

Public Service Company of New Hampshire
d/b/a Eversource Energy
Docket No. DE 19-057
Testimony of Ann E. Bulkley
May 28, 2019

STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

DOCKET NO. DE 19-057
REQUEST FOR PERMANENT RATES

DIRECT TESTIMONY OF
ANN E. BULKLEY

Return on Equity

On behalf of Public Service Company of New Hampshire
d/b/a Eversource Energy

May 28, 2019

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Attachment AEB-2	Summary of Results
Attachment AEB-3	Proxy Group Selection
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1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is Ann E. Bulkley. I am a consultant with Concentric Energy Advisors,
4 Inc. (“Concentric”) with a business address of 293 Boston Post Road West, Suite
5 500, Marlborough, Massachusetts 01752.

6 **Q. What is your position with Concentric?**

7 A. I am employed by Concentric as a Senior Vice President.

8 **Q. On whose behalf are you submitting this Direct Testimony?**

9 A. I am submitting this Direct Testimony before the New Hampshire Public Utilities
10 Commission (“Commission”) on behalf of Public Service Company of New
11 Hampshire (“PSNH” or the “Company”).

12 **Q. Please describe your education and experience.**

13 A. I hold a Bachelor’s degree in Economics and Finance from Simmons College and
14 a Master’s degree in Economics from Boston University, with more than 20 years
15 of experience consulting to the energy industry. I have advised numerous energy

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1 and utility clients on a wide range of financial and economic issues with primary
2 concentrations in valuation and utility rate matters. Many of these assignments
3 have included the determination of the cost of capital for valuation and ratemaking
4 purposes. I have included my resume and a summary of testimony that I have filed
5 in other proceedings as Attachment AEB-1.

6 **Q. Please describe Concentric's activities in energy and utility engagements.**

7 A. Concentric provides financial and economic advisory services to many and various
8 energy and utility clients across North America. Our regulatory, economic, and
9 market analysis services include utility ratemaking and regulatory advisory
10 services; energy market assessments; market entry and exit analysis; corporate and
11 business unit strategy development; demand forecasting; resource planning; and
12 energy contract negotiations. Our financial advisory activities include buy and sell-
13 side merger, acquisition and divestiture assignments; due diligence and valuation
14 assignments; project and corporate finance services; and transaction support
15 services. In addition, we provide litigation support services on a wide range of
16 financial and economic issues on behalf of clients throughout North America.

17 **Q. Have you testified before any regulatory authorities?**

18 A. Yes. A list of proceedings in which I have provided testimony is provided in
19 Attachment AEB-1.

1 **II. PURPOSE AND OVERVIEW OF DIRECT TESTIMONY**

2 **Q. What is the purpose of your Direct Testimony?**

3 A. The purpose of my Direct Testimony is to present evidence and provide a
4 recommendation regarding the Company's Return on Equity ("ROE")¹ and to
5 provide an assessment of the capital structure to be used for ratemaking purposes.
6 My analyses and recommendations are supported by the data presented in
7 Attachment AEB-2 through Attachment AEB-13, which were prepared by me or
8 under my direction.

9 **Q. Please provide a brief overview of the analyses that led to your ROE**
10 **recommendation.**

11 A. As discussed in more detail in Section VII, in developing my ROE
12 recommendation, I applied the Constant Growth and Projected forms of the
13 Discounted Cash Flow ("DCF") model, the Capital Asset Pricing Model ("CAPM")
14 and the Risk Premium Approach. My recommendation also takes into
15 consideration: (1) the regulatory environment in which the Company operates; (2)
16 the Company's adjustment mechanisms; and (3) Flotation Cost. Finally, I
17 considered the Company's proposed capital structure as compared to the capital
18 structures of the proxy companies.² While I did not make any specific adjustments
19 to my ROE estimates for any of these factors, I did take them into consideration in

¹ Throughout my Direct Testimony, I interchangeably use the terms "ROE" and "cost of equity".

² The selection and purpose of developing a group of comparable companies will be discussed in detail in Section VI of my Direct Testimony.

1 aggregate when determining where the Company's ROE falls within the range of
2 analytical results.

3 **Q. How is the remainder of your Direct Testimony organized?**

4 A. Section III provides a summary of my analyses and conclusions. Section IV reviews
5 the regulatory guidelines pertinent to the development of the cost of capital.
6 Section V discusses current and projected capital market conditions and the effect
7 of those conditions on the Company's cost of equity. Section VI explains my
8 selection of a proxy group of electric utilities. Section VII describes my analyses
9 and the analytical basis for the recommendation of the appropriate ROE for PSNH.
10 Section VIII provides a discussion of specific regulatory, business, and financial
11 risks that have a direct bearing on the ROE to be authorized for the Company in
12 this case. Section IX assesses the Company's proposed capital structure as
13 compared to the proxy group. Section X presents my conclusions and
14 recommendation for the market cost of equity.

15 **III. SUMMARY OF ANALYSIS AND CONCLUSIONS**

16 **Q. Please summarize the key factors considered in your analyses and upon which**
17 **you base your recommended ROE.**

18 A. My analyses and recommendations considered the following:

- 19 • The *Hope* and *Bluefield* decisions³ that established the standards for
20 determining a fair and reasonable allowed ROE, including consistency of

³ Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944); Bluefield Waterworks & Improvement Co., v. Public Service Commission of West Virginia, 262 U.S. 679 (1923).

1 the allowed return with other businesses having similar risk, adequacy of
2 the return to provide access to capital and support credit quality, and that
3 result must lead to just and reasonable rates.

4 • The effect of current and projected capital market conditions on investors'
5 return requirements.

6 • The Company's regulatory, business, and financial risks relative to the
7 proxy group of comparable companies and the implications of those risks in
8 arriving at the appropriate ROE.

9 **Q. Please explain how you considered those factors.**

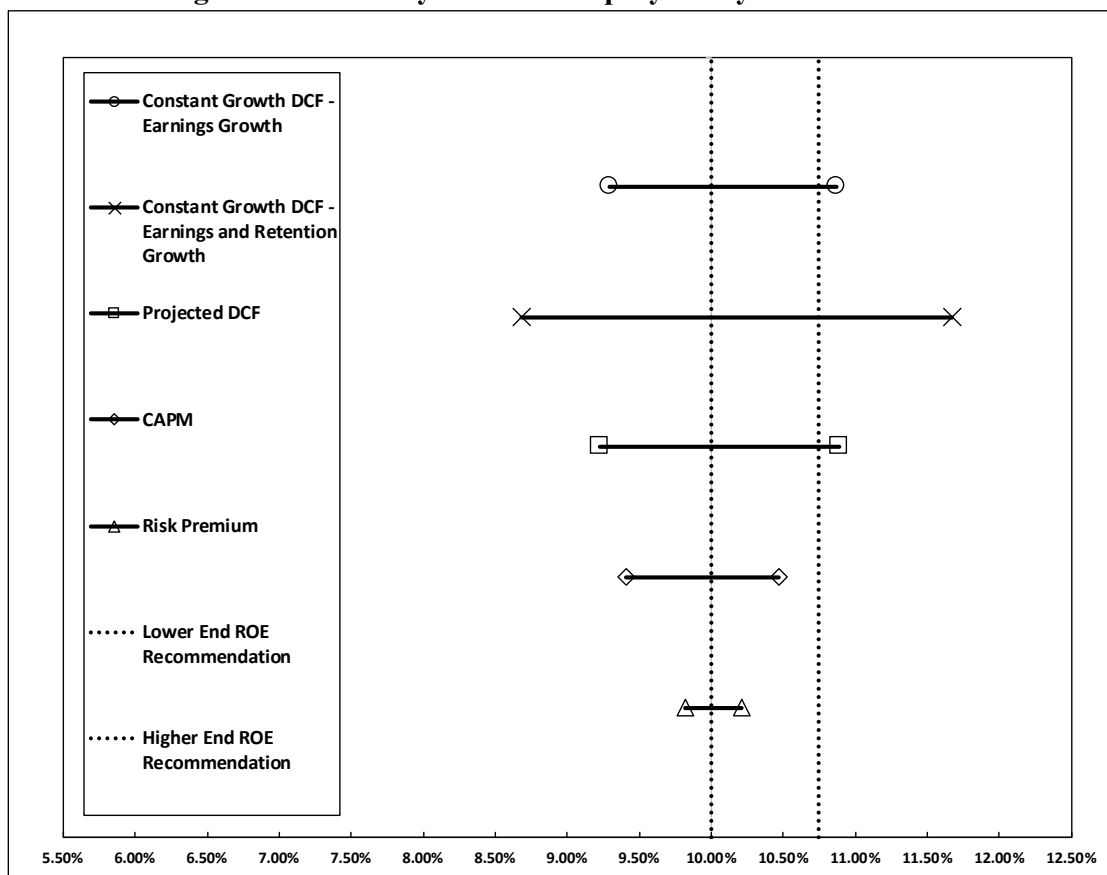
10 A. I have relied on several analytical approaches to estimate PSNH's cost of equity
11 based on a proxy group of publicly traded companies. As shown in Figure 1, those
12 ROE estimation models produce a wide range of results. My conclusion as to where
13 within that range of results PSNH's ROE should be set is based on PSNH's business
14 and financial risk relative to the proxy group.

15 **Q. Please summarize the ROE estimation models that you considered to establish**
16 **the range of ROEs for PSNH.**

17 A. I considered the results of three DCF models: (1) Constant Growth DCF model
18 using current dividends, earnings growth rates and stock prices; (2) Constant
19 Growth DCF model using current dividends, earnings and retention growth rates,
20 and stock prices; and (3) Constant Growth DCF model developed using Value Line
21 projected dividends and stock prices. In addition, I considered two risk premium

approaches: the CAPM and a Bond Yield Plus Risk Premium methodology. Figure 1 summarizes the range of results established using each of these estimation methodologies.

Figure 1: Summary of Cost of Equity Analytical Results⁴



As shown on Figure 1 (and in Attachment AEB-2), the range of the DCF model results is wide, particularly in relation to the results of the other methodologies.

⁴ The analytical results reflect the results of the Constant Growth and Projected DCF analysis excluding the results for individual companies that did not meet the minimum threshold of 7.00 percent.

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1 While it is common to consider multiple models to estimate the cost of equity, it is
2 particularly important when the range of results is wide.

3 The requested ROE is for the future rate period; therefore, the analyses supporting
4 my recommendation rely on forward-looking inputs and assumptions (e.g.,
5 projected growth rates in the DCF model, forecasted risk-free rate and Market Risk
6 Premium in the CAPM analysis, etc.) and takes into consideration the current high
7 valuations of utility stocks and the market's expectation for higher interest rates.
8 The use of historical inputs and assumptions would tend to understate the required
9 ROE for PSNH, when considering current and projected conditions in capital
10 markets.

11 As discussed in more detail in Sections V and VII, the DCF models are influenced
12 by current market conditions that are not projected to be sustained in the long-term.
13 Those conditions result in lower estimates of the ROE using the DCF model. For
14 example, the mean low DCF results⁵ (prior to exclusions for outliers) for the proxy
15 group range from 8.29 to 8.42 percent for the Constant Growth DCF model using
16 earnings growth rates and from 7.17 to 7.30 percent for the Constant Growth DCF
17 model using earnings and retention growth rates.⁶ Therefore, the range of mean
18 low DCF results is below an acceptable range of returns for an electric utility.

⁵ My DCF models generated a mean low, mean, and mean high result. The mean low result is the average of the proxy group DCF results calculated using the lowest earnings growth rate for each company from Value Line, Yahoo!Finance or Zacks.

⁶ The range of DCF results was developed using the 30-, 90-, and 180-day average price assumption.

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1 Based on prospective capital market conditions, and the inverse relationship
2 between the market risk premium and interest rates, I conclude that the mean low
3 DCF results do not provide a sufficient risk premium to compensate equity
4 investors for the residual risks of ownership, including the risk that they have the
5 lowest claim on the assets and income of PSNH.

6 In my recommendation, I balance concerns about the results produced by the DCF
7 model with recognition that the Commission has historically given weight to that
8 model. My ROE recommendation considers the mean and mean-high results of the
9 DCF model, a forward-looking CAPM analysis, and a Bond Yield plus Risk
10 Premium analysis. I also consider company-specific risk factors and current and
11 prospective capital market conditions.

12 **Q. What is your recommended ROE for PSNH?**

13 A. In addition to the analytical results presented in Figure 1, I also considered the level
14 of regulatory, business, and financial risk faced by the Company relative to the
15 proxy group to establish the range of reasonable returns. Considering these factors
16 and recognizing the Commission's historical preference for the Constant Growth
17 DCF model, I believe a range from 10.00 to 10.75 percent is appropriate. This
18 recommendation reflects the range of results for the proxy group companies, the
19 relative risk of PSNH as compared to the proxy group, and current capital market
20 conditions. Within that range, a return of 10.40 percent fairly balances the interests
21 of customers and shareholders.

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1 **Q. Please summarize the analysis you conducted in determining that PSNH's**
2 **requested capital structure is reasonable and appropriate.**

3 A. Based on the analysis presented in Section IX of my testimony, I conclude that the
4 Company's proposed 54.85 percent common equity is reasonable. To determine if
5 PSNH's requested capital structure was reasonable, I reviewed the capital
6 structures of the utility subsidiaries of the proxy companies. As shown in
7 Attachment AEB-13, the results of that analysis demonstrate that the average equity
8 ratios for the utility operating companies of the proxy group range from 46.72
9 percent to 59.97 percent. PSNH's proposed equity ratio of 54.85 percent is close
10 to the mean for the proxy group and is reasonable, especially considering that
11 Federal tax reform legislation has had a negative effect on the cash flows and credit
12 metrics of regulated utilities.

