Maryland Industrial Group	Baltimore Gas & Electric Co.	Revenue requirement, cost allocation, rate design, Tariff issues.
01/06	2005-0034	KY	Kentucky Industrial Utility Customers, Inc.	Kentucky Power Co.	Return on equity.

Expert Testimony Appearances
of
Richard A. Baudino
As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
03/06	05-1278-E-PC-PW-42T	WV	West Virginia Energy Users Group	Appalachian Power Company	Return on equity.
04/06	U-25116 Commission	LA	Louisiana Public Service	Entergy Louisiana, LLC	Transmission Issues
07/06	U-23327 Commission	LA	Louisiana Public Service	Southwestern Electric Power Company	Return on equity, Service quality
08/06	ER-2006-0314	MO	Missouri Office of the Public Counsel	Kansas City Power & Light Co.	Return on equity, Weighted cost of capital
08/06	06S-234EG	CO	CF&I Steel, L.P. & Climax Molybdenum	Public Service Company of Colorado	Return on equity, Weighted cost of capital
01/07	06-0960-E-42T	WV	West Virginia Energy Users Group	Monongahela Power & Potomac Edison	Return on Equity
01/07	43112	AK	AK Steel, Inc.	Vectren South, Inc.	Cost allocation, rate design
05/07	2006-661	ME	Maine Office of the Public Advocate	Bangor Hydro-Electric	Return on equity, weighted cost of capital.
09/07	07-07-01	CT	Connecticut Industrial Energy Consumers	Connecticut Light & Power	Return on equity, weighted cost of capital
10/07	05-UR-103	WI	Wisconsin Industrial Energy Group, Inc.	Wisconsin Electric Power Co.	Return on equity
11/07	29797	LA	Louisiana Public Service Commission	Cleco Power :LLC & Southwestern Electric Power	Lignite Pricing, support of settlement
01/08	07-551-EL-AIR	OH	Ohio Energy Group	Ohio Edison, Cleveland Electric, Toledo Edison	Return on equity
03/08	07-0585, 07-0585, 07-0587, 07-0588, 07-0589, 07-0590, (consol.)	IL	The Commercial Group	Ameren	Cost allocation, rate design
04/08	07-0566	IL	The Commercial Group	Commonwealth Edison	Cost allocation, rate design
06/08	R-2008-2011621	PA	Columbia Industrial Intervenors	Columbia Gas of PA	Cost and revenue allocation, Tariff issues
07/08	R-2008-2028394	PA	Philadelphia Area Industrial Energy Users Group	PECO Energy	Cost and revenue allocation, Tariff issues

Expert Testimony Appearances
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As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
07/08	R-2008-2039634	PA	PPL Gas Large Users Group	PPL Gas	Retainage, LUFG Pct.
08/08	6680-UR-116	WI	Wisconsin Industrial Energy Group	Wisconsin P&L	Cost of Equity
08/08	6690-UR-119	WI	Wisconsin Industrial Energy Group	Wisconsin PS	Cost of Equity
09/08	ER-2008-0318	MO	The Commercial Group	AmerenUE	Cost and revenue allocation
10/08	R-2008-2029325	PA	U.S. Steel & Univ. of Pittsburgh Med. Ctr.	Equitable Gas Co.	Cost and revenue allocation
10/08	08-G-0609	NY	Multiple Intervenors	Niagara Mohawk Power	Cost and Revenue allocation
12/08	27800-U	GA	Georgia Public Service Commission	Georgia Power Company	CWIP/AFUDC issues, Review financial projections
03/09	ER08-1056	FERC	Louisiana Public Service Commission	Entergy Services, Inc.	Capital Structure
04/09	E002/GR-08-1065	MN	The Commercial Group	Northern States Power	Cost and revenue allocation and rate design
05/09	08-0532	IL	The Commercial Group	Commonwealth Edison	Cost and revenue allocation
07/09	080677-EI	FL	South Florida Hospital and Health Care Association	Florida Power & Light	Cost of equity, capital structure, Cost of short-term debt
07/09	U-30975	LA	Louisiana Public Service Commission	Cleco LLC, Southwestern Public Service Co.	Lignite mine purchase
10/09	4220-UR-116	WI	Wisconsin Industrial Energy Group	Northern States Power	Class cost of service, rate design
10/09	M-2009-2123945	PA	PP&L Industrial Customer Alliance	PPL Electric Utilities	Smart Meter Plan cost allocation
10/09	M-2009-2123944	PA	Philadelphia Area Industrial Energy Users Group	PECO Energy Company	Smart Meter Plan cost allocation
10/09	M-2009-2123951	PA	West Penn Power Industrial Intervenors	West Penn Power	Smart Meter Plan cost allocation
11/09	M-2009-2123948	PA	Duquesne Industrial Intervenors	Duquesne Light Company	Smart Meter Plan cost allocation
11/09	M-2009-2123950	PA	Met-Ed Industrial Users Group Penelec Industrial Customer Alliance, Penn Power Users Group	Metropolitan Edison, Pennsylvania Electric Co., Pennsylvania Power Co.	Smart Meter Plan cost allocation

Expert Testimony Appearances
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Date	Case	Jurisdict.	Party	Utility	Subject
03/10	09-1352-	WV E-42T	West Virginia Energy Users Group	Monongahela Power	Return on equity, rate of return Potomac Edison
03/10	E015/GR-09-1151	MN	Large Power Intervenors	Minnesota Power	Return on equity, rate of return
04/10	2009-00459	KY	Kentucky Industrial Utility Consumers	Kentucky Power	Return on equity
04/10	2009-00548 2009-00549	KY	Kentucky Industrial Utility Consumers	Louisville Gas and Electric, Kentucky Utilities	Return on equity.
05/10	10-0261-E-GI	WV	West Virginia Energy Users Group	Appalachian Power Co./ Wheeling Power Co.	EE/DR Cost Recovery, Allocation, & Rate Design
05/10	R-2009-2149262	PA	Columbia Industrial Intervenors	Columbia Gas of PA	Class cost of service & cost allocation
06/10	2010-00036	KY	Lexington-Fayette Urban County Government	Kentucky American Water Company	Return on equity, rate of return, revenue requirements
06/10	R-2010-2161694	PA	PP&L Industrial Customer Alliance	PPL Electric Utilities	Rate design, cost allocation
07/10	R-2010-2161575	PA	Philadelphia Area Industrial Energy Users Group	PECO Energy Co.	Return on equity
07/10	R-2010-2161592	PA	Philadelphia Area Industrial Energy Users Group	PECO Energy Co.	Cost and revenue allocation
07/10	9230	MD	Maryland Energy Group	Baltimore Gas and Electric	Electric and gas cost and revenue allocation; return on equity
09/10	10-70	MA	University of Massachusetts-Amherst	Western Massachusetts Electric Co.	Cost allocation and rate design
10/10	R-2010-2179522	PA	Duquesne Industrial Intervenors	Duquesne Light Company	Cost and revenue allocation, rate design
11/10	P-2010-2158084	PA	West Penn Power Industrial Intervenors	West Penn Power Co.	Transmission rate design
11/10	10-0699-E-42T	WV	West Virginia Energy Users Group	Appalachian Power Co. & Wheeling Power Co.	Return on equity, rate of Return
11/10	10-0467	IL	The Commercial Group	Commonwealth Edison	Cost and revenue allocation and rate design
04/11	R-2010-2214415	PA	Central Pen Gas Large Users Group	UGI Central Penn Gas, Inc.	Tariff issues, revenue allocation
07/11	R-2011-2239263	PA	Philadelphia Area Energy Users Group	PECO Energy	Retainage rate

Expert Testimony Appearances
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Date	Case	Jurisdict.	Party	Utility	Subject
08/11	R-2011-2232243	PA	AK Steel	Pennsylvania-American Water Company	Rate Design
08/11	11AL-151G	CO	Climax Molybdenum	PS of Colorado	Cost allocation
09/11	11-G-0280	NY	Multiple Intervenors	Corning Natural Gas Co.	Cost and revenue allocation
10/11	4220-UR-117	WI	Wisconsin Industrial Energy Group	Northern States Power	Cost and revenue allocation, rate design
02/12	11AL-947E	CO	Climax Molybdenum, CF&I Steel	Public Service Company of Colorado	Return on equity, weighted cost of capital
07/12	120015-EI	FL	South Florida Hospitals and Health Care Association	Florida Power and Light Co,	Return on equity, weighted cost of capital
07/12	12-0613-E-PC	WV	West Virginia Energy Users Group	American Electric Power/APCo	Special rate proposal for Century Aluminum
07/12	R-2012-2290597	PA	PP&L Industrial Customer Alliance	PPL Electric Utilities Corp.	Cost allocation
09/12	05-UR-106	WI	Wisconsin Industrial Energy Group	Wisconsin Electric Power Co.	Class cost of service, cost and revenue allocation, rate design
09/12	2012-00221 2012-00222	KY	Kentucky Industrial Utility Consumers	Louisville Gas and Electric, Kentucky Utilities	Return on equity.
10/12	9299	MD	Maryland Energy Group	Baltimore Gas & Electric	Cost and revenue allocation, rate design Cost of equity, weighted cost of capital
10/12	4220-UR-118	WI	Wisconsin Industrial Energy Group	Northern States Power Company	Class cost of service, cost and revenue allocation, rate design
10/12	473-13-0199	TX	Steering Committee of Cities Served by Oncor	Cross Texas Transmission, LLC	Return on equity, capital structure
01/13	R-2012-2321748 et al.	PA	Columbia Industrial Intervenors	Columbia Gas of Pennsylvania	Cost and revenue allocation
02/13	12AL-1052E	CO	Cripple Creek & Victor Gold Mining, Holcim (US) Inc.	Black Hills/Colorado Electric Utility Company	Cost and revenue allocations
06/13	8009	VT	IBM Corporation	Vermont Gas Systems	Cost and revenue allocation, rate design
07/13	130040-EI	FL	WCF Hospital Utility Alliance	Tampa Electric Co.	Return on equity, rate of return
08/13	9326	MD	Maryland Energy Group	Baltimore Gas and Electric	Cost and revenue allocation, rate design, special rider

Expert Testimony Appearances
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Date	Case	Jurisdict.	Party	Utility	Subject
08/13	P-2012-2325034	PA	PP&L Industrial Customer Alliance	PPL Electric Utilities, Corp.	Distribution System Improvement Charge
09/13	4220-UR-119	WI	Wisconsin Industrial Energy Group	Northern States Power Co.	Class cost of service, cost and revenue allocation, rate design
11/13	13-1325-E-PC	WV	West Virginia Energy Users Group	American Electric Power/APCo	Special rate proposal, Felman Production
06/14	R-2014-2406274	PA	Columbia Industrial Intervenors	Columbia Gas of Pennsylvania	Cost and revenue allocation, rate design
08/14	05-UR-107	WI	Wisconsin Industrial Energy Group	Wisconsin Electric Power Co.	Cost and revenue allocation, rate design
10/14	ER13-1508 et al.	FERC	Louisiana Public Service Comm.	Entergy Services, Inc.	Return on equity
11/14	14AL-0660E	CO	Climax Molybdenum Co. and CFI Steel, LP	Public Service Co. of Colorado	Return on equity, weighted cost of capital
11/14	R-2014-2428742	PA	AK Steel	West Penn Power Company	Cost and revenue allocation
12/14	42866	TX	West Travis Co. Public Utility Agency	Travis County Municipal Utility District No. 12	Response to complain of monopoly power
3/15	2014-00371 2014-00372	KY	Kentucky Industrial Utility Customers	Louisville Gas & Electric, Kentucky Utilities	Return on equity, cost of debt, weighted cost of capital
3/15	2014-00396	KY	Kentucky Industrial Utility Customers	Kentucky Power Co.	Return on equity, weighted cost of capital
6/15	15-0003-G-42T	WV	West Virginia Energy Users Gp.	Mountaineer Gas Co.	Cost and revenue allocation, Infrastructure Replacement Program
9/15	15-0676-W-42T	WV	West Virginia Energy Users Gp.	West Virginia-American Water Company	Appropriate test year, Historical vs. Future
9/15	15-1256-G-390P	WV	West Virginia Energy Users Gp.	Mountaineer Gas Co.	Rate design for Infrastructure Replacement and Expansion Program
10/15	4220-UR-121	WI	Wisconsin Industrial Energy Gp.	Northern States Power Co.	Class cost of service, cost and revenue allocation, rate design
12/15	15-1600-G-390P	WV	West Virginia Energy Users Gp.	Dominion Hope	Rate design and allocation for Pipeline Replacement & Expansion Prog.
12/15	45188	TX	Steering Committee of Cities Served by Oncor	Oncor Electric Delivery Co.	Ring-fence protections for cost of capital