13 **IV. REGULATORY GUIDELINES**

14 **Q. Please describe the guiding principles to be used in establishing the cost of**
15 **capital for a regulated utility.**

16 A. The United States Supreme Court's precedent-setting *Hope* and *Bluefield* cases
17 established the standards for determining the fairness or reasonableness of a
18 utility's allowed ROE. Among the standards established by the Court in those cases
19 are: (1) consistency with other businesses having similar or comparable risks; (2)
20 adequacy of the return to support credit quality and access to capital; and (3) that

1 the result, as opposed to the methodology employed, is the controlling factor in
2 arriving at just and reasonable rates.⁷

3 **Q. Has the Commission provided similar guidance in establishing the appropriate**
4 **return on common equity?**

5 A. Yes, it has. In its decision in Docket No. DG 08-009, the Commission stated that
6 it adheres to the capital attraction standard discussed in the *Hope* and *Bluefield*
7 decisions.⁸ Additionally, the Commission noted that it is:

8 bound to set a rate of return that falls within a zone of
9 reasonableness, neither so low to result in a confiscation of
10 company property, nor so high as to result in extortionate
11 charges to customers. A rate falling within that zone should, at
12 a minimum, be sufficient to yield the cost of debt and equity
13 capital necessary to provide the assets required for the
14 discharge of the company's responsibility.⁹

15 This guidance is in accordance with my view that an allowed rate of return must be
16 sufficient to enable regulated companies, like PSNH, the ability to attract capital on
17 reasonable terms.

18 **Q. Why is it important for a utility to be allowed the opportunity to earn an ROE**
19 **that is adequate to attract capital at reasonable terms?**

20 A. An ROE that is adequate to attract capital at reasonable terms enables the Company
21 to continue to provide safe, reliable electric service while maintaining its financial
22 integrity. To the extent the Company is provided the opportunity to earn its market-
23 based cost of capital, neither customers nor shareholders are disadvantaged.

⁷ *Hope*, 320 U.S. 591 (1944); *Bluefield*, 262 U.S. 679 (1923).

⁸ EnergyNorth Natural Gas, Inc. d/b/a National Grid NH, Docket No. DG 08-009, Order No. 24,972, May 29, 2009, at 54-55.

⁹ *Id.*, at 54. See also, Appeal of Conservation Law Foundation, 127 N.H. 606, 635 (1986).

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1 **Q. Is a utility's ability to attract capital also affected by the ROEs that are**
2 **authorized for other utilities?**

3 A. Yes. Utilities compete directly for capital with other investments of similar risk,
4 which include other electric utilities. Therefore, the ROE awarded to a utility sends
5 an important signal to investors regarding whether there is regulatory support for
6 financial integrity, dividends, growth, and fair compensation for business and
7 financial risk. The cost of capital represents an opportunity cost to investors. If
8 higher returns are available for other investments of comparable risk, investors have
9 an incentive to direct their capital to those investments. Thus, an authorized ROE
10 significantly below authorized ROEs for other electric utilities can inhibit the
11 utility's ability to attract capital for investment in New Hampshire.

12 **Q. What are your conclusions regarding regulatory guidelines?**

13 A. The ratemaking process is premised on the principle that, for investors and
14 companies to commit the capital needed to provide safe and reliable utility services,
15 a utility must have the opportunity to recover the return of, and the market-required
16 return on, its invested capital. Because utility operations are capital-intensive,
17 regulatory decisions should enable the utility to attract capital at reasonable terms
18 under a variety of economic and financial market conditions; doing so balances the
19 long-term interests of the utility and its ratepayers.

20 The financial community carefully monitors the current and expected financial
21 condition of utility companies, and the regulatory framework in which they operate.

22 In that respect, the regulatory framework is one of the most important factors in

1 both debt and equity investors' assessments of risk. The Commission's order in
2 this proceeding, therefore, should establish rates that provide PSNH with the
3 opportunity to earn an ROE that is: (1) adequate to attract capital at reasonable
4 terms under a variety of economic and financial market conditions; (2) sufficient to
5 ensure good management and its financial integrity; and (3) commensurate with
6 returns on investments in enterprises with similar risk. To the extent PSNH is
7 authorized the opportunity to earn its market-based cost of capital, the proper
8 balance is achieved between customers' and shareholders' interests.

9 **V. CAPITAL MARKET CONDITIONS**

10 **Q. Why is it important to analyze capital market conditions?**

11 A. The ROE estimation models rely on market data that are either specific to the proxy
12 group, in the case of the DCF model, or to the expectations of market risk, in the
13 case of the CAPM. The results of the ROE estimation models can be affected by
14 prevailing market conditions at the time the analysis is performed. While the ROE
15 that is established in a rate proceeding is intended to be forward-looking, the analyst
16 uses current and projected market data, specifically stock prices, dividends, growth
17 rates and interest rates in the ROE estimation models to estimate the required return
18 for the subject company.

19 As is discussed in the remainder of this section, analysts and regulatory
20 commissions have concluded that current market conditions have affected the
21 results of the ROE estimation models. As a result, it is important to consider the
22 effect of these conditions on the ROE estimation models when determining the

1 appropriate range and recommended ROE for a future period. If investors do not
2 expect current market conditions to be sustained in the future, it is possible that the
3 ROE estimation models will not provide an accurate estimate of investors' required
4 return during that rate period. Therefore, it is very important to consider projected
5 market data to estimate the return for that forward-looking period.

6 **Q. What factors are affecting the cost of equity for regulated utilities in the**
7 **current and prospective capital markets?**

8 A. The cost of equity for regulated utility companies is being affected by several
9 factors in the current and prospective capital markets, including: (1) the current low
10 interest rate environment and the corresponding effect on valuations and dividend
11 yields of utility stocks relative to historical levels; (2) the market's expectation for
12 interest rates; and (3) recent Federal tax reform. In this section, I discuss each of
13 these factors and how it affects the models used to estimate the cost of equity for
14 regulated utilities.

15 **A. The Effect of Market Conditions on Valuations**

16 **Q. How has the Federal Reserve's monetary policy affected capital markets in**
17 **recent years?**

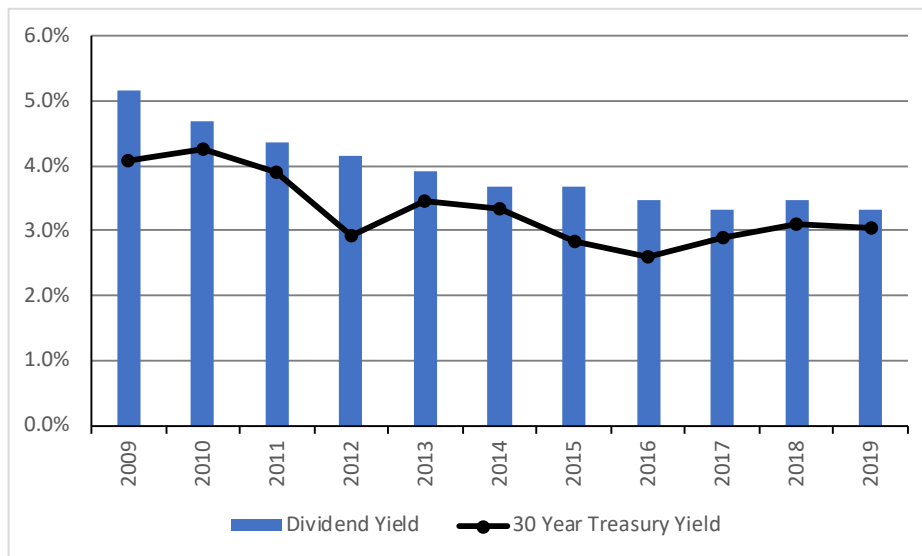
18 A. Extraordinary and persistent federal intervention in capital markets artificially
19 lowered government bond yields after the Great Recession of 2008-2009, as the
20 Federal Open Market Committee ("FOMC") used monetary policy (both reductions
21 in short-term interest rates and purchases of Treasury bonds and mortgage-backed
22 securities) to stimulate the U.S. economy. As a result of very low or zero returns
23 on short-term government bonds, yield-seeking investors have been forced into

1 longer-term instruments, bidding up prices and reducing yields on those
2 investments. As investors have moved along the risk spectrum in search of yields
3 that meet their return requirements, there has been increased demand for dividend-
4 paying equities, such as gas and electric utility stocks.

5 **Q. How has the period of abnormally low interest rates affected the valuations**
6 **and dividend yields of utility shares?**

7 A. The Federal Reserve's accommodative monetary policy has caused investors to
8 seek alternatives to the historically low interest rates available on Treasury bonds.
9 A result of this search for higher yield is that the share prices for many common
10 stocks, especially dividend-paying stocks such as utilities, have been driven higher
11 while the dividend yields (which are computed by dividing the dividend payment
12 by the stock price) have decreased to levels well below the historical average. As
13 shown in Figure 2, over the period from 2009 through 2017, since the Federal
14 Reserve intervened to stabilize financial markets and support the economic
15 recovery after the Great Recession of 2008-09, Treasury bond yields and utility
16 dividend yields declined. Specifically, Treasury bond yields declined by
17 approximately 118 basis points, and electric utility dividend yields have decreased
18 by about 185 basis points over this same period.

Figure 2: Dividend Yields for Electric Utility Stocks



Note: Figure includes data through February 28, 2019.

Source: SNL Financial

Q. How have higher stock valuations and lower dividend yields for utility companies affected the results of the DCF model?

A. During periods of general economic and capital market stability, the DCF model may adequately reflect market conditions and investor expectations. However, in the current market environment, the DCF model results are distorted by the historically low level of interest rates and the higher valuation of utility stocks.

Value Line recently commented on the high valuations of electric utilities:

Even after a pullback in late 2018, most stocks in the Electric Utility Industry are still priced expensively, in our view. Many of the equities are still trading within our 2021-2023 Target Price Range. The industry's average dividend yield is 3.5%, and some stocks have yields that aren't significantly higher than the median of all stocks under our coverage. For the 3- to 5-year period, the group's average total return potential is just 5%.¹⁰

¹⁰ Value Line Investment Survey, Electric Utility (West) Industry, January 25, 2019, at 2217.

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1 This is further supported by a recent Edward Jones report on the utility sector:

2 Utility valuations have climbed back to near-record levels as
3 10-year Treasury bond rates have fallen back to around 2.5%.
4 On a price-to-earnings basis, remain significantly above their
5 historical average, and have been trading near all-time highs.
6 We have seen utility valuations moving in line with interest
7 rate movements, although there have been exceptions to this.
8 Overall, however, we believe the low-interest rate
9 environment has been the biggest factor in pushing utilities
10 higher since many investors buy them for their dividend yield.
11 Utilities recently hit new all-time highs, and are still trading
12 significantly above their average price-to-earnings ratio over
13 the past decade. The premium valuation continues to reflect
14 not only the low interest rate environment, but also the stable
15 and predominantly regulated earnings growth we foresee.¹¹

16 As noted by Value Line and Edward Jones, over the last few years, utility stocks
17 have experienced high valuations and low dividend yields; driven by investors
18 moving into dividend paying stocks from bonds due to the low interest rates in the
19 bond market, however, those dynamics are changing. Value Line and Edward
20 Jones recognize that as interest rates increase, bonds become a substitute for utility
21 stocks. As utility stock prices decline, the dividend yields will increase. This
22 change in market conditions implies that the ROE calculated using historical market
23 data in the DCF model may understate the forward-looking cost of equity.

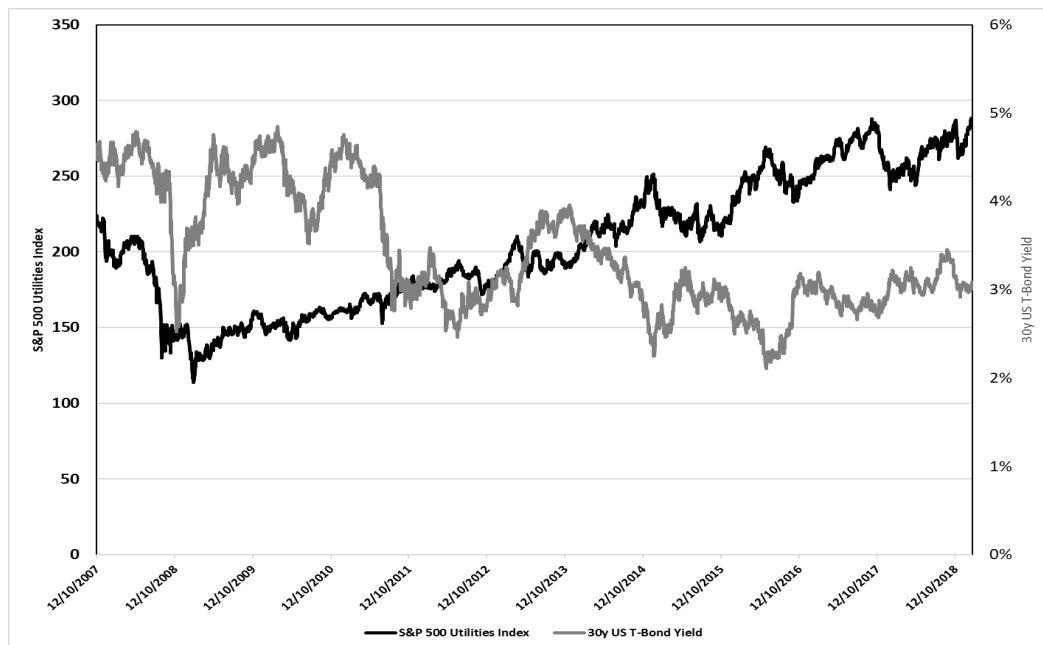
¹¹ Andy Pusateri and Andy Smith. Edward Jones, Utilities Sector Outlook (April 10, 2019), at 2-3.
[Reference to figure omitted.]

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1 **Q. How did the Standard & Poor's ("S&P") Utilities Index respond to the market**
2 **conditions that existed following the Great Recession of 2008-2009?**

3 A. Figure 3 demonstrates market conditions from 2007-2019 as measured by the S&P
4 Utilities index and the yield on 30-year Treasury bonds. As shown in Figure 3, the
5 S&P Utilities index increased steadily from the beginning of 2009 through early
6 November 2017, as yields on 30-year Treasury bonds declined in response to
7 accommodative federal monetary policy.

8 **Figure 3: S&P Utilities Index and U.S. Treasury Bond Yields (2007-2019)**



9 *Source: Bloomberg Professional*

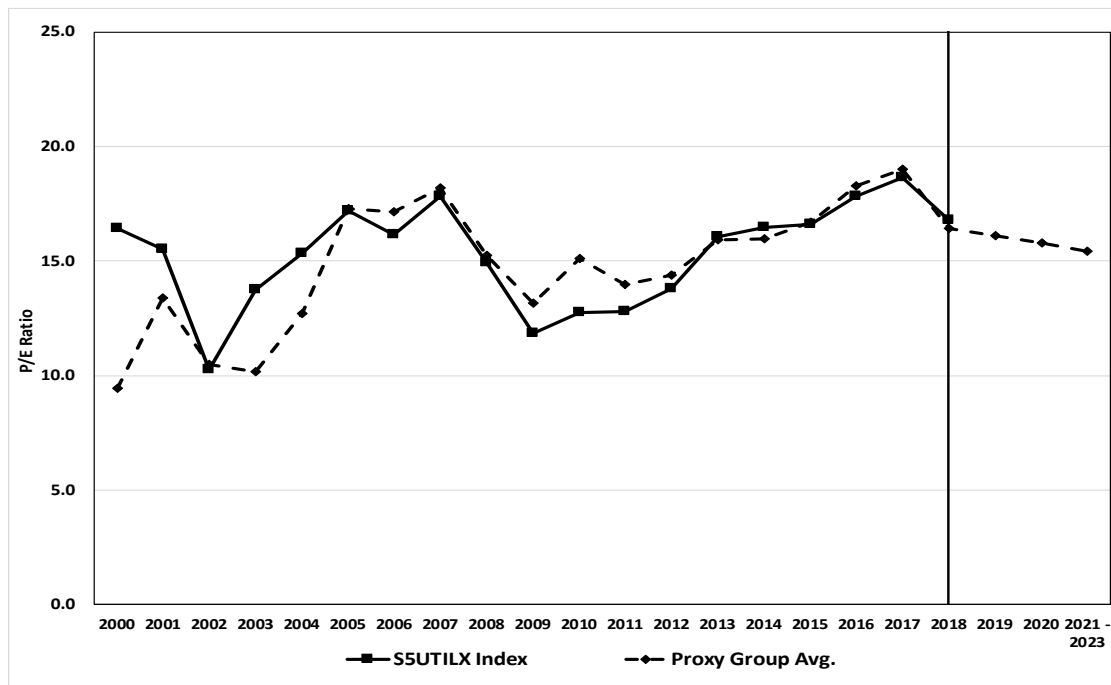
10 **Q. How do the valuations of public utilities compare to the historical average?**

11 A. Figure 4 summarizes the average historical and projected P/E ratios for the proxy
12 companies calculated using data from Bloomberg Professional and Value Line.¹²

¹² Selection of the Proxy Companies is discussed in detail in Section VI of my Direct Testimony.

As shown in Figure 4, the average P/E ratio for the proxy companies was higher in 2017 than at any other time over the last seventeen years and is significantly higher than the average projected P/E ratio for the group for the period from 2021-2023. In 2018 however, the average P/E ratio for the proxy companies has decreased to 16.44 from 19.02 in 2017. All else equal, if P/E ratios for the proxy companies continue to decline, as Value Line projects, the ROE results from the DCF model would be higher. Therefore, the DCF model using historical market data is likely understating the forward-looking cost of equity for the proxy group companies.

Figure 4: Average Historical Proxy Group P/E Ratios



Note: Figure includes data through February 28, 2019.
Source: Bloomberg Professional

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1 **Q. How do equity investors view the utilities sector based on these recent market**
2 **conditions?**

3 A. Investment advisors have noted the underperformance of utility stocks as a result
4 of current and future market conditions. Barron's recently published the results of
5 its survey of 148 professional money manager in which 64 percent of the professional
6 money managers surveyed recommended selling utility stocks.¹³ This position was
7 further supported in a separate article where Barron's noted that:

8 Utilities, by contrast, have returned about 19% in the past year.
9 Investors view them as a safer bet and more-reliable dividend
10 plays. Higher share prices have pushed down their yields,
11 which have averaged about 3.8% over the past 10 years,
12 according to FactSet.

13 Nancy Tengler, chief investment strategist at Tengler Wealth
14 Management, is avoiding utility stocks, which in her view
15 offer "high multiples for no growth."¹⁴

16 Similarly, a recent report on the market outlook for 2019 from J.P. Morgan Asset
17 Management noted that due to higher volatility the Fed may pause increasing the
18 federal funds rate; however, they are not recommending rotation into the utility
19 sector:

20 As prospects for slower economic growth become clearer in
21 the middle of next year, the Fed may signal it will pause. Such
22 a signal, or a trade agreement with China, could lead multiples
23 to expand, pushing the stock market higher and potentially
24 adding years to this already old bull market. However, even if
25 the bull market does end in the next few years, it is important

¹³ Jasinski, Nicholas. "Stock Market Highs Are Making Even Bullish Money Managers Cautious, Exclusive Poll Finds." Barron's, Barron's, 26 Apr. 2019, https://www.barrons.com/articles/stock-market-big-money-poll-51556309101?mod=past_editions.

¹⁴ Strauss, Lawrence C. "Dividends Can Tell You a Lot About a Sector's Strength." Barron's, Barron's, 5 Apr. 2019, www.barrons.com/articles/this-dividend-metric-can-help-you-understand-an-industry-51554463800.

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1 to remember that late-cycle returns have typically been quite
2 strong.

3 This leaves investors in a tough spot – should they focus on a
4 fundamental story that is softening, or invest with an
5 expectation that multiples will expand as the bull market runs
6 its course? The best answer is probably a little bit of each. We
7 are comfortable holding stocks as long as earnings growth is
8 positive, but do not want to be over-exposed given an
9 expectation for higher volatility. As such, higher-income
10 sectors like financials and energy look more attractive than
11 technology and consumer discretionary, and we would lump
12 the new communication services sector in with the latter
13 names, rather than the former. However, given our expectation
14 of still some further interest rate increases, it does not yet seem
15 appropriate to fully rotate into defensive sectors like utilities
16 and consumer staples. Rather, a focus on cyclical value should
17 allow investors to optimize their upside/downside capture as
18 this bull market continues to age.¹⁵

19 This view was further supported by UBS who underweights utilities:

20 Our underweight views on consumer staples and utilities
21 sectors reflect our preference for sectors that are more
22 leveraged to continued favorable economic growth than these
23 two defensive sectors. In addition, consumer staples are
24 contending with sluggish organic growth. High dividend
25 yields for the utilities sector makes it most negatively exposed
26 to higher interest rates. Our industrials underweight is a bit of
27 a hedge against a potential increase in trade frictions.¹⁶

28 **Q. Have regulators recently responded to the historically low dividend yields for**
29 **utility companies and the corresponding effect on the DCF model?**

30 A. Yes. The Federal Energy Regulatory Commission (“FERC”) recently proposed a
31 methodology that reflects their current view that investors rely on multiple ROE

¹⁵ J.P. Morgan Asset Management, “The investment outlook for 2019: Late-cycle risks and opportunities”, November 30, 2018, at 5.

¹⁶ UBS, “2019 outlook: Aging gracefully”, December 5, 2018, at 7.

1 estimation models. The proposed methodology includes an equal weighting of the
2 DCF, CAPM, Expected Earnings and Risk Premium models to better reflect
3 investor behavior and capital market conditions.¹⁷

4 In addition, the Illinois Commerce Commission (“ICC”), the Pennsylvania Public
5 Utility Commission (“PPUC”) and the Missouri Public Service Commission
6 (“Missouri PSC”) have all considered this phenomenon in recent decisions. I
7 discuss the response of these regulators to historically low dividend yields and the
8 impact on the DCF model in detail later in my testimony.

9 **B. The Current and Expected Interest Rate Environment**

10 **Q. Please provide a brief summary of the recent monetary policy actions of the**
11 **Federal Reserve.**

12 A. Based on stronger conditions in employment markets, a relatively stable inflation
13 rate, steady economic growth, and increased household spending, the Federal
14 Reserve raised the short-term borrowing rate by 25 basis points on four occasions
15 in 2018. Since December 2015, the Federal Reserve has increased interest rates
16 nine times, bringing the federal funds rate to the range of 2.25 percent to 2.50
17 percent. While, the Federal Reserve recently indicated at the March 2019 meeting
18 that going forward it will be patient in determining future adjustments to the federal
19 funds rate due to recent global economic and financial developments and low
20 inflationary pressures, the FOMC has not indicated that they will not raise interest

¹⁷ Federal Energy Regulatory Commission, Docket No. EL 11-66-001, et al., Order Directing Briefs, issued October 16, 2018, at para. 32.

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1 rates over the coming year. In fact, Bloomberg recently noted that some
2 participants saw higher rates as appropriate later this year if economic growth
3 continued above its longer-run trend rate, according to the minutes.¹⁸ This view
4 was further supported following the May 2019 meeting by Federal Reserve Bank
5 of Philadelphia President Patrick Harker who indicated that he still expects the
6 Federal Reserve to increase rates once in both 2019 and 2020.¹⁹

7 Additionally, in October 2017, the FOMC started reducing the size of the Fed's
8 \$4.5 trillion bond portfolio by no longer reinvesting the proceeds of the bonds it
9 holds. In response to the Great Recession, the Fed pursued a policy known as
10 "Quantitative Easing," in which it systematically purchased mortgage-backed
11 securities and long-term Treasury bonds to provide liquidity in financial markets
12 and drive down yields on long-term government bonds. Although the Federal
13 Reserve discontinued the Quantitative Easing program in October 2014, it
14 continued to reinvest the proceeds from the bonds it holds. Under the initial balance
15 sheet normalization policy, the FOMC gradually reduced the Federal Reserve's
16 securities holdings by \$10 billion per month initially, ramping up to \$50 billion per

¹⁸ FOMC, Federal Reserve press release, March 20, 2019. See also, Torres, Craig. "Fed Minutes Show Some Rate Flexibility During Year of Patience." Bloomberg.com, Bloomberg, 10 Apr. 2019, www.bloomberg.com/news/articles/2019-04-10/fed-minutes-show-some-rate-flexibility-during-year-of-patience.

¹⁹ Derby, Michael. "Fed's Harker Expects One More Rate Hike in 2019 and Another in 2020." The Wall Street Journal, 6 May 2019, www.wsj.com/articles/feds-harker-expects-one-more-rate-hike-in-2019-and-another-in-2020-11557151277.

1 month by the end of the first twelve months.²⁰ However, at the March 2019
2 meeting, the FOMC announced that it intends to slow the reduction of its holdings
3 of Treasury Securities starting in May 2019 and ultimately conclude the program
4 in September 2019.²¹

5 **Q. How does the recent change in the Federal Reserve's policy affect the yields**
6 **on long-term government bonds?**

7 A. While the Federal Reserve has recently indicated to that will it will be patient in
8 determining future adjustments the federal funds rate, this is not unusual as
9 monetary policy has a lagged effect on the economy. As Federal Reserve Bank of
10 San Francisco notes:

11 It can take a fairly long time for a monetary policy action to
12 affect the economy and inflation. And the lags can vary a lot,
13 too. For example, the major effects on output can take
14 anywhere from three months to two years. And the effects on
15 inflation tend to involve even longer lags, perhaps one to three
16 years, or more.²²

Since December 2015, the Federal Reserves has increased the federal funds rate
nine times, four of which occurred in 2018 and three in 2017. Therefore, given
recent market volatility and lagged effect that monetary policy has on the economy,
it is reasonable to expect the Federal Reserve to be patient with future increases.

²⁰ Federal Reserve press release, Addendum to the Policy Normalization Principles and Plans, June 14, 2017, implemented at FOMC meeting, September 20, 2017.

²¹ Federal Reserve press release, Balance Sheet Normalization Principles and Plans, March 20, 2019.

²² Federal Reserve Bank of San Francisco, "U.S. Monetary Policy: An Introduction - How does monetary policy affect the U.S. economy?", February 6, 2004. <https://www.frbsf.org/education/teacher-resources/us-monetary-policy-introduction/real-interest-rates-economy/>

However, it is important to note, that the Federal Reserve is continuing to reduce the size of its balance sheet by no longer reinvesting the proceeds of the bonds it holds over the near-term. This policy in conjunction with the lagged effect of past increases in the federal funds rate suggests that the yields on long-term government bonds should continue to increase over the near-term which is consistent with investors' expectations. As shown in Figure 5, investors are expecting continued increases in interest rates on both government and corporate/utility bonds over the next few years.

1

Figure 5: Interest Rate Conditions²³



2

3 **Q. What has been the effect of the Federal Reserve's monetary policy on the yields**
4 **of long-term government bonds?**

5 A. As shown in Figure 5 yields on long-term government bonds have increased since
6 the Federal Reserve started to raise the federal funds rate in 2016. However, the

²³ Source: Historical data from Bloomberg Professional. Forecast data from Blue Chip Financial Forecasts, Volume. 38, No. 3, March 1, 2019, at 2.