Expert Testimony Appearances
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Date	Case	Jurisdict.	Party	Utility	Subject
2/16	9406	MD	Maryland Energy Group	Baltimore Gas & Electric	Cost and revenue allocation, rate design, proposed Rider 5
3/16	39971	GA	GA Public Service Comm. Staff	Southern Company / AGL Resources	Credit quality and service quality issues
04/16	2015-00343	KY	Kentucky Office of the Attorney General	Atmos Energy	Cost of equity, cost of short-term debt, capital structure
05/16	16-G-0058 16-G-0059	NY	City of New York	Brooklyn Union Gas Co., KeySpan Gas East Corp.	Cost and revenue allocation, rate design, service quality issues
06/16	16-0073-E-C	WV	Constellium Rolled Products Ravenswood, LLC	Appalachian Power Co.	Complaint; security deposit
07/16	9418	MD	Healthcare Council of the National Capital Area	Potomac Electric Power Co.	Cost of equity, cost of service, Cost and revenue allocation
07/16	160021-EI	FL	South Florida Hospital and Health Care Association	Florida Power and Light Co.	Return on equity, cost of debt, capital structure
07/16	16-057-01	UT	Utah Office of Consumer Svcs.	Dominion Resources, Questar Gas Co.	Credit quality and service quality issues
08/16	8710	VT	Vermont Dept. of Public Service	Vermont Gas Systems	Return on equity, cost of debt, cost of capital
08/16	R-2016-2537359	PA	AK Steel Corp.	West Penn Power Co.	Cost and revenue allocation
09/16	2016-00162	KY	Kentucky Office of the Attorney General	Columbia Gas of Ky.	Return on equity, cost of short-term debt
09/16	16-0550-W-P	WV	West Va. Energy Users Gp.	West Va. American Water Co.	Infrastructure Replacement Program Surcharge
01/17	46238	TX	Steering Committee of Cities Served by Oncor	Oncor Electric Delivery Co.	Ring fencing and other conditions for acquisition, service quality and reliability
02/17	45414	TX	Cities of Midland, McAllen, and Colorado City	Sharyland Utilities, LP and Sharyland Dist. and Transmission Services, LLC	Return on equity
02/17	2016-00370 2016-00371	KY	Kentucky Industrial Utility Customers	Louisville Gas & Electric, Kentucky Utilities	Return on equity, cost of debt, weighted cost of capital
03/17	10580	TX	Atmos Cities Steering Committee	Atmos Pipeline Texas	Return on equity, capital structure, weighted cost of capital
03/17	R-3867-2013	Quebec, Canada	Canadian Federation of Independent Businesses	Gaz Metro	Marginal Cost of Service Study

Expert Testimony Appearances
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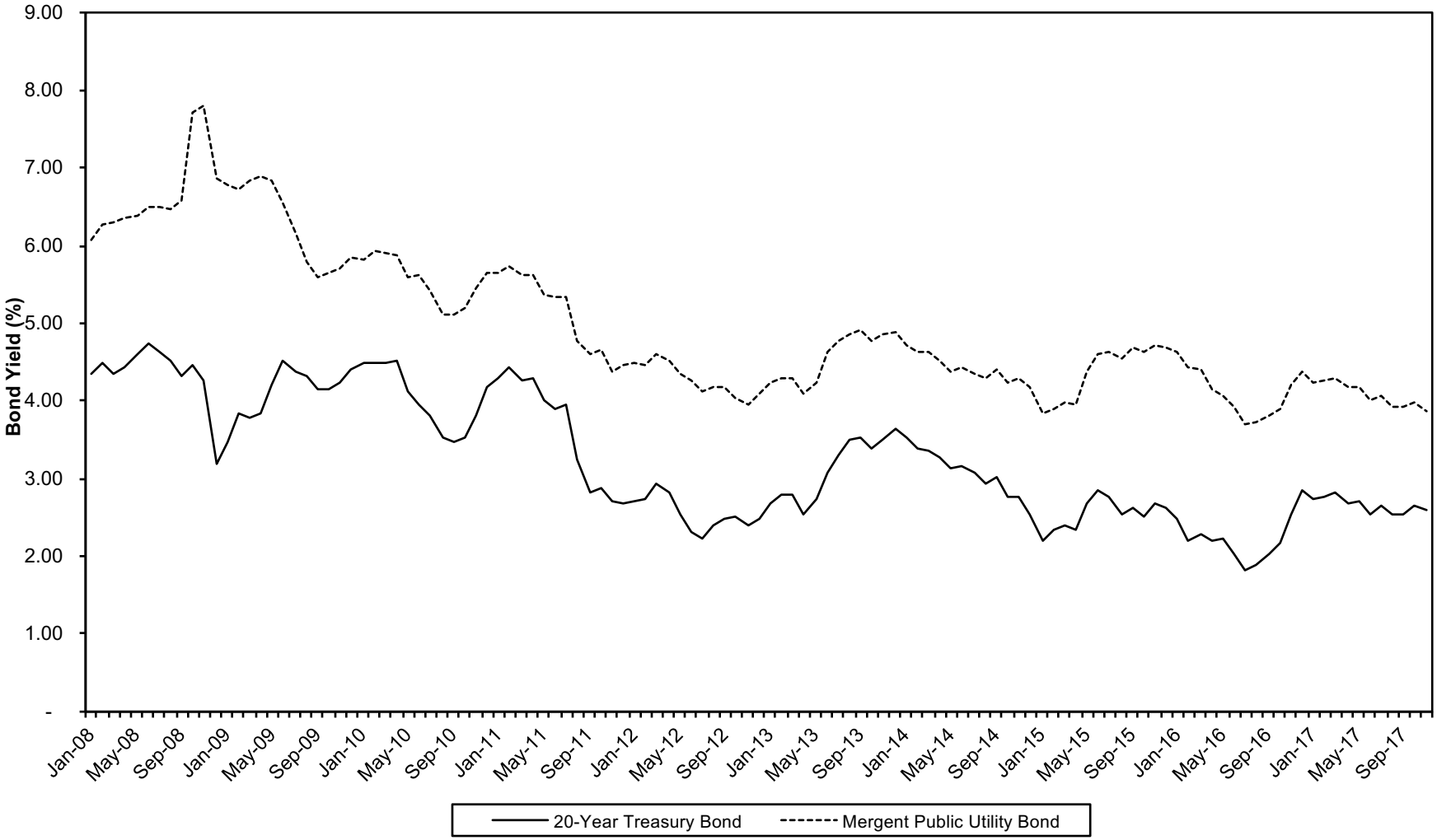
As of December 2017

Date	Case	Jurisdict.	Party	Utility	Subject
05/17	R-2017-2586783	PA	Philadelphia Industrial and Commercial Gas Users Gp.	Philadelphia Gas Works	Cost and revenue allocation, rate design, Interruptible tariffs
08/17	R-2017-2595853	PA	AK Steel	Pennsylvania American Water Co.	Cost and revenue allocation, rate design
8/17	17-3112-INV	VT	Vt. Dept. of Pubic Service	Green Mountain Power	Return on equity, cost of debt, weighted cost of capital
9/17	4220-UR-123	WI	Wisconsin Industrial Energy Group	Northern States Power	Cost and revenue allocation, rate design
10/17	2017-00179	KY	Kentucky Industrial Utility Customers, Inc.	Kentucky Power Co.	Return on equity, cost of short-term debt
12/17	2017-000321	KY	Office of the Attorney General	Duke Energy Kentucky, Inc.	Return on equity