1 increase in long-term government bond yields has not been as pronounced as the
2 rise in short-term interest rates. This is due to a shift in the supply and demand of
3 long-term government bonds that has occurred since 2009. For example, since the
4 Great Recession of 2008-2009, federal debt has increased significantly which has
5 resulted in an increase in the supply of Treasury bonds in the market. In general,
6 an increase in supply should result in a decrease in the price of Treasury bonds and
7 an increase in yield. However, long-term government bond yields have not
8 increased as fast as expected given the increase in supply. This is because the
9 demand for Treasury bonds has also increased since 2009. As noted in a recent
10 article published by the St. Louis Federal Reserve, the demand for government
11 bonds increased for a number of reasons some of which included increased holdings
12 foreign governments as countries in Europe and Asia faced their own economic
13 uncertainty, and increased holdings from commercial banks due to new regulations
14 that required banks to hold a larger portion of high-quality liquid assets.²⁴ This has
15 resulted in a more gradual increase in the yields on long-term government bonds
16 over the past few years.

17 **Q. Is the demand for long-term government bonds currently increasing?**

18 A. No, it is not. As noted in the Federal Reserve article:

19 Some evidence suggests that the growth in demand for
20 Treasuries has already begun to soften. Returning to Figures 1
21 and 2, foreign holdings have remained more or less constant
22 since 2014, largely because of declining holdings in Japan and

²⁴ David Andolfatto and Andrew Spewak, Federal Reserve Bank of St. Louis, "On the Supply of, and Demand for, U.S. Treasury Debt," Economic Synopses, No. 5, 2018. <https://doi.org/10.20955/es.2018.5>.

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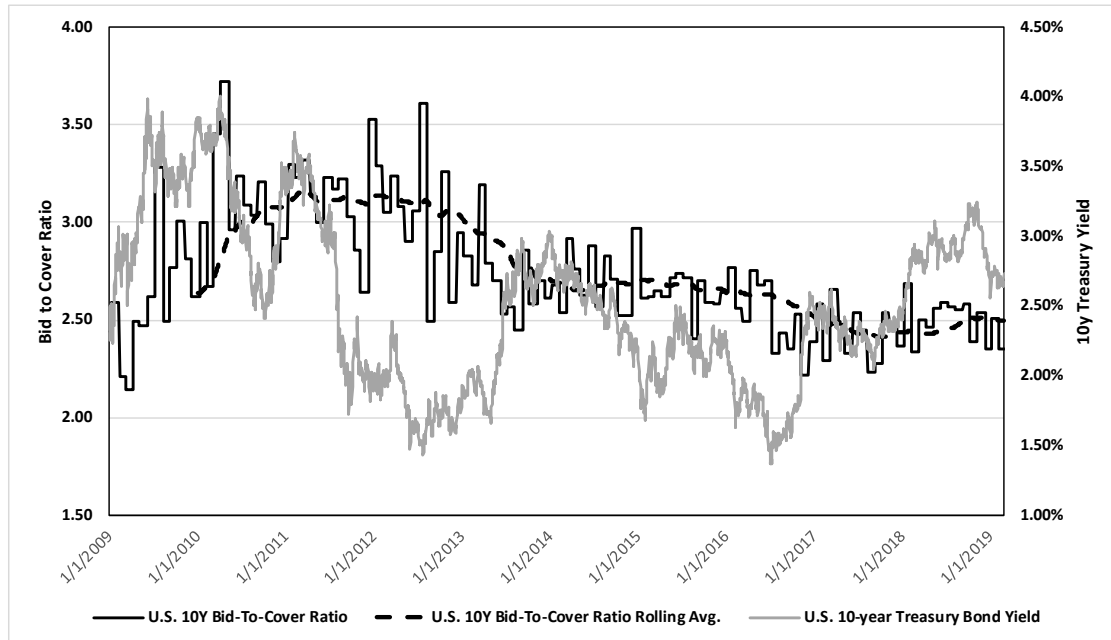
1 China. Likewise, regulation and policy changes such as the
2 Dodd-Frank Act and new rules for prime money market funds
3 may have only transitory effects on the demand for Treasuries.
4 For example, the pace of growth of the ratio of commercial
5 bank Treasury security holdings to private loans has slowed
6 since 2014 (see Figure 3), as has the growth of investment in
7 government money market funds since 2017 (Figure 4).²⁵

Furthermore, another indicator of the demand for Treasury bonds is the bid to cover ratio which represents the dollar amount of bids received versus the dollar amount sold in a Treasury security auction. Therefore, a higher bid-to-cover ratio is indicative of an increase in the demand for government bonds. As shown in Figure 6, the bid-to-cover ratio for the 10-year U.S. Treasury bond is currently at its lowest point since 2009 which indicates that the demand for long-term government bonds has declined. The decline in demand is occurring at a time when the supply of Treasury bonds is expected to increase as the Federal Reserve continues its balance sheet unwind and the federal government issues bonds to offset the reduced tax revenue associated with the implementation of the TCJA. As a result, yields on long-term government bonds are expected to continue to increase over the near-term which is consistent with investors' expectations shown in Figure 5.

²⁵ *Ibid.*

1

Figure 6: U.S. 10-year Treasury Bond Bid-to-Cover-Ratio



2 **Q. What effect do rising interest rates have on the cost of equity?**

3 A. As interest rates continue to increase, the cost of equity for the proxy companies
4 using the DCF model is likely to underestimate investors' required returns because
5 the proxy group average dividend yield reflects the increase in stock prices that
6 resulted from substantially lower interest rates. Rising interest rates support the
7 selection of a return toward the upper end of a reasonable range of ROE estimates
8 resulting from the DCF analysis. Alternatively, my CAPM and Bond Yield Plus
9 Risk Premium analyses include estimated returns based on near-term projected
10 interest rates, reflecting investors' expectations of market conditions over the
11 period that the rates that are determined in this case will be set.

1 **C. Effect of Tax Reform on the Return on Equity and Capital Structure**

2 **Q. Are there other factors that should be considered in determining the cost of**
3 **equity for PSNH?**

4 A. Yes. The effect of the TCJA should also be considered in the determination of the
5 cost of equity. The credit rating agencies have commented on the effect of the TCJA
6 on regulated utilities. In summary, the TCJA is expected to reduce utility revenues
7 due to the lower federal income taxes and the requirement to return excess
8 accumulated deferred income taxes (“ADIT”) to customers. This change in
9 revenue is expected to reduce Funds From Operations (“FFO”) metrics across the
10 sector, and absent regulatory mitigation strategies, is expected to lead to weaker
11 credit metrics and negative ratings actions for some utilities.²⁶

12 **Q. Have credit or equity analysts commented on the effect of the TCJA on**
13 **utilities?**

14 A. Yes. Moody’s Investors Services (“Moody’s”) indicated that while the TCJA was
15 credit positive for many sectors, it has an overall negative credit impact on
16 regulated operating companies of utilities and their holding companies due to the
17 reduction in cash flow that results from the change in the federal tax rate and the
18 loss of bonus depreciation.

19 Moody’s noted that the rates that regulators allow utilities to charge customers is
20 based on a cost-plus model, with tax expense being one of the pass-through items.
21 Utilities will collect less taxes at the lower rate, reducing revenue. While the taxes

²⁶ FitchRatings, Special Report, What Investors Want to Know, “Tax Reform Impact on the U.S. Utilities, Power & Gas Sector”, January 24, 2018.

1 are ultimately paid out as an expense, under the new law utilities lose the timing
2 benefit of bonus depreciation, reducing cash that may have been carried over a
3 number of years. The lower tax rate combined with the loss of bonus depreciation
4 will have a negative effect on utility cash flows and will ultimately negatively
5 impact the utilities' ability to fund ongoing operations and capital improvement
6 programs with internally generated cash.

7 **Q. How has Moody's responded to the increased risk for utilities resulting from**
8 **the TCJA?**

9 A. In January 2018, Moody's issued a report changing the rating outlook for several
10 regulated utilities from Stable to Negative.²⁷ At that time, Moody's noted that the
11 rating change affected companies with limited cushion in their ratings for
12 deterioration in financial performance. In June 2018, Moody's issued a report in
13 which the rating agency downgraded the outlook for the entire regulated utility
14 industry from stable to negative for the first time ever. Moody's cites ongoing
15 concerns about the negative effect of the TCJA on cash flows of regulated utilities.
16 While noting that "[r]egulatory commissions and utility management teams are
17 taking important first steps"²⁸ and that "we have seen some credit positive
18 developments in some states in response to tax reform,"²⁹ Moody's concludes that

²⁷ Moody's Investor Service, Global Credit Research, Rating Action: Moody's changes outlooks on 25 US regulated utilities primarily impacted by tax reform, January 19, 2018.

²⁸ Moody's Investors Service, "Regulated utilities – US: 2019 outlook shifts to negative due to weaker cash flows, continued high leverage", June 18, 2018, at 3.

²⁹ *Ibid.*

1 “we believe that it will take longer than 12-18 months for the majority of the sector
2 to show any material financial improvement from such efforts.”³⁰

3 **Q. Has Moody’s changed its outlook for utilities in 2019?**

A. No. Consistent with the prior reports issued by Moody’s in January and June of
2018, Moody’s is maintaining its negative outlook for regulated utilities in 2019 as
a result of continued concerns over the effect of the TCJA on cash flows as well as
increasing debt.³¹ Moody’s notes that “[t]he combination of financial pressures is
expected to keep the sector’s ratio of funds from operations to debt down around
15% in the year ahead”.³²

4 **Q. What does it mean for Moody’s to downgrade a credit outlook?**

5 A. A Moody’s rating outlook is an opinion regarding the likely rating direction over
6 what it refers to as “the medium term.” A Stable outlook indicates a low likelihood
7 of a rating change in the medium term. A Negative outlook indicates a higher
8 likelihood of a rating change over the medium term. While Moody’s indicates that
9 the time period for changing a rating subsequent to a change in the outlook from
10 Stable will vary, on average Moody’s indicates that a rating change will follow
11 within a year of a change in outlook.³³

³⁰ *Ibid.*

³¹ Moody’s Investors Service, Research Announcement: Moody’s: US regulated utilities sector outlook for 2019 remains negative, November 8, 2018.

³² *Ibid.*

³³ Moody’s Investors Service, Rating Symbols and Definitions, July 2017, at 27.

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1 **Q. Has the Company experienced a downgrade related to cash flow metrics**
2 **resulting from tax reform?**

3 A. No, although, on February 13, 2019, S&P revised its outlook on Eversource Energy
4 and its rated subsidiaries to Negative from Stable. In its Research Update, S&P
5 specifically identified TCJA changes as one of the predominate reasons for
6 changing its outlook for Eversource and its subsidiaries: “We expect Eversource's
7 FFO-to-debt ratio in 2018-2020 to be at or below 15%, primarily reflecting the
8 company's rising capital spending and the impact of U.S. tax reform.”³⁴

9 **Q. Have any utilities experienced a downgrade related to cash flow metrics**
10 **resulting from the TCJA?**

11 A. Yes. Figure 7 summarizes credit rating downgrades for utilities that have resulted
12 from tax reform.

³⁴ Standard and Poor's Global Ratings, “Research Update: Eversource Energy and Subsidiaries Outlooks Revised To Negative On Announcement of Offshore Wind Joint Venture”, February 12, 2019.

Figure 7: Credit Rating Downgrades Resulting from TCJA

Utility	Rating Agency	Credit Rating before TCJA	Credit Rating after TCJA	Downgrade Date
American Water Works	Moody's	A3	Baa1	4/1/2019
Niagara Mohawk Power Corporation	Moody's	A2	A3	3/29/2019
KeySpan Gas East Corporation (KEDLI)	Moody's	A2	A3	3/29/2019
Xcel Energy	Moody's	A3	Baa1	3/28/2019
ALLETE, Inc.	Moody's	A3	Baa1	3/26/2019
Brooklyn Union Gas Company (KEDNY)	Moody's	A2	A3	2/22/2019
Avista Corp.	Moody's	Baa1	Baa2	12/30/2018
Consolidated Edison Company of New York	Moody's	A2	A3	10/30/2018
Consolidated Edison, Inc.	Moody's	A3	Baa1	10/30/2018
Orange and Rockland Utilities	Moody's	A3	Baa1	10/30/2018
Southwestern Public Service Company	Moody's	Baa1	Baa2	10/19/2018
Dominion Energy Gas Holdings	Moody's	A2	A3	9/20/2018
Piedmont Natural Gas Company, Inc.	Moody's	A2	A3	8/1/2018
WEC Energy Group, Inc.	Moody's	A3	Baa1	7/12/2018
Integrus Holdings Inc.	Moody's	A3	Baa1	7/12/2018
OGE Energy Corp.	Moody's	A3	Baa1	7/5/2018
Oklahoma Gas & Electric Company	Moody's	A1	A2	7/5/2018

Q. Have other rating agencies commented on the effect of the TCJA on ratings?

A. Yes. S&P and Fitch have also commented on the implications of the TCJA on utilities. S&P published a report on January 24, 2018 entitled "U.S. Tax Reform: For Utilities' Credit Quality, Challenges Abound" in which S&P concludes:

The impact of tax reform on utilities is likely to be negative to varying degrees depending on a company's tax position going into 2018, how its regulators react, and how the company reacts in return. It is negative for credit quality because the combination of a lower tax rate and the loss of stimulus provisions related to bonus depreciation or full expensing of capital spending will create headwinds in operating cash-flow generation capabilities as customer rates are lowered in response to the new tax code. The impact could be sharpened or softened by regulators depending on how much they want to lower utility rates immediately instead of using some of the

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1 lower revenue requirement from tax reform to allow the utility
2 to retain the cash for infrastructure investment or other
3 expenses. Regulators must also recognize that tax reform is a
4 strain on utility credit quality, and we expect companies to
5 request stronger capital structures and other means to offset
6 some of the negative impact.

7 Finally, if the regulatory response does not adequately
8 compensate for the lower cash flows, we will look to the
9 issuers, especially at the holding company level, to take steps
10 to protect credit metrics if necessary. Some deterioration in the
11 ability to deduct interest expense could occur at the parent,
12 making debt there relatively more expensive. More equity may
13 make sense and be necessary to protect ratings if financial
14 metrics are already under pressure and regulators are
15 aggressive in lowering customer rates. It will probably take the
16 remainder of this year to fully assess the financial impact on
17 each issuer from the change in tax liabilities, the regulatory
18 response, and the company's ultimate response. We have
19 already witnessed differing responses. We revised our outlook
20 to negative on PNM Resources Inc. and its subsidiaries on Jan.
21 16 after a Public Service Co. of New Mexico rate case decision
22 incorporated tax savings with no offsetting measures taken to
23 alleviate the weaker cash flows. It remains to be seen whether
24 PNM will eventually do so, especially as it is facing other
25 regulatory headwinds. On the other hand, FirstEnergy Corp.
26 issued \$1.62 billion of mandatory convertible stock and \$850
27 million of common equity on Jan. 22 and explicitly referenced
28 the need to support its credit metrics in the face of the new tax
29 code in announcing the move. That is exactly the kind of
30 proactive financial management that we will be looking for to
31 fortify credit quality and promote ratings stability.³⁵

32 In S&P's 2019 trends report, the rating agency notes that the utility industry's
33 financial measures weakened in 2018 and attributed that to tax reform, capital
34 spending and negative load growth. In addition, S&P expects that weaker credit
35 metrics will continue into 2019 for those utilities operating with minimal financial

³⁵ Standard and Poor's Global Ratings, "U.S. Tax Reform: For Utilities' Credit Quality, Challenges Abound", January 24, 2018.

1 cushion. S&P further expects that these utilities will look to offset the revenue
2 reductions from tax reform with equity issuances. The rating agency reported that
3 in 2018 regulated utilities issued nearly \$35 billion in equity, which is more than
4 twice the equity issuances in 2016 and 2017.³⁶

5 Finally, FitchRatings recognized the implications of tax reform but indicated that
6 any ratings actions will be guided by the response of regulators and the management
7 of the utilities. Fitch notes that the solution will depend on the ability of utility
8 management to manage the cash flow implications of the TCJA. Fitch offers
9 several solutions to provide rate stability and to moderate changes to cash flow in
10 the near term, including increasing the authorized ROE and/or equity ratio as
11 measures that can be implemented.³⁷

12 **Q. What conclusions do you draw from your analysis of capital market**
13 **conditions?**

14 **A.** The important conclusions resulting from capital market conditions are:

- 15 • The assumptions used in the ROE estimation models have been affected
16 by the recent historical market conditions.
- 17 • Recent market conditions are not expected to persist as the Federal Reserve
18 continues to normalize monetary policy. As a result, the recent historical
19 market conditions are not reflective of the market conditions that will be
20 present when the rates for PSNH will be in effect.

³⁶ Standard & Poor's Ratings, "Industry Top Trends 2019, North America Regulated Utilities", November 8, 2018.

³⁷ FitchRatings, Special Report, What Investors Want to Know, "Tax Reform Impact on the U.S. Utilities, Power & Gas Sector", January 24, 2018.

- 1 • It is important to consider the results of a variety of ROE estimation models,
2 using forward-looking assumptions to estimate the cost of equity.
- 3 • Without adequate regulatory support, the TCJA will have a negative effect
4 on utility cash flows, which increases investor risk expectations for utilities.

5 **VI. PROXY GROUP SELECTION**

6 **Q. Why have you used a group of proxy companies to estimate the cost of equity**
7 **for PSNH?**

8 A. In this proceeding, we are focused on estimating the cost of equity for an electric
9 utility company that is not itself publicly traded. Since the cost of equity is a
10 market-based concept and given that PSNH does not make up the entirety of a
11 publicly traded entity, it is necessary to establish a group of companies that is both
12 publicly traded and comparable to PSNH in certain fundamental business and
13 financial respects to serve as its “proxy” in the ROE estimation process.

14 Even if PSNH were a publicly traded entity, it is possible that transitory events
15 could bias its market value over a given period. A significant benefit of using a
16 proxy group is that it moderates the effects of unusual events that may be associated
17 with any one company. The proxy companies used in my analyses all possess a set
18 of operating and risk characteristics that are substantially comparable to the
19 Company, and thus provide a reasonable basis to derive and estimate the
20 appropriate ROE for PSNH.

1 **Q. Please provide a brief profile of PSNH.**

2 A. PSNH is an electric transmission and distribution utility that is wholly owned by
3 Eversource. The Company distributes electricity to approximately 519,000
4 customers in 211 cities and towns across New Hampshire covering close to 5,630
5 square miles.³⁸ The Company's service territory encompasses most of the State's
6 largest municipalities, including Manchester, Nashua, Derry, Dover, and
7 Rochester. In 2018, the Company had retail electric sales volume of approximately
8 7,915,000 MWh³⁹ and total retail tariff sales revenue of \$953.7 million.⁴⁰ The
9 Company's 2018 retail tariff sales revenues were made up of 58.46 percent
10 residential, 33.23 percent commercial, and 8.31 percent industrial.⁴¹ Additionally,
11 PSNH completed the divestiture of the Company's generation assets in 2018. The
12 sale of the Company's thermal generating assets was completed on January 10,
13 2018⁴² while the sale of PSNH's hydroelectric generation facilities was completed
14 on August 26, 2018.⁴³ PSNH currently has an investment grade long-term rating of
15 A+ from S&P, and A3 from Moody's.⁴⁴

³⁸ Eversource Energy, SEC Form 10-K for the fiscal year ended December 31, 2018, at 5.

³⁹ *Id.*, at 50.

⁴⁰ *Id.*, at 133.

⁴¹ *Ibid.*

⁴² *Id.*, at 6.

⁴³ *Ibid.*

⁴⁴ SNL Financial, March 14, 2019.

1 **Q. How did you select the companies included in your proxy group?**

2 A. I began with the group of 39 companies that Value Line classifies as Electric
3 Utilities and applied the following screening criteria to select companies that:

- 4 • pay consistent quarterly cash dividends, because companies that do not
5 cannot be analyzed using the Constant Growth DCF model;
- 6 • have investment grade long-term issuer ratings from both S&P and
7 Moody's;
- 8 • have positive long-term earnings growth forecasts from at least two utility
9 industry equity analysts;
- 10 • owned generation comprises less than 60.00 percent of the Company's
11 MWh sales to ultimate customers;
- 12 • derive more than 70.00 percent of their total operating income from
13 regulated operations;
- 14 • derive more than 80.00 percent of their total regulated operating income
15 from regulated electric operations; and
- 16 • were not parties to a merger or transformative transaction during the
17 analytical periods relied on.

18 **Q. Did you eliminate any other companies that otherwise met your screening**
19 **criteria?**

20 A. Yes. Edison International is facing significant liability related to recent wildfires in
21 California. As a result, Edison International recently had its credit rating
22 downgraded by S&P, Moody's and Fitch Ratings. Moreover, the incident also

1 resulted in immediate financial ramifications for Edison International; the
2 company's stock price fell approximately 32 percent between November 8th, 2018
3 and November 15th, 2018 as wildfires were located in the company's service
4 territory. Given the impact the incidents had on the stock price of Edison
5 International, and the potential effect on the company's financial performance
6 going forward, it is appropriate to exclude Edison International from my proxy
7 group.

8 **Q. Did you include Eversource in your analysis?**

9 A. No. It is my practice to exclude the subject company, or its parent holding
10 company, from the proxy group to avoid circular logic that otherwise would occur.

11 **Q. What is the composition of your proxy group?**

12 A. The screening criteria discussed above is shown in Attachment AEB-3 and resulted
13 in a proxy group consisting of the companies shown in Figure 8 below.

14 **Figure 8: Proxy Group**

Company	Ticker
ALLETE, Inc.	ALE
Alliant Energy Corporation	LNT
Avangrid, Inc.	AGR
FirstEnergy Corporation	FE
Hawaiian Electric Industries, Inc.	HE
NorthWestern Corporation	NWE
Portland General Electric Company	POR
PPL Corporation	PPL

1 **VII. COST OF EQUITY ESTIMATION**

2 **Q. Please briefly discuss the ROE in the context of the regulated rate of return.**

3 A. The overall rate of return for a regulated utility is based on its weighted average
4 cost of capital, in which the cost rates of the individual sources of capital are
5 weighted by their respective book values. While the costs of debt and preferred
6 stock can be directly observed, the cost of equity is market-based and, therefore,
7 must be estimated based on observable market data.

8 **Q. How is the required ROE determined?**

9 A. The required ROE is estimated by using one or more analytical techniques that rely
10 on market-based data to quantify investor expectations regarding required equity
11 returns, adjusted for certain incremental costs and risks. Informed judgment is then
12 applied to determine where the company's cost of equity falls within the range of
13 results. The key consideration in determining the cost of equity is to ensure that
14 the methodologies employed reasonably reflect investors' views of the financial
15 markets in general, as well as the subject company (in the context of the proxy
16 group), in particular.

17 **Q. What methods did you use to determine the Company's ROE?**

18 A. I considered the results of the Constant Growth DCF model, a Projected Constant
19 Growth DCF model, the CAPM model, and the Bond Yield Plus Risk Premium
20 methodology. As discussed in more detail below, a reasonable ROE estimate
21 appropriately considers alternative methodologies and the reasonableness of their
22 individual and collective results.

1 **A. Importance of Multiple Analytical Approaches**

2 **Q. Why is it important to use more than one analytical approach?**

3 A. Because the cost of equity is not directly observable, it must be estimated based on
4 both quantitative and qualitative information. When faced with the task of
5 estimating the cost of equity, analysts and investors are inclined to gather and
6 evaluate as much relevant data as reasonably can be analyzed. Several models have
7 been developed to estimate the cost of equity, and I use multiple approaches to
8 estimate the cost of equity. As a practical matter, however, all of the models
9 available for estimating the cost of equity are subject to limiting assumptions or
10 other methodological constraints. Consequently, many well-regarded finance texts
11 recommend using multiple approaches when estimating the cost of equity. For
12 example, Copeland, Koller, and Murrin⁴⁵ suggest using the CAPM and Arbitrage
13 Pricing Theory model, while Brigham and Gapenski⁴⁶ recommend the CAPM,
14 DCF, and Bond Yield Plus Risk Premium approaches.

15 **Q. Is it important given the current market conditions to use more than one**
16 **analytical approach?**

17 A. Yes. As discussed in Section V above, the U.S. economy is beginning to emerge
18 from an unprecedented period of low interest rates. Low interest rates, and the
19 effects of the investor “flight to quality” can be seen in high utility share valuations,

⁴⁵ Tom Copeland, Tim Koller and Jack Murrin, Valuation: Measuring and Managing the Value of Companies, 3rd Ed. (New York: McKinsey & Company, Inc., 2000), at 214.

⁴⁶ Eugene Brigham, Louis Gapenski, Financial Management: Theory and Practice, 7th Ed. (Orlando: Dryden Press, 1994), at 341.

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1 relative to historical levels and relative to the broader market. Higher utility stock
2 valuations produce lower dividend yields and result in lower cost of equity
3 estimates from a DCF analysis. Low interest rates also impact the CAPM in two
4 ways: (1) the risk-free rate is lower, and (2) because the market risk premium is a
5 function of interest rates, (i.e., it is the return on the broad stock market less the
6 risk-free interest rate), the risk premium should move higher when interest rates are
7 lower. Therefore, it is important to use multiple analytical approaches to moderate
8 the impact that the current low interest rate environment is having on the ROE
9 estimates for the proxy group and, where possible, consider using projected market
10 data in the models to estimate the return for the forward-looking period.

11 **Q. Are you aware of any regulatory commissions who have recognized that recent**
12 **conditions in capital markets are causing ROE recommendations based on**
13 **DCF models to be unreasonable?**

14 A. Yes, several regulatory commissions have addressed the effect of capital market
15 conditions on the DCF model, including FERC, the ICC, the PPUC and the
16 Missouri PSC.

17 **Q. Please summarize how the FERC has responded to the effect of market**
18 **conditions on the DCF.**

19 A. Understanding the important role that dividend yields play in the DCF model, the
20 FERC determined that capital market conditions have caused the DCF model to
21 understate equity costs for regulated utilities. In Opinion No. 531, the FERC noted:

22 There is 'model risk' associated with the excessive reliance or
23 mechanical application of a model when the surrounding
24 conditions are outside of the normal range. 'Model risk' is the
25 risk that a theoretical model that is used to value real world

1 transactions fails to predict or represent the real phenomenon
2 that is being modeled.⁴⁷

3 In Opinion No. 531, the FERC noted that the low interest rates and bond yields that
4 persisted throughout the analytical period that was relied on (study period) had
5 affected the results of the DCF model and recognized the need to move away from
6 the midpoint of the DCF analysis. In that case, the FERC relied on the CAPM and
7 other risk premium methodologies to inform its judgment to set the return above
8 the midpoint of the DCF results.

9 In Opinion No. 551, issued in September 2016, the FERC recognized that those
10 same market conditions continued into the study period, and again concluded that
11 it was necessary to rely on ROE estimation methodologies other than the DCF
12 model to set the appropriate ROE:

13 Though the Commission noted certain economic conditions in
14 Opinion No. 531, the principle argument was based on low
15 interest rates and bond yields, conditions that persisted
16 throughout the study period. Consequently, we find that
17 capital market conditions are still anomalous as described
18 above...⁴⁸

19 *****

20 Because the evidence in this proceeding indicates that capital
21 markets continue to reflect the type of unusual conditions that
22 the Commission identified in Opinion No. 531, we remain
23 concerned that a mechanical application of the DCF
24 methodology would result in a return inconsistent with *Hope*
25 and *Bluefield*.⁴⁹

⁴⁷ FERC Docket No. EL11-66-001, Opinion No. 531 (June 19, 2014), fn 286.