HISTORICAL BOND YIELDS
AVERAGE PUBLIC UTILITY BOND VS 20-YEAR TREASURY BOND



DUKE ENERGY®

Fall 2017
Investor Meetings

Our investor proposition

DUK
LISTED
NYSE

A SOLID LONG-TERM HOLDING

4.0%
DIVIDEND YIELD(1) WITH DIVIDEND **GROWTH COMMITMENT(2)**

~8-10%
ATTRACTIVE RISK-ADJUSTED **TOTAL SHAREHOLDER RETURN(3)**

4-6%
HIGHLY ACHIEVABLE **EPS GROWTH THROUGH 2021(4)**

SUPPORTED BY THE STRENGTH OF OUR BALANCE SHEET

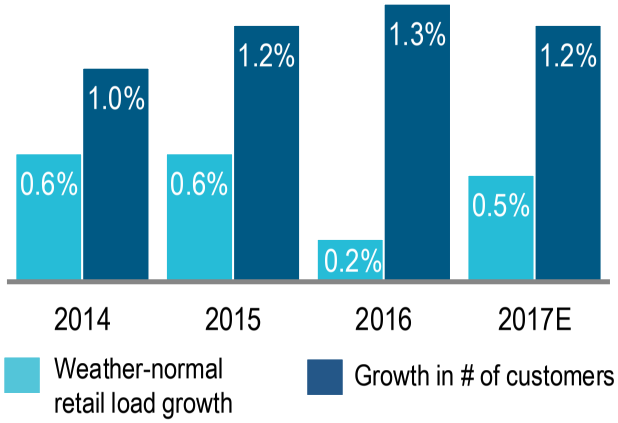
(1) *As of Oct. 31, 2017*
(2) *4-6% dividend growth subject to approval by the Board of Directors*
(3) *Total shareholder return proposition at a constant P/E ratio*
(4) *Based on adjusted diluted EPS off the midpoint of the original 2017 guidance range of $4.50-$4.70*

Managing regulatory lag to earn our allowed ROEs

EARNING ALLOWED ROEs
WITH **NO SIGNIFICANT RATE CASES** SINCE 2013

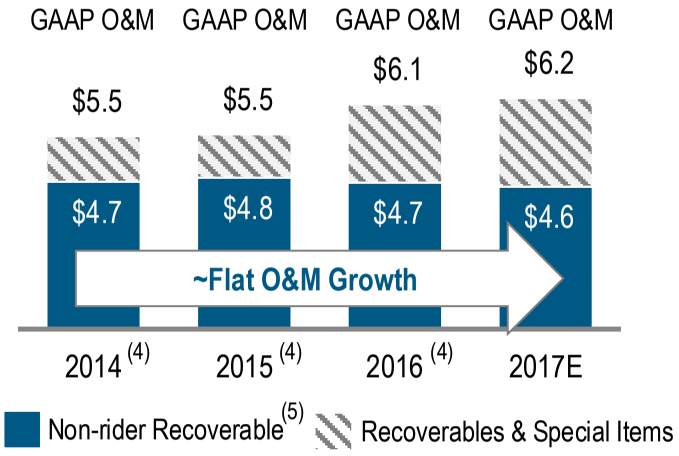
REGULATORY LAG MITIGATED
BY **CUSTOMER GROWTH**, FOCUSED **COST MANAGEMENT** EFFORTS AND **WHOLESALE EXPANSION**

CUSTOMER GROWTH AND VOLUME TRENDS(1)

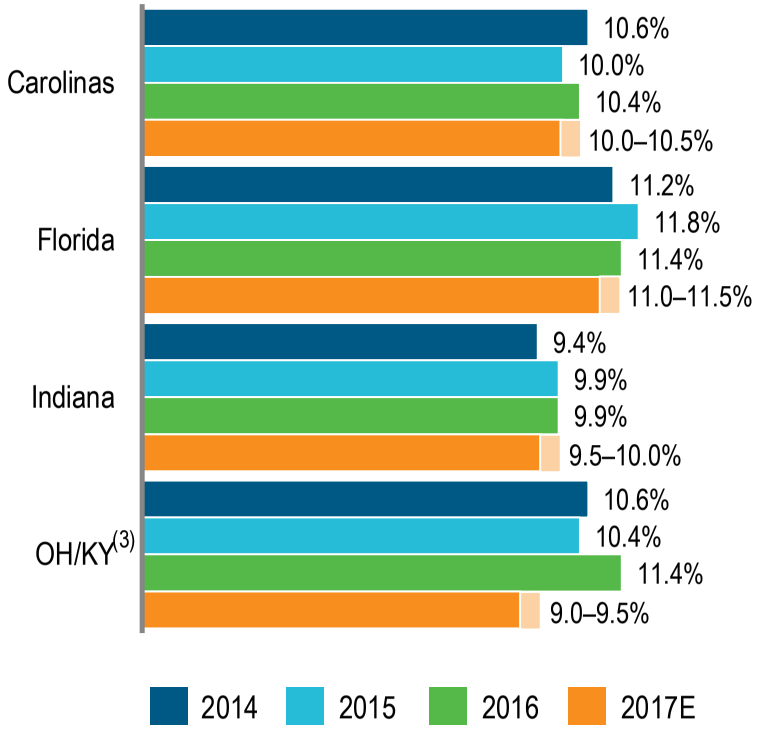


O&M COST MANAGEMENT(1)

($ IN BILLIONS)



ADJUSTED BOOK ROEs(1,2)



(1) *2017 assumptions as originally discussed on the Fourth Quarter 2016 Earnings Review and Business Update on Feb. 16, 2017*
(2) *Adjusted book ROEs exclude special items and are based on average book equity less Goodwill. Adjusted ROEs also include wholesale and are not adjusted for the impacts of weather. Regulatory ROEs will differ from Adjusted Book ROEs*
(3) *Combined electric and gas utilities*
(4) *Excludes Midwest Generation Business O&M (sold in April 2015), Latin American Generation Business (sold in December 2016)*
(5) *Excludes Piedmont Natural Gas, added beginning October 2016, to show trend*