⁴⁸ FERC Docket No. EL14-12-002, Opinion No. 551, at para. 121.

⁴⁹ *Id.*, at para. 122.

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As the Commission found in Opinion No. 531, under these circumstances, we have less confidence that the midpoint of the zone of reasonableness in this proceeding accurately reflects the equity returns necessary to meet the Hope and Bluefield capital attraction standards. We therefore find it necessary and reasonable to consider additional record evidence, including evidence of alternative methodologies...⁵⁰

Finally, in October 2018, the FERC issued an Order in response to the remand from the U.S. Court of Appeals for the District of Columbia indicating plans to establish ROEs based on an equal weighting of the results of four financial models: the DCF, CAPM, Expected Earnings and Risk Premium. FERC explains its reasons for moving away from sole reliance on the DCF model as follows:

Our decision to rely on multiple methodologies in these four complaint proceedings is based on our conclusion that the DCF methodology may no longer singularly reflect how investors make their decisions. We believe that, since we adopted the DCF methodology as our sole method for determining utility ROEs in the 1980s, investors have increasingly used a diverse set of data sources and models to inform their investment decisions. Investors appear to base their decisions on numerous data points and models, including the DCF, CAPM, Risk Premium, and Expected Earnings methodologies. As demonstrated in Figure 2 below, which shows the ROE results from the four models over the four test periods at issue in this proceeding, these models do not correlate such that the DCF methodology captures the other methodologies. In fact, in some instances, their cost of equity estimates may move in opposite directions over time. Although we recognize the greater administrative burden on parties and the Commission to evaluate multiple models, we believe that the DCF methodology alone no longer captures how investors view utility returns because investors do not rely on the DCF alone and the other methods used by investors

⁵⁰ *Ibid.*

1 do not necessarily produce the same results as the DCF.
2 Consequently, it is appropriate for our analysis to consider a
3 combination of the DCF, CAPM, Risk Premium, and
4 Expected Earnings approaches.⁵¹

5 **Q. How have the PPUC, the ICC and the Missouri PSC addressed the effect of**
6 **market conditions on the DCF?**

7 A. In a 2012 decision for PPL Electric Utilities, while noting that the PPUC has
8 traditionally relied primarily on the DCF method to estimate the cost of equity for
9 regulated utilities, the PPUC recognized that market conditions were causing the
10 DCF model to produce results that were much lower than other models such as the
11 CAPM and Bond Yield Plus Risk Premium. The PPUC's Order explained:

12 Sole reliance on one methodology without checking the
13 validity of the results of that methodology with other cost of
14 equity analyses does not always lend itself to responsible
15 ratemaking. We conclude that methodologies other than the
16 DCF can be used as a check upon the reasonableness of the
17 DCF derived equity return calculation.⁵²

18 The PPUC ultimately concluded:

19 As such, where evidence based on the CAPM and RP methods
20 suggest that the DCF-only results may understate the utility's
21 current cost of equity capital, we will give consideration to
22 those other methods, to some degree, in determining the
23 appropriate range of reasonableness for our equity return
24 determination.⁵³

⁵¹ Federal Energy Regulatory Commission, Docket No. EL 11-66-001, et al., Order Directing Briefs, issued October 16, 2018, at para. 40. [Figure 2 was omitted]

⁵² Pennsylvania Public Utility Commission, PPL Electric Utilities, R-2012-2290597, meeting held December 5, 2012, at 80.

⁵³ *Id.*, at 81.

1 In a recent ICC case, Docket No. 16-0093, Staff relied on a DCF analysis that
2 resulted in average returns for their proxy groups of 7.24 percent to 7.51 percent.
3 The company demonstrated that these results were uncharacteristically too low, by
4 comparing the results of Staff's models to recently authorized ROEs for regulated
5 utilities and the return on the S&P 500.⁵⁴ In Order No. 16-0093, the ICC agreed
6 with the Company that Staff's proposed ROE of 8.04 percent was anomalous and
7 recognized that a return that is not competitive will deter investment in Illinois.⁵⁵
8 In setting the return in this proceeding the ICC recognized that it was necessary to
9 consider other factors beyond the outputs of the financial models, particularly
10 whether or not the return is sufficient to attract capital, maintain financial integrity,
11 and is commensurate with returns for companies of comparable risk, while
12 balancing the interests of customers and shareholders.⁵⁶

13 Finally, in February 2018, the Missouri PSC issued a decision in Spire's 2017 gas
14 rate case, in which the allowed ROE was set at 9.80 percent. In explaining the
15 rationale for its decision, the Commission cited the importance of considering
16 multiple methodologies to estimate the cost of equity and the need for the
17 authorized ROE to be consistent with returns in other jurisdictions and to reflect
18 the growing economy and investor expectations for higher interest rates.

⁵⁴ State of Illinois Commerce Commission, Docket No. 16-0093, Illinois-American Water Company Initial Brief, August 31, 2016, at 10.

⁵⁵ Illinois Staff's analysis and recommendation in that proceeding were based on its application of the multi-stage DCF model and the CAPM to a proxy group of water utilities.

⁵⁶ State of Illinois Commerce Commission Decision, Docket No. 16-0093, Illinois-American Water Company, 2016 WL 7325212 (2016), at 55.

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1 Based on the competent and substantial evidence in the record,
2 on its analysis of the expert testimony offered by the parties,
3 and on its balancing of the interests of the company's
4 ratepayers and shareholders, as fully explained in its findings
5 of fact and conclusions of law, the Commission finds that 9.8
6 percent is a fair and reasonable return on equity for Spire
7 Missouri. That rate is nearly the midpoint of all the experts'
8 recommendations and is consistent with the national average,
9 the growing economy, and the anticipated increasing interest
10 rates. The Commission finds that this rate of return will allow
11 Spire Missouri to compete in the capital market for the funds
12 needed to maintain its financial health.⁵⁷

13 **Q. What are your conclusions about the results of the DCF and CAPM models?**

14 A. Recent market data that is used as the basis for the assumptions for both models
15 have been affected by market conditions. As a result, relying exclusively on
16 historical assumptions in these models, without considering whether these
17 assumptions are consistent with investors' future expectations, will underestimate
18 the cost of equity that investors would require over the period that the rates in this
19 case are to be in effect. In this instance, relying on the historical average of
20 abnormally high stock prices results in low dividend yields that are not expected to
21 continue over the period that the new rates will be in effect. This, in turn,
22 underestimates the ROE for the rate period.

23 The use of recent historical Treasury bond yields in the CAPM also tends to
24 underestimate the projected cost of equity. Recent experience indicates that interest
25 rates are increasing. The expectation that bond yields will not remain at currently

⁵⁷ File No. GR-2017-0215 and File No. GR-2017-0216, Missouri Public Service Commission, Report and Order, Issue Date February 21, 2018, at 34.

low levels means that the expected cost of equity would be higher than is suggested by the CAPM using historical average yields. The use of projected yields on Treasury bonds results in CAPM estimates that are more reflective of the market conditions that investors expect during the period that the Company's rates will be in effect.

B. Constant Growth DCF Model

Q. Please describe the DCF approach.

A. The DCF approach is based on the theory that a stock's current price represents the present value of all expected future cash flows. In its most general form, the DCF model is expressed as follows:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \dots + \frac{D_\infty}{(1+k)^\infty} \quad [1]$$

Where P_0 represents the current stock price, $D_1 \dots D_\infty$ are all expected future dividends, and k is the discount rate, or required ROE. Equation [1] is a standard present value calculation that can be simplified and rearranged into the following form:

$$k = \frac{D_0(1+g)}{P_0} + g \quad [2]$$

Equation [2] is often referred to as the Constant Growth DCF model in which the first term is the expected dividend yield and the second term is the expected long-term growth rate.

1 **Q. What assumptions are required for the Constant Growth DCF model?**

2 A. The Constant Growth DCF model requires the following four assumptions: (1) a
3 constant growth rate for earnings and dividends; (2) a stable dividend payout ratio;
4 (3) a constant price-to-earnings ratio; and (4) a discount rate greater than the
5 expected growth rate. To the extent that any of these assumptions is violated,
6 considered judgment and/or specific adjustments should be applied to the results.

7 **Q. What market data did you use to calculate the dividend yield in your Constant**
8 **Growth DCF model?**

9 A. The dividend yield in my Constant Growth DCF model is based on the proxy
10 companies' current annualized dividend and average closing stock prices over the
11 30-, 90-, and 180-trading days ended February 28, 2019.

12 **Q. Why did you use 30-, 90-, and 180-day averaging periods?**

13 A. In my Constant Growth DCF model, I use an average of recent trading days to
14 calculate the term P_0 in the DCF model to ensure that the ROE is not skewed by
15 anomalous events that may affect stock prices on any given trading day. The
16 averaging period should also be reasonably representative of expected capital
17 market conditions over the long-term. However, the averaging periods that I use
18 rely on historical data which is not consistent with the forward-looking expectation
19 that interest rates will increase. Therefore, the results of my Constant Growth DCF
20 model using historical data may underestimate the forward-looking cost of equity.
21 As a result, I place more weight on the mean to mean-high results produced by my
22 Constant Growth DCF model. In addition, I calculate an additional Constant

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1 Growth DCF analysis which relies on projected market data from Value Line to
2 more reasonably approximate future market conditions.

3 **Q. Did you make any adjustments to the dividend yield to account for periodic**
4 **growth in dividends?**

5 A. Yes, I did. Since utility companies tend to increase their quarterly dividends at
6 different times throughout the year, it is reasonable to assume that dividend
7 increases will be evenly distributed over calendar quarters. Given that assumption,
8 it is reasonable to apply one-half of the expected annual dividend growth rate for
9 purposes of calculating the expected dividend yield component of the DCF model.
10 This adjustment ensures that the expected first year dividend yield is, on average,
11 representative of the coming twelve-month period, and does not overstate the
12 aggregated dividends to be paid during that time.

13 **Q. Why is it important to select appropriate measures of long-term growth in**
14 **applying the DCF model?**

15 A. In its Constant Growth form, the DCF model (*i.e.*, Equation [2]) assumes a single
16 growth estimate in perpetuity. To reduce the long-term growth rate to a single
17 measure, one must assume a constant payout ratio, and that earnings per share,
18 dividends per share and book value per share all grow at the same constant rate.
19 Over the long run, however, dividend growth can only be sustained by earnings
20 growth. Therefore, it is important to incorporate a variety of sources of long-term
21 earnings growth rates into the Constant Growth DCF model.

1 **Q. Which sources of long-term earnings growth rates did you use?**

2 A. My Constant Growth DCF model incorporates three sources of long-term earnings
3 growth rates: (1) Zacks Investment Research; (2) Thomson First Call (provided by
4 Yahoo!Finance); and (3) Value Line Investment Survey.

5 **Q. Why are earnings growth rates the appropriate growth rates to be relied on in**
6 **the DCF model?**

7 A. Earnings are the fundamental driver of a company's ability to pay dividends;
8 therefore, earnings growth is the appropriate measure of a company's long-term
9 growth. In contrast, changes in a company's dividend payments are based on
10 management decisions related to cash management and other factors. For example,
11 a company may decide to retain earnings rather than pay out a portion of those
12 earnings to shareholders through dividends. Therefore, dividend growth rates are
13 less likely than earnings growth rates to reflect accurately investor perceptions of a
14 company's growth prospects.

15 **Q. Has the Commission relied exclusively on earnings growth rates as the**
16 **estimate of long-term growth in the DCF model?**

17 A. No, it has not. In Docket No. DE 08-009, the Commission noted in its decision that
18 the use of additional growth rates in the DCF model such as dividend per share and
19 book value per share is appropriate.⁵⁸ In support of its conclusion, the Commission
20 reasoned that an investor's return from utility stocks is based not only on stock price

⁵⁸ EnergyNorth Natural Gas, Inc. d/b/a National Grid NH, Docket No. DG 08-009, Order No. 24,972, May 29, 2009, at 62.

1 appreciation but also dividends.⁵⁹ Furthermore, the Commission noted that the
2 assumption in the DCF model of a constant P/E ratio does not hold and therefore
3 complete reliance on earnings growth is not appropriate.⁶⁰

4 **Q. As a result of the Commission's decision, have you considered additional long-**
5 **term growth rates in the development of your DCF analysis?**

6 A. Yes. While I believe that earnings are the fundamental driver of a company's
7 ability to pay dividends, and therefore are the appropriate measure of a company's
8 long-term growth, I have also considered a DCF analysis that also relies on the
9 retention growth rate.

10 **Q. Please describe the Retention Growth estimate as applied in your testimony.**

11 A. The Retention Growth estimate stems from the proposition that a firm's growth is
12 a function of its expected earnings and the extent to which it retains earnings to
13 invest in the enterprise. In its simplest form, the model represents long-term growth
14 as the product of the retention ratio (i.e., the percentage of earnings not paid out as
15 dividends, referred to below as "b") and the expected return on book equity
16 (referred to below as "r"). Thus, the simple "b x r" form of the model projects
17 growth as a function of internally generated funds. That form of the model is
18 limiting, however, in that it does not provide for growth funded from external
19 equity.

⁵⁹ *Id.*, at 63.

⁶⁰ *Ibid.*

1 The “br + sv” form of the Retention Growth estimate used in my DCF analysis is
2 meant to reflect growth from both internally generated funds (i.e., the “br” term)
3 and from issuances of equity (i.e., the “sv” term). The first term, which is the
4 product of the retention ratio (i.e., “b”, or the portion of net income not paid in
5 dividends) and the expected return on equity (i.e., “r”) represents the portion of net
6 income that is “plowed back” into the Company as a means of funding growth. The
7 “sv” term can be represented as:

$$\left(\frac{m}{b} - 1\right) \times \text{Common Shares growth rate [3]}$$

9 Where:

$$\frac{m}{b} = \text{the market to book ratio.}$$

10
11 In this form, the “sv” term reflects an element of growth as the product of (a) the
12 growth in shares outstanding and (b) that portion of the market-to-book ratio that
13 exceeds unity. As shown in Attachment AEB-5, all of the components of the
14 Retention Growth Model can be derived from data provided by Value Line.

15 **Q. Did you also consider dividend per share (“DPS”) and book value per share**
16 **(“BVPS”) growth rates?**

17 **A.** Yes; however, I did not rely on either DPS or BVPS growth rates as a long-term
18 growth estimate in the Constant Growth DCF model. There are several reasons
19 why reliance on Value Line projections of DPS growth and BVPS growth are not
20 appropriate. First, the use of dividend and book value growth rates ignores the
21 academic research demonstrating that earnings growth rates are most relevant in

1 stock price valuation.⁶¹ Second, projections of dividend growth are entirely
2 dependent on dividend policy, only measuring a portion of the growth experienced
3 by the company, whereas estimates of book value growth are also highly influenced
4 by dividend policy and how earnings are invested between assets and liabilities.
5 Investing earnings in assets or paying down debt will both increase BVPS (all else
6 equal) but paying dividends will decrease BVPS. Therefore, projections of
7 earnings growth provide a more robust estimate of total company growth and is not
8 influenced by the effects of subsequent investment and dividend payment policies
9 as is the case with both DPS and BVPS growth rates.

10 **C. Discounted Cash Flow Model Results**

11 **Q. How did you calculate the range of results for the Constant Growth DCF**
12 **Model?**

13 A. I calculated the low result for my DCF models using the minimum growth rate (*i.e.*,
14 the lowest of the First Call, Zacks, and Value Line earnings growth rates, as well
15 as the retention growth rate) for each of the proxy group companies. Thus, the low
16 result reflects the minimum DCF result for the proxy group. I used a similar
17 approach to calculate the high results, using the highest growth rate for each proxy

⁶¹ See Robert S. Harris, Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return, *Financial Management*, Spring 1986, at 66; James H. Vander Weide, Willard T. Carleton, Investor growth expectations: Analysts vs. history, *The Journal of Portfolio Management*, Spring, 1988; Robert S. Harris, Felicia C. Marston, *Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts*, *Financial Management*, Summer, 1992; Advanced Research Center, *Investor Growth Expectations*, Summer, 2004; The Risk Premium Approach to Measuring a Utility's Cost of Equity, *Financial Management*, Spring, 1985; Dr. Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc. (2006) pp. 299-303.

1 group company. The mean results were calculated using the average growth rates
2 from all sources.

3 **Q. Have you excluded any of the Constant Growth DCF results for individual**
4 **companies in your proxy group?**

5 A. Yes, I have. It is appropriate to exclude Constant Growth DCF results below a
6 specified threshold at which equity investors would consider such returns to provide
7 an insufficient return increment above the long-term debt cost. The average credit
8 rating for the companies in the proxy group is BBB+/Baa1. The average yield on
9 Moody's Baa-rated utility bonds for the 30 trading days ending February 28, 2019
10 was 4.82 percent.⁶² As shown on Attachment AEB-4 and Attachment AEB-6, I
11 have eliminated Constant Growth DCF results lower than 7.00 percent because
12 such returns would provide equity investors a risk premium only 218 basis points
13 above Baa-rated utility bonds.

14 **Q. Have you considered the results of any other DCF analyses?**

15 A. Yes, because of analysts' views that utility stocks may currently be at unsustainably
16 high prices in a rising interest rate environment, I have also considered the results
17 of a projected Constant Growth DCF model. The projected DCF analysis relies on
18 Value Line's projected average stock prices and dividends for the period from 2021
19 through 2023 and the five-year projected EPS growth rates.⁶³ As shown in
20 Attachment AEB-7, my analysis demonstrates that using the Value Line projected

⁶² Source: Bloomberg Professional.

⁶³ Based on the Value Line reporting cycle the EPS growth rates are projected for the period from 2022 to 2024 for three of the proxy companies.

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1 assumptions in the DCF model increases the ROE by 55 basis points (i.e., 10.25
2 percent vs. 9.70 percent) from the average DCF mean result for all three dividend
3 measurement periods using only earnings growth rates as shown in Attachment
4 AEB-4.

5 **Q. What were the results of your DCF analyses?**

6 A. Figure 9 summarizes the results of my DCF analyses. As shown in Figure 9, the
7 mean DCF results range from 9.49 percent to 10.25 percent and the mean high
8 results are in the range of 10.82 percent to 11.86 percent. While I also summarize
9 the mean low DCF results, I do not believe that the low DCF results provide a
10 reasonable spread over the expected yields on Treasury bonds to compensate
11 investors for the incremental risk related to an equity investment.

Figure 9: Discounted Cash Flow Results

	Mean Low	Mean	Mean High
Constant Growth DCF using Earnings Growth Rates⁶⁴			
30-Day Average	9.37%	9.65%	10.82%
90-Day Average	9.42%	9.70%	10.86%
180-Day Average	9.09%	9.76%	10.93%
Constant Growth DCF using Earnings and Retention Growth Rates⁶⁵			
30-Day Average	8.75%	9.49%	11.82%
90-Day Average	8.83%	9.53%	11.86%
180-Day Average	8.47%	9.60%	11.33%
Constant Growth DCF – Projected Price and Dividends⁶⁶			
2021-2023 Projection	9.22%	10.25%	10.89%

Q. What are your conclusions about the results of the DCF models?

A. As discussed previously, one primary assumption of the DCF models is a constant P/E ratio. That assumption is heavily influenced by the market price of utility stocks. To the extent that utility valuations are high and may not be sustainable, it is important to consider the results of the DCF models with caution. As I indicated previously, this is due to the high utility equity valuations that occurred in the lower interest rate environment as investors have sought higher returns. With the expectation of rising interest rates, such levels are not expected to be sustained in the upcoming years. Since the low dividend yields may result in the DCF model understating investors' expected return, I have given primary weight to the mean and high-end DCF results. My overall recommendation also relies on the results of other ROE estimation models.

⁶⁴ See Attachment AEB-4.

⁶⁵ See Attachment AEB-6.

⁶⁶ See Attachment AEB-7.

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1 The variance of the market return (i.e., Variance (r_m)) is a measure of the
2 uncertainty of the general market, and the covariance between the return on a
3 specific security and the general market (i.e., Covariance (r_e , r_m)) reflects the extent
4 to which the return on that security will respond to a given change in the general
5 market return. Thus, Beta represents the risk of the security relative to the general
6 market.

7 **Q. What risk-free rate did you use in your CAPM analysis?**

8 A. I relied on three sources for my estimate of the risk-free rate: (1) the current 30-day
9 average yield on 30-year U.S. Treasury bonds (i.e., 3.04 percent);⁶⁷ (2) the average
10 projected 30-year U.S. Treasury bond yield for Q2 2019 through Q2 2020 of 3.28
11 percent;⁶⁸ and (3) the average projected 30-year U.S. Treasury bond yield for 2020
12 through 2024 of 3.90 percent.⁶⁹

13 **Q. Why did you use the 30-year Treasury bond yield as the risk-free rate in the**
14 **CAPM analysis?**

15 A. In determining the security most relevant to the application of the CAPM, it is
16 important to select the term (or maturity) that best matches the life of the underlying
17 investment. As noted by Morningstar:

18 The traditional thinking regarding the time horizon of the
19 chosen Treasury security is that it should match the time
20 horizon of whatever is being valued... Note that the horizon
21 is a function of the investment, not the investor. If an investor
22 plans to hold stock in a company for only five years, the yield

⁶⁷ Bloomberg Professional, as of February 28, 2019.

⁶⁸ Blue Chip Financial Forecasts, Vol. 38, No. 3, March 1, 2019, at 2.

⁶⁹ Blue Chip Financial Forecasts, Vol. 37, No. 12, December 1, 2018, at 14.

1 on a five-year Treasury note would not be appropriate since
2 the company will continue to exist beyond those five years.⁷⁰

3 Because utility companies represent long-duration investments, it is appropriate to
4 use yields on long-term Treasury bonds as the risk-free rate component of the
5 CAPM. In my view, the 30-year Treasury bond is the appropriate security for that
6 purpose. Because the cost of capital is intended to be forward-looking, it is
7 appropriate to consider projected measures of interest rates and the market risk
8 premium.

9 **Q. Would you place more weight on one of these scenarios?**

10 A. Yes. Based on current market conditions, I place more weight on the results of the
11 projected yields on the 30-year Treasury bonds. As discussed previously, the
12 estimation of the cost of equity in this case should be forward looking since it is the
13 return that investors would receive over the future rate period. Therefore, the inputs
14 and assumptions used in the CAPM analysis should reflect the expectations of the
15 market at that time. As discussed in Section V of my Direct Testimony, leading
16 economists surveyed by Blue Chip are expecting an increase in long-term interest
17 rates over the next five years. This is an important consideration for equity investors
18 as they assess their return requirements. While I have included the results of a
19 CAPM analysis which relies the current average risk-free rate, this analysis fails to
20 take into consideration the effect of the market's expectations for interest rate
21 increases on the cost of equity.

⁷⁰ Morningstar Inc., Ibbotson SBBI 2013 Valuation Yearbook, at 44.

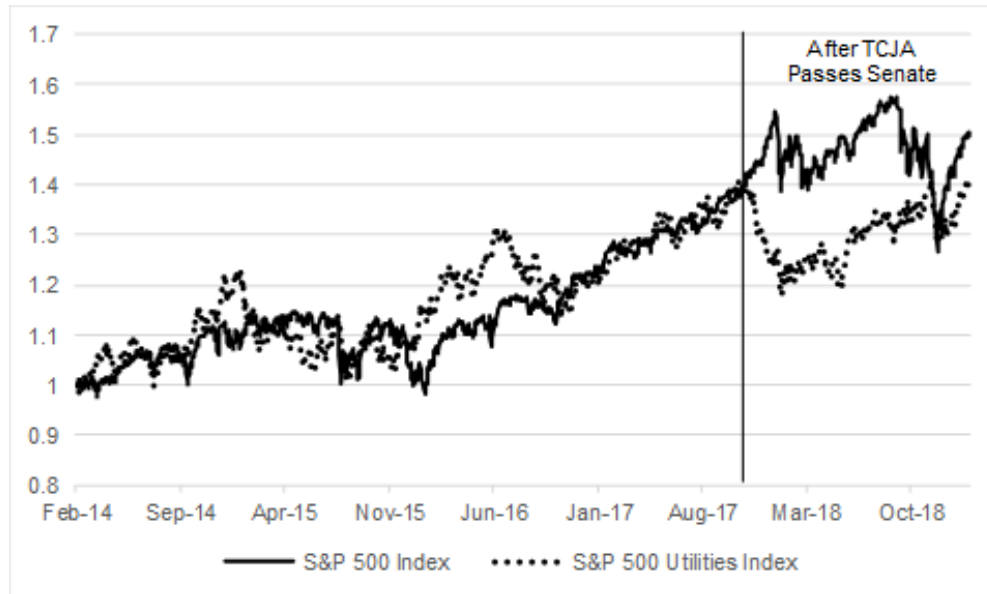
1 **Q. What Beta coefficients did you use in your CAPM analysis?**

2 A. As shown on Attachment AEB-8, I used the average Beta coefficients for the proxy
3 group companies as reported by Bloomberg and Value Line. The Beta coefficients
4 reported by Bloomberg were calculated using ten years of weekly returns relative
5 to the S&P 500 Index. Value Line's calculation is based on five years of weekly
6 returns relative to the New York Stock Exchange Composite Index. My average
7 Beta coefficient for the proxy group was 0.666 using Bloomberg and 0.594 using
8 Value Line.

9 **Q. Why did you select a ten-year period to calculate the Beta coefficients from**
10 **Bloomberg?**

11 A. As I discussed in Section V, the TCJA has had a significant effect on utility
12 companies. While other industries are able to retain the benefits of a reduced
13 corporate income tax rate, this benefit has largely been passed through to customers
14 by utility companies. This fundamental difference had an effect on investors' view
15 of the utility industry relative to other industries. As shown in Figure 10, after the
16 Senate passed the TCJA on December 2, 2017, utilities significantly deviated from
17 the broader market.

Figure 10: Relative Performance of the Utility Industry Relative to the S&P 500



The TCJA's effect on the utility industry relative to other industries caused a short-term significant shift in the returns on the utility industry relative to the broader market. Over the last three to five years, volatility for the utility industry has been higher than the broader market (as measured by the S&P 500),⁷¹ suggesting higher Beta coefficients for utility companies. However, in short-term calculations of the Beta coefficient, the significant effect of the shift in returns related to the TCJA has outweighed the effect of longer-term measures of relative volatility. As such, to reflect the long-term relationship that suggests utility stocks are less volatile than the broader market (i.e. the relative volatility for utility companies has been lower

⁷¹ See, S&P Dow Jones Indices, Equity, S&P 500 Utilities, February 28, 2019.

1 than the S&P 500 over the ten-year measure⁷²), I selected a ten-year period to
2 calculate the Beta coefficients from Bloomberg.