Access to capital – 2017 long-term debt financing activity

Amount ($ in millions)	Entity	Date Issued	Credit Ratings (M/S&P, unless otherwise noted)	Term	Type	Rate
$650	DE Florida	January 2017	A1/A	10 Year	First Mortgage Bond	Fixed – 3.200%
$250	DE Florida	January 2017	A1/A	3 Year	First Mortgage Bond	Fixed – 1.850%
$100	DE Ohio	March 2017	A2/A	29.2 Year(1)	First Mortgage Bond	Fixed – 3.70%
$587	Texoma Wind	February 2017	BBB-(2)	17.4 Year(3)	Secured	Fixed – 4.12%
$420	Holdco(4)	April 2017	N/A	8 Year	Senior Notes	Fixed – 3.364%
$330	Holdco(4)	June 2017	Baa1/BBB+	3 Year	Senior Notes	Fixed – 2.100%
$270(5)	Holdco	June 2017	N/A	3 Year	Revolving Credit Facility	Floating
$125(6)	Piedmont	June 2017	N/A	1.5 Year	Term Loan	Floating
$233	High Noon Solar	August 2017	BBB-(2)	19.4 Year(3)	Secured	Fixed – 4.11%
$500	Holdco	August 2017	Baa1/BBB+	5 Year	Senior Notes	Fixed – 2.400%
$750	Holdco	August 2017	Baa1/BBB+	10 Year	Senior Notes	Fixed – 3.150%
$500	Holdco	August 2017	Baa1/BBB+	30 Year	Senior Notes	Fixed – 3.950%
$300	DE Progress	September 2017	Aa3/A	3 Year	First Mortgage Bond	Floating
$500	DE Progress	September 2017	Aa3/A	30 Year	First Mortgage Bond	Fixed – 3.600%
$30	DE Kentucky	September 2017	N/A	12 Year	Debentures	Fixed – 3.35%
$30	DE Kentucky	September 2017	N/A	30 Year	Debentures	Fixed – 4.11%
$30	DE Kentucky	September 2017	N/A	40 Year	Debentures	Fixed – 4.26%
$125(7)	Piedmont	September 2017	N/A	1.5 Year	Term Loan	Floating

(1) Re-opener of $250 million 3.70% first mortgage bonds originally issued in June 2016 and due 2046
(2) As rated by Kroll Bond Rating Agency, Inc.
(3) Notes are amortizing, represents final year of maturity
(4) Issuance privately placed
(5) Amount drawn on a $1 billion revolving credit facility
(6) First draw on $250 million term loan
(7) Second draw on $250 million term loan

PROXY GROUP
AVERAGE PRICE, DIVIDEND AND DIVIDEND YIELD

		Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17
Alliant Energy	High Price ($)	42.190	41.660	43.230	43.690	43.970	45.550
	Low Price ($)	40.160	39.360	40.500	41.160	41.050	42.880
	Avg. Price ($)	41.175	40.510	41.865	42.425	42.510	44.215
	Dividend ($)	0.315	0.315	0.315	0.315	0.315	0.315
	Mo. Avg. Div.	3.06%	3.11%	3.01%	2.97%	2.96%	2.85%
	6 mos. Avg.	2.99%					
Ameren Corp.	High Price ($)	57.210	56.670	60.790	60.910	62.140	64.890
	Low Price ($)	54.380	53.540	56.160	57.560	57.670	61.480
	Avg. Price ($)	55.795	55.105	58.475	59.235	59.905	63.185
	Dividend ($)	0.440	0.440	0.440	0.440	0.440	0.440
	Mo. Avg. Div.	3.15%	3.19%	3.01%	2.97%	2.94%	2.79%
	6 mos. Avg.	3.01%					
Black Hills	High Price ($)	72.020	70.800	71.010	70.970	69.790	65.710
	Low Price ($)	67.400	67.080	68.030	68.200	64.290	57.260
	Avg. Price ($)	69.710	68.940	69.520	69.585	67.040	61.485
	Dividend ($)	0.445	0.445	0.445	0.445	0.445	0.475
	Mo. Avg. Div.	2.55%	2.58%	2.56%	2.56%	2.66%	3.09%
	6 mos. Avg.	2.67%					
CenterPoint Energy	High Price ($)	29.080	28.340	30.120	30.450	29.970	30.070
	Low Price ($)	27.350	26.980	27.610	28.900	28.600	28.200
	Avg. Price ($)	28.215	27.660	28.865	29.675	29.285	29.135
	Dividend ($)	0.268	0.268	0.268	0.268	0.268	0.268
	Mo. Avg. Div.	3.80%	3.88%	3.71%	3.61%	3.66%	3.68%
	6 mos. Avg.	3.72%					
Chesapeake Utilities	High Price ($)	77.750	77.600	81.100	81.950	82.150	86.350
	Low Price ($)	73.650	74.800	77.150	76.950	77.650	78.600
	Avg. Price ($)	75.700	76.200	79.125	79.450	79.900	82.475
	Dividend ($)	0.325	0.325	0.325	0.325	0.325	0.325
	Mo. Avg. Div.	1.72%	1.71%	1.64%	1.64%	1.63%	1.58%
	6 mos. Avg.	1.65%					
CMS Energy Corp.	High Price ($)	48.370	47.020	48.910	49.110	48.920	50.850
	Low Price ($)	46.020	45.340	45.980	45.920	45.820	47.760
	Avg. Price ($)	47.195	46.180	47.445	47.515	47.370	49.305
	Dividend ($)	0.333	0.333	0.333	0.333	0.333	0.333
	Mo. Avg. Div.	2.82%	2.88%	2.81%	2.80%	2.81%	2.70%
	6 mos. Avg.	2.81%					
Consolidated Edison	High Price ($)	85.130	82.980	84.920	86.160	86.330	89.580
	Low Price ($)	80.670	80.040	82.040	80.020	80.260	85.270
	Avg. Price ($)	82.900	81.510	83.480	83.090	83.295	87.425
	Dividend ($)	0.690	0.690	0.690	0.690	0.690	0.690
	Mo. Avg. Div.	3.33%	3.39%	3.31%	3.32%	3.31%	3.16%
	6 mos. Avg.	3.30%					

PROXY GROUP
AVERAGE PRICE, DIVIDEND AND DIVIDEND YIELD

		Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17
Dominion Energy	High Price ($)	81.650	77.570	80.670	79.950	82.130	84.340
	Low Price ($)	76.170	75.400	76.560	76.230	75.750	80.010
	Avg. Price ($)	78.910	76.485	78.615	78.090	78.940	82.175
	Dividend ($)	0.755	0.755	0.755	0.755	0.755	0.770
	Mo. Avg. Div.	3.83%	3.95%	3.84%	3.87%	3.83%	3.75%
	6 mos. Avg.	3.84%					
DTE Energy Co.	High Price ($)	111.350	108.000	112.580	113.710	113.270	116.210
	Low Price ($)	105.130	104.190	106.160	106.210	106.210	109.580
	Avg. Price ($)	108.240	106.095	109.370	109.960	109.740	112.895
	Dividend ($)	0.825	0.825	0.825	0.825	0.825	0.825
	Mo. Avg. Div.	3.05%	3.11%	3.02%	3.00%	3.01%	2.92%
	6 mos. Avg.	3.02%					
Duke Energy Corp.	High Price ($)	87.490	85.330	87.950	88.400	88.640	91.800
	Low Price ($)	83.590	82.720	84.650	83.400	83.520	87.560
	Avg. Price ($)	85.540	84.025	86.300	85.900	86.080	89.680
	Dividend ($)	0.855	0.855	0.890	0.890	0.890	0.890
	Mo. Avg. Div.	4.00%	4.07%	4.13%	4.14%	4.14%	3.97%
	6 mos. Avg.	4.07%					
Eversource Energy	High Price ($)	63.340	61.560	63.670	64.190	62.840	66.150
	Low Price ($)	60.520	59.550	60.370	60.010	59.590	61.980
	Avg. Price ($)	61.930	60.555	62.020	62.100	61.215	64.065
	Dividend ($)	0.475	0.475	0.475	0.475	0.475	0.475
	Mo. Avg. Div.	3.07%	3.14%	3.06%	3.06%	3.10%	2.97%
	6 mos. Avg.	3.07%					
Exelon Corp.	High Price ($)	37.440	38.500	38.780	38.500	40.380	42.670
	Low Price ($)	35.800	35.370	37.250	36.630	37.550	39.470
	Avg. Price ($)	36.620	36.935	38.015	37.565	38.965	41.070
	Dividend ($)	0.328	0.328	0.328	0.328	0.328	0.328
	Mo. Avg. Div.	3.58%	3.55%	3.45%	3.49%	3.37%	3.19%
	6 mos. Avg.	3.44%					
Fortis	High Price ($)	47.060	45.660	46.430	45.800	47.780	48.730
	Low Price ($)	44.420	43.980	45.060	44.010	44.450	46.530
	Avg. Price ($)	45.740	44.820	45.745	44.905	46.115	47.630
	Dividend ($)	0.400	0.400	0.400	0.400	0.400	0.425
	Mo. Avg. Div.	3.50%	3.57%	3.50%	3.56%	3.47%	3.57%
	6 mos. Avg.	3.53%					

PROXY GROUP
AVERAGE PRICE, DIVIDEND AND DIVIDEND YIELD

		Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17
MGE Energy	High Price ($)	68.600	68.700	67.200	66.500	68.100	67.700
	Low Price ($)	63.800	61.800	62.010	63.200	63.800	63.630
	Avg. Price ($)	66.200	65.250	64.605	64.850	65.950	65.665
	Dividend ($)	0.308	0.308	0.323	0.323	0.323	0.323
	Mo. Avg. Div.	1.86%	1.89%	2.00%	1.99%	1.96%	1.97%
	6 mos. Avg.	1.94%					
NorthWestern Corp.	High Price ($)	63.860	61.800	61.360	60.820	59.610	64.380
	Low Price ($)	60.940	57.580	57.690	56.870	56.440	58.460
	Avg. Price ($)	62.400	59.690	59.525	58.845	58.025	61.420
	Dividend ($)	0.525	0.525	0.525	0.525	0.525	0.525
	Mo. Avg. Div.	3.37%	3.52%	3.53%	3.57%	3.62%	3.42%
	6 mos. Avg.	3.50%					
Public Svc. Enterprise Gp.	High Price ($)	45.800	45.360	47.470	47.010	49.700	53.200
	Low Price ($)	42.790	41.670	44.730	45.050	46.050	49.170
	Avg. Price ($)	44.295	43.515	46.100	46.030	47.875	51.185
	Dividend ($)	0.430	0.430	0.430	0.430	0.430	0.430
	Mo. Avg. Div.	3.88%	3.95%	3.73%	3.74%	3.59%	3.36%
	6 mos. Avg.	3.71%					
Vectren Corp.	High Price ($)	62.790	60.240	67.170	68.300	68.840	69.580
	Low Price ($)	58.240	57.480	59.450	64.930	65.570	64.000
	Avg. Price ($)	60.515	58.860	63.310	66.615	67.205	66.790
	Dividend ($)	0.420	0.420	0.420	0.420	0.420	0.450
	Mo. Avg. Div.	2.78%	2.85%	2.65%	2.52%	2.50%	2.70%
	6 mos. Avg.	2.67%					
WEC Energy Group	High Price ($)	64.370	63.500	65.710	67.200	68.030	70.090
	Low Price ($)	61.240	60.470	62.730	62.400	62.840	66.760
	Avg. Price ($)	62.805	61.985	64.220	64.800	65.435	68.425
	Dividend ($)	0.520	0.520	0.520	0.520	0.520	0.520
	Mo. Avg. Div.	3.31%	3.36%	3.24%	3.21%	3.18%	3.04%
	6 mos. Avg.	3.22%					
Xcel Energy Inc.	High Price ($)	48.500	47.700	49.700	50.560	49.830	52.220
	Low Price ($)	45.790	45.180	47.180	46.690	46.860	48.930
	Avg. Price ($)	47.145	46.440	48.440	48.625	48.345	50.575
	Dividend ($)	0.360	0.360	0.360	0.360	0.360	0.360
	Mo. Avg. Div.	3.05%	3.10%	2.97%	2.96%	2.98%	2.85%
	6 mos. Avg.	2.99%					
Monthly Avg. Dividend Yield		3.14%	3.20%	3.11%	3.10%	3.09%	3.03%
6-month Avg. Dividend Yield		3.11%					

Source: Yahoo! Finance

PROXY GROUP
DCF Growth Rate Analysis

Company	(1) Value Line DPS	(2) Value Line EPS	(3) Value Line B x R	(4) Zacks	(5) Yahoo! Finance
Alliant Energy	4.50%	6.00%	5.00%	6.20%	6.75%
Ameren Corp.	4.50%	6.00%	4.00%	6.70%	7.00%
Black Hills	5.00%	7.50%	5.00%	5.60%	4.26%
CenterPoint Energy	3.50%	6.00%	4.00%	5.50%	7.38%
Chesapeake Utilities	5.50%	8.00%	8.00%	6.00%	8.10%
CMS Energy Corp.	6.50%	6.50%	5.50%	6.50%	7.44%
Consolidated Edison	3.00%	2.50%	2.50%	3.00%	3.23%
Dominion Energy	9.00%	6.50%	2.00%	5.60%	3.64%
DTE Energy Co.	7.00%	6.00%	4.00%	6.00%	4.91%
Duke Energy Corp.	4.50%	4.50%	2.00%	4.00%	3.23%
Eversource Energy	6.00%	6.50%	4.00%	5.90%	5.91%
Exelon Corp.	5.50%	8.50%	4.50%	4.30%	0.84%
Fortis	6.00%	9.00%	3.00%	5.50%	5.50%
MGE Energy	4.00%	7.00%	6.50%	4.00%	4.00%
NorthWestern Corp.	5.00%	4.50%	4.00%	1.50%	2.25%
Pub Sv Enterprise Grp.	5.00%	1.00%	3.50%	2.70%	1.48%
Vectren Corp.	4.50%	6.50%	5.00%	5.70%	6.00%
WEC Energy Group	6.00%	6.00%	3.50%	5.30%	5.27%
Xcel Energy Inc.	6.00%	4.50%	3.50%	5.50%	5.50%
Averages	5.32%	5.95%	4.18%	5.03%	4.88%
Median Values	5.00%	6.00%	4.00%	5.50%	5.27%

Sources: Value Line Investment Survey, Sept. 15, Oct. 27, and Nov. 17, 2017
Yahoo! Finance growth rates retrieved November 27, 2017
Zacks growth rates retrieved November 27, 2017
Note: Yahoo! estimate for MGE Energy was used for Zacks' value, which was not available.
Note: Zacks estimates were used for Fortis' and Xcel's Yahoo! forecasts, which were not available

PROXY GROUP
DCF RETURN ON EQUITY

	(1) Value Line Dividend Gr.	(2) Value Line Earnings Gr.	(3) Zack's Earning Gr.	(4) Yahoo! Earning Gr.	(5) Average of All Gr. Rates
Method 1:					
Dividend Yield	3.11%	3.11%	3.11%	3.11%	3.11%
Average Growth Rate	5.32%	5.95%	5.03%	4.88%	5.29%
Expected Div. Yield	3.20%	3.21%	3.19%	3.19%	3.20%
DCF Return on Equity	***8.52%***	***9.16%***	***8.22%***	***8.07%***	***8.49%***
Method 2:					
Dividend Yield	3.11%	3.11%	3.11%	3.11%	3.11%
Median Growth Rate	5.00%	6.00%	5.50%	5.27%	5.44%
Expected Div. Yield	3.19%	3.21%	3.20%	3.20%	3.20%
DCF Return on Equity	***8.19%***	***9.21%***	***8.70%***	***8.47%***	***8.64%***

PROXY GROUP
Capital Asset Pricing Model Analysis

20-Year Treasury Bond, Value Line Beta

Line No.		Value Line
1	Market Required Return Estimate	9.35%
2	Risk-free Rate of Return, 20-Year Treasury Bond	
3	Average of Last Six Months	2.59%
4	Risk Premium	
5	(Line 1 minus Line 3)	6.76%
6	Comparison Group Beta	0.69
7	Comparison Group Beta * Risk Premium	
8	(Line 5 * Line 6)	4.64%
9	CAPM Return on Equity	
10	(Line 3 plus Line 8)	7.23%

5-Year Treasury Bond, Value Line Beta

1	Market Required Return Estimate	9.35%
2	Risk-free Rate of Return, 5-Year Treasury Bond	
3	Average of Last Six Months	1.88%
4	Risk Premium	
5	(Line 1 minus Line 3)	7.47%
6	Comparison Group Beta	0.69
7	Comparison Group Beta * Risk Premium	
8	(Line 5 * Line 6)	5.13%
9	CAPM Return on Equity	
10	(Line 3 plus Line 8)	7.01%

PROXY GROUP
Capital Asset Pricing Model Analysis

Supporting Data for CAPM Analyses

20 Year Treasury Bond Data

	Avg. Yield
June-17	2.54%
July-17	2.65%
August-17	2.55%
September-17	2.53%
October-17	2.65%
November-17	2.60%
6 month average	2.59%

Source: www.federalreserve.gov

5 Year Treasury Bond Data

	Avg. Yield
June-17	1.77%
July-17	1.87%
August-17	1.78%
September-17	1.80%
October-17	1.98%
November-17	2.05%
6 month average	1.88%

Value Line Market Return Data:

Forecasted Data:

Value Line Median Growth Rates:	
Earnings	10.50%
Book Value	7.50%
Average	9.00%
Average Dividend Yield	0.86%
Estimated Market Return	9.90%
Value Line Projected 3-5 Yr.	
Median Annual Total Return	8.00%
Average Annual Total Return	9.60%
Average	8.80%
Average of Projected Mkt.	
Returns	9.35%

Source: Value Line Investment Survey
for Windows retreived Nov. 30, 2017

Comparison Group Betas:	Value Line
Alliant Energy	0.70
Ameren Corp.	0.65
Black Hills	0.90
CenterPoint Energy	0.90
Chesapeake Utilities	0.70
CMS Energy Corp.	0.65
Consolidated Edison	0.50
Dominion Energy	0.65
DTE Energy Co.	0.65
Duke Energy Corp.	0.60
Eversource Energy	0.65
Exelon Corp.	0.70
Fortis	0.70
MGE Energy	0.75
NorthWestern Corp.	0.70
Pub Sv Enterprise Grp.	0.70
Vectren Corp.	0.75
WEC Energy Group	0.60
Xcel Energy Inc.	0.60
Average	0.69

PROXY GROUP
Capital Asset Pricing Model Analysis
Historic Market Premium

	Geometric Mean	Arithmetic Mean	Adjusted Arithmetic Mean
Long-Term Annual Return on Stocks	10.00%	12.00%	
Long-Term Annual Income Return on Long-Term Treas. Bonds	5.00%	5.00%	
Historical Market Risk Premium	5.00%	7.00%	5.97%
Comparison Group Beta, Value Line	0.69	0.69	0.69
Beta * Market Premium	3.43%	4.81%	4.10%
Current 20-Year Treasury Bond Yield	2.59%	2.59%	2.59%
CAPM Cost of Equity, Value Line Beta	**6.02%**	**7.39%**	**6.69%**

Source: *2017 SBBI Yearbook, Stocks, Bonds, Bills, and Inflation*, Duff and Phelps; pp. 2-6, 6-17, 10-30

Duke Energy Kentucky
Case No. 2017-00321
Attorney General's First Set Data Requests
Date Received: October 27, 2017

AG-DR-01-089

REQUEST:

Reference the Stipulation approved by the Commission in Case No. 2016-00152, paragraph 10, page 14, which states, "Duke Energy Kentucky commits that for any future 'major AMR or AMI meter investments, distribution grid investments for DA' [Distribution Automation] or 'SCADA or volt/var resources' that require a CPCN, the Company will include a detailed cost-benefit analysis similar to what was submitted in this case. " The Company is proposing a significant investment ($67 million over several years) for Rider DCI, "targeted undergrounding", in this case.

a. Provide a cost-benefit analysis for targeted undergrounding in accordance with the Company's commitment in Case No. 2016-00152, paragraph 10.
b. Identify the circuit/tap sections targeted for undergrounding for the first 3 years ($15 million) of the program.
c. Locate the circuit/tap sections targeted for undergrounding on a map.
d. For each circuit/tap section targeted, provide the length of undergrounding.
e. For each circuit/tap section targeted, provide the count of customers served by the section to be undergrounded.
f. For each circuit/tap section targeted, provide SAIDI and SAIFI data, both with and without Major Event Days.

g. For each circuit/tap section targeted, provide SAIDI and SAIFI data, both with and without Major Event Days.

h. Estimate the impact on Company-wide SAIDI and SAIFI, both with and without Major Event Days, from undergrounding these circuit/tap sections.

Include in your responses all workpapers, worksheets, calculations, estimates, assumptions, and other materials used to calculate the amounts.

RESPONSE:

a. Objection: Assumes facts not in evidence, and misstates and misconstrues the Company's prior commitment. Duke Energy Kentucky's Targeted Underground program does not fall under the investment categories referenced in the Stipulation and as approved by the Commission in Case No. 2016-00152. Targeted Underground is *not* a "major AMR or AMI meter investment," nor is it "a distribution grid investment for DA [Distribution Automation] or SCADA or volt/var resource[s] that requires a CPCN" as the Company agreed to in the Commission's April 13, 2016 Order in Case No. 2012-00428.

Notwithstanding the objection, and to the extent discoverable, the 10 year budget for the Targeted Underground program and associated line miles by year are provided as AG-DR-01-089(a)(1) Attachment. Reliability benefits of completing the candidate line miles identified through 2026 are provided as AG-DR-01-089(a)(2) Attachment for non-Major Event Days (MEDs) and as AG-DR-01-089(a)(3) Attachment for MEDs.

Duke's analysis to identify outlier overhead segments using previous ten years outage history was used to project MED event benefits. By using past MED outage data showing specific CI (customers interrupted), CMI (customer minutes of interruption) and outage events (total number) linked to specific device or equipment identifiers, we were able to perform analysis to look for correlations between those MED event devices and the proposed list of candidate targets for the Targeted Underground program.

That correlation analysis suggests that MED events we will see a 16% reduction in outage events post completion of the proposed TUG program and a 15-20% reduction in major event day duration depending on the severity of the MED event. These percentages represent the average experience over multiple events.

b. Duke Energy Kentucky has not yet selected specific circuit/tap sections to complete in the first 3 years of its Targeted Underground program. However, AG-DR-01-089(b)(1) Attachment contains information on candidate circuit segments that are being considered for prioritization to be deployed within the first 3 years of the program. AG-DR-01-089(b)(2) Attachment contains information on all the candidate circuit segments within the Company's 10-year scope for the Targeted Underground program.

c. AG-DR-01-089(c)(1) Attachment shows the location within Duke Energy Kentucky's service area of candidate line segments being considered for prioritization within the first three years of the Targeted Underground program. AG-DR-01-089(c)(2) Attachment shows the location within Duke

Energy Kentucky's service area of candidate line segments within the Company's ten-year scope for the Targeted Underground Program.

d. See response to AG-DR-01-089(b).

e. The attachments provided in response to AG-DR-01-089(b) provide the count of customers who have experienced an outage in the last ten years on each candidate section. Those attachments do not list the total customer count on those segments.

f. Duke Energy Kentucky does not have SAIDI and SAIFI data at the individual circuit section level.

g. See response to AG-DR-01-089(f).

h. See response to AG-DR-01-089(a).

PERSON RESPONSIBLE: Objection- Legal
Tony Platz

DEK Targeted Overhead/Underground Conversion											
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027*	Total
Total	$ -	**$ 5,048,798**	**$ 5,048,798**	**$ 5,048,798**	**$ 8,078,077**	**$ 7,575,000**	**$ 7,575,000**	**$ 7,575,000**	**$ 10,100,000**	**$ 10,100,000**	**$ 66,149,471**
Capital	$ -	$ 4,998,810	$ 4,998,810	$ 4,998,810	$ 7,998,096	$ 7,500,000	$ 7,500,000	$ 7,500,000	$ 10,000,000	$ 10,000,000	**$ 65,494,526**
O&M	$ -	$ 49,988	$ 49,988	$ 49,988	$ 79,981	$ 75,000	$ 75,000	$ 75,000	$ 100,000	$ 100,000	**$ 654,945**

Unit Cost	$ 470,000										
Units (Miles)	0	11	11	11	17	16	16	16	21	21	141

[1] Targeted Underground benefits were calculated based on spend projections and line miles through end of 2026. 2027 budget amount was not known until the time of testimony development.

DEK	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2012-2016 Std Dev	80% CI
SAIFI Trend	0.70	0.61	0.52	0.51	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.16	0.21
MAX	0.91	0.82	0.72	0.72	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71		
MIN	0.49	0.40	0.31	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29		
Targeted Underground (TUG) SAIFI Savings	0.70	0.61	0.52	0.51	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		
MAX	0.91	0.82	0.72	0.72	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71		
MIN	0.49	0.40	0.31	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29		

DEK	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2012-2016 Std Dev	80% CI
SAIDI Trend	97	94	91	88	86	83	80	77	75	72	69	66	7.06	9.06
MAX	106	103	100	98	95	92	89	86	84	81	78	75		
MIN	88	85	82	79	77	74	71	68	66	63	60	57		
TUG SAIDI Savings	97	94	91	88	84	81	77	73	69	65	61	60		
MAX	106	103	100	97	93	90	86	82	78	74	70	69		
MIN	88	85	82	79	75	71	68	64	60	56	52	51		

DEK	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027		2012-2016 Std Dev	80% CI
EVENTS Trend	3,365	3,263	3,160	3,057	2,955	2,852	2,749	2,646	2,544	2,441	2,338		204.98	262.79
MAX	3,628	3,525	3,423	3,320	3,217	3,115	3,012	2,909	2,806	2,704	2,601			
MIN	3,103	3,000	2,897	2,794	2,692	2,589	2,486	2,384	2,281	2,178	2,076			
TUG EVENTS Savings	3,365	3,263	3,160	3,000	2,840	2,680	2,491	2,302	2,113	1,924	1,707			
MAX	3,628	3,525	3,423	3,263	3,102	2,942	2,754	2,565	2,376	2,187	1,970			
MIN	3,103	3,000	2,897	2,737	2,577	2,417	2,228	2,039	1,850	1,662	1,444			