3 **Q. How did you estimate the market risk premium in the CAPM?**

4 A. I estimated the market risk premium based on the expected return on S&P 500
5 Index less the yield on the 30-year Treasury bond. I calculate the expected return
6 on the S&P 500 Index companies for which dividend yields and long-term earnings
7 projections are available using the Constant Growth DCF model discussed earlier
8 in my Direct Testimony. Based on an estimated market capitalization-weighted
9 dividend yield of 2.03 percent and a weighted long-term growth rate of 11.62
10 percent, the estimated required market return for the S&P 500 Index is 13.77
11 percent. As shown in Attachment AEB-9, the implied market risk premium over
12 the current 30-day average of the 30-year U.S. Treasury bond yield, and projected
13 yields on the 30-year U.S. Treasury bond, range from 9.87 percent to 10.73 percent.

14 **Q. Have other regulators endorsed the use of a forward-looking market risk**
15 **premium?**

16 A. Yes. In Opinion No. 531-B, the FERC specifically endorsed a method that is similar
17 to the method I have used to calculate the forward-looking market risk premium
18 (i.e., applying a Constant Growth DCF analysis to the S&P 500 and using the 30-
19 year Treasury bond yields).⁷³

⁷² Ibid.

⁷³ 150 FERC ¶ 61,165, Docket Nos. EL11-66-002, Opinion No. 531-B (March 3, 2015), at para. 109-111.

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1 In response to arguments against this methodology, the FERC stated:

2 We are also unpersuaded that the growth rate projection in the
3 NETOs' [New England Transmission Owners'] CAPM study
4 was skewed by the NETOs' reliance on analysts' projections
5 of non-utility companies' medium-term earnings growth, or
6 that the study failed to consider that those analysts' estimates
7 reflect unsustainable short-term stock repurchase programs
8 and are not long-term projections. As explained above, the
9 NETOs based their growth rate input on data from IBES,
10 which the Commission has found to be a reliable source of
11 such data. Thus, the time periods used for the growth rate
12 projections in the NETOs' CAPM study are the time periods
13 over which IBES forecasts earnings growth. Petitioners'
14 arguments against the time period on which the NETOs'
15 CAPM analysis is based are, in effect, arguments that IBES
16 data are insufficient in a CAPM study.⁷⁴

17 ***

18 While an individual company cannot be expected to sustain
19 high short term growth rates in perpetuity, the same cannot be
20 said for a stock index like the S&P 500 that is regularly
21 updated to contain only companies with high market
22 capitalization, and the record in this proceeding does not
23 indicate that the growth rate of the S&P 500 stock index is
24 unsustainable.⁷⁵

25 Additionally, the Staff in Maine has also endorsed the use of a forward-looking
26 market risk premium. In the Bench Analysis in Docket No. 2018-00194 for Central
27 Maine Power Company, Docket No. 2017-00198 for Emera Maine and Docket No.
28 2017-00065 for Northern Utilities, Staff accepted the approach proposed by the
29 companies for calculating the market return.⁷⁶ In each case, the market return was

⁷⁴ *Id.*, at para. 112.

⁷⁵ *Id.*, at para. 113.

⁷⁶ Central Maine Power Company, Investigation into Rates and Revenue Requirements of Central Maine Power Company, Docket No. 2018-00194, Bench Analysis at 52 (February 22, 2019); Emera

1 the expected return for the S&P 500 which was calculated using a Constant Growth
2 DCF model. In Docket No. 2017-00198, Staff noted the following:

3 Staff has no issue with the methodology used by Mr. Perkins
4 in calculating market parameters based on the S&P 500 and
5 used the model provided by Mr. Perkins with the revised risk
6 free rate to re-calculate the market risk premiums.⁷⁷

7 Furthermore, the Maine Public Utilities Commission (“Maine PUC”) in Docket No.
8 2017-0198 used the CAPM results calculated by Staff and Emera Maine as a check
9 on the reasonableness of the DCF results in the case and did not dispute the use of
10 the forward-looking market risk premium by the parties (i.e., Staff and Emera
11 Maine).⁷⁸

12 **Q. Has the Commission considered the results of the CAPM analysis when**
13 **determining the authorized ROE?**

A. Yes. In in Order No. 24,473 for PSNH, the Commission relied on the results of the
CAPM analysis to check the reasonableness of the DCF model.⁷⁹ Specifically, the
Commission noted the following:

14 We will, therefore, employ the CAPM approach because of its
15 established theoretical applicability and because each of the

Maine, Request for Approval of a Proposed Rate Increase, Docket No. 2017-00198, Bench Analysis at 71-72 (December 21, 2017); Northern Utilities, Inc. d/b/a UNITIL, Request for Approval of Rate Change Pursuant to Section 307, Docket No. 2017-00065, Bench Analysis, at 15-16 (October 6, 2017).

⁷⁷ Emera Maine, Request for Approval of a Proposed Rate Increase, Docket No. 2017-00198, Bench Analysis, at 71-72 (December 21, 2017).

⁷⁸ Emera Maine, Request for Approval of Proposed Rate Increase, Docket No. 2017-00198, June 28, 2018, at 41

⁷⁹ Public Service Company of New Hampshire, Docket No. DE 04-177, Order No. 24,473, 90 NH PUC 230, June 8, 2005, at 42. *See also*, EnergyNorth Natural Gas, Inc. d/b/a National Grid NH, Docket No. DG 08-009, Order No. 24,972, May 29, 2009, at 68-69;

witnesses employs it, so as to provide a thorough and
consistent basis on which to test reasonableness.⁸⁰

Q. What are the results of your CAPM analyses?

A. As shown in Figure 11 (*see* also Attachment AEB-9), my CAPM analysis produces
a range of returns from 9.41 percent to 10.47 percent. The mean returns using
Bloomberg's average Beta coefficient and three measures of the risk-free rate is
10.31 percent. Using the average Value Line Beta coefficient and three measures
of the risk-free rate, the mean result is 9.56 percent.

Figure 11: CAPM Results

	Bloomberg Beta	Value Line Beta
Current Risk-Free Rate (3.04%)	10.18%	9.41%
Q2 2019-Q2 2020 Projected Risk-Free Rate (3.28%)	10.26%	9.51%
2020-2024 Projected Risk-Free Rate (3.90%)	10.47%	9.76%
Mean Result	10.31%	9.56%

E. Bond Yield Plus Risk Premium Analysis

Q. Please describe the Bond Yield Plus Risk Premium approach.

A. In general terms, this approach is based on the fundamental principle that equity
investors bear the residual risk associated with equity ownership and therefore
require a premium over the return they would have earned as a bondholder. That
is, since returns to equity holders have greater risk than returns to bondholders,
equity investors must be compensated to bear that risk. Risk premium approaches,

⁸⁰ Public Service Company of New Hampshire, Docket No. DE 04-177, Order No. 24,473, 90 NH PUC 230, June 8, 2005, at 42.

1 therefore, estimate the cost of equity as the sum of the equity risk premium and the
2 yield on a particular class of bonds. In my analysis, I used actual authorized returns
3 for electric utilities as the historical measure of the cost of equity to determine the
4 risk premium.

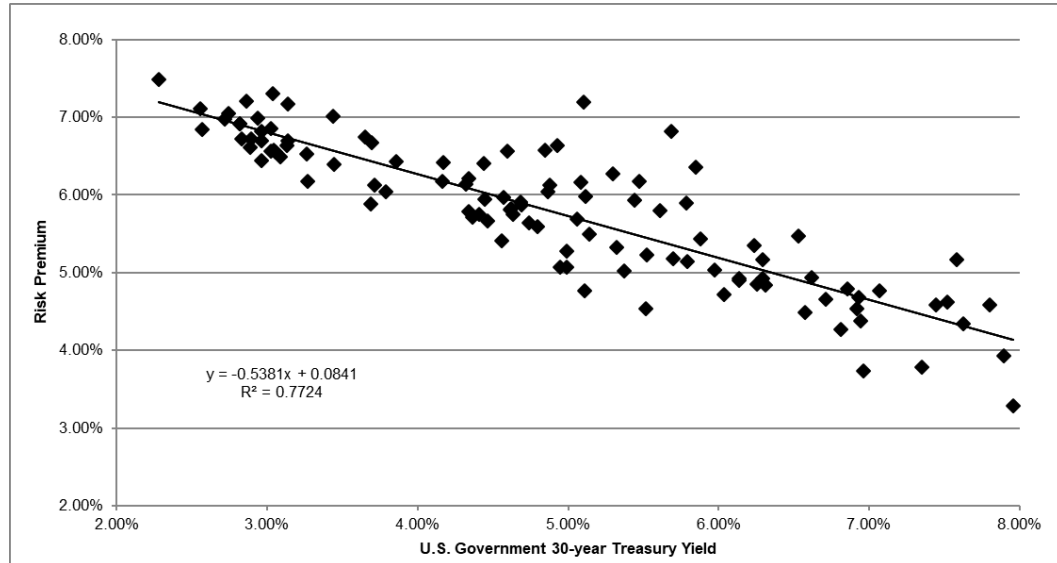
5 **Q. Are there other considerations that should be addressed in conducting this**
6 **analysis?**

7 A. Yes. It is important to recognize both academic literature and market evidence
8 indicating that the equity risk premium (as used in this approach) is inversely
9 related to the level of interest rates. That is, as interest rates increase (decrease),
10 the equity risk premium decreases (increases). Consequently, it is important to
11 develop an analysis that: (1) reflects the inverse relationship between interest rates
12 and the equity risk premium; and (2) relies on recent and expected market
13 conditions. Such an analysis can be developed based on a regression of the risk
14 premium as a function of U.S. Treasury bond yields. If we let authorized ROEs for
15 electric utilities serve as the measure of required equity returns and define the yield
16 on the long-term U.S. Treasury bond as the relevant measure of interest rates, the
17 risk premium simply would be the difference between those two points.⁸¹

⁸¹ See e.g., S. Keith Berry, *Interest Rate Risk and Utility Risk Premia during 1982-93*, Managerial and Decision Economics, Vol. 19, No. 2 (March, 1998), in which the author used a methodology similar to the regression approach described below, including using allowed ROEs as the relevant data source, and came to similar conclusions regarding the inverse relationship between risk premia and interest rates. See also Robert S. Harris, *Using Analysts' Growth Forecasts to Estimate Shareholders Required Rates of Return*, Financial Management, Spring 1986, at 66.

(“RRA”).⁸² This equation’s coefficients were statistically significant at the 99.00 percent level.

Figure 12: Risk Premium Results



As shown on Attachment AEB-10, based on the current 30-day average of the 30-year U.S. Treasury bond yield (i.e., 3.04 percent), the risk premium would be 6.78 percent, resulting in an estimated ROE of 9.82 percent. Based on the near-term (Q2 2019 – Q2 2020) projections of the 30-year U.S. Treasury bond yield (i.e., 3.28 percent), the risk premium would be 6.65 percent, resulting in an estimated ROE of 9.93 percent. Based on longer-term (2020-2024) projections of the 30-year U.S. Treasury bond yield (i.e., 3.90 percent), the risk premium would be 6.31 percent, resulting in an estimated ROE of 10.21 percent.

⁸² This analysis began with a total of 1,143 cases and was screened to eliminate limited issue rider cases, transmission-only cases and cases that were silent with respect to the authorized ROE. After applying those screening criteria, the analysis was based on data for 768 cases.

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1 **Q. How did the results of the Bond Yield Risk Premium inform your**
2 **recommended ROE for PSNH?**

3 A. I have considered the results of the Bond Yield Risk Premium analysis in setting
4 my recommended ROE for PSNH. The results of both my CAPM and Bond Yield
5 Risk Premium analysis provide support for my view that the DCF model is
6 understating investors' return requirements under current market conditions. Also,
7 as noted above, investors will consider the ROE award of a company when
8 assessing the risk of that company as compared to utilities of comparable risk
9 operating in other jurisdictions. The risk premium analysis takes into account this
10 comparison by estimating the return expectations of investors based on the current
11 and past ROE awards of electric utilities across the US.

12 **VIII. REGULATORY AND BUSINESS RISKS**

13 **Q. Is it reasonable to rely exclusively on the mean DCF, CAPM and Risk**
14 **Premium results for the proxy group to provide an appropriate estimate of the**
15 **cost of equity for PSNH?**

16 A. No. These results provide only a range of the appropriate estimate of the
17 Company's cost of equity. There are several additional factors that must be taken
18 into consideration when determining where the Company's cost of equity falls
19 within the range of results. These factors, which are discussed below, should be
20 considered with respect to their overall effect on the Company's risk profile.

1 **A. Regulatory Risk**

2 **Q. Please explain how the regulatory environment affects investors' risk**
3 **assessments.**

4 A. The ratemaking process is premised on the principle that, for investors and
5 companies to commit the capital needed to provide safe and reliable utility service,
6 the subject utility must have the opportunity to recover the return of, and the
7 market-required return on, invested capital. Regulatory authorities recognize that
8 because utility operations are capital intensive, regulatory decisions should enable
9 the utility to attract capital at reasonable terms; doing so balances the long-term
10 interests of investors and customers. PSNH is no exception. It must finance its
11 operations and requires the opportunity to earn a reasonable return on its invested
12 capital to maintain its financial profile. In that respect, the regulatory environment
13 is one of the most important factors considered in both debt and equity investors'
14 risk assessments.

15 From the perspective of debt investors, the authorized return should enable the
16 Company to generate the cash flow needed to meet its near-term financial
17 obligations, make the capital investments needed to maintain and expand its system,
18 and maintain the necessary levels of liquidity to fund unexpected events. This
19 financial liquidity must be derived not only from internally generated funds, but
20 also by efficient access to capital markets. Moreover, because fixed income
21 investors have many investment alternatives, even within a given market sector, the
22 Company's financial profile must be adequate on a relative basis to ensure its ability
23 to attract capital under a variety of economic and financial market conditions.

1 Equity investors require that the authorized return be adequate to provide a risk-
2 comparable return on the equity portion of the Company's capital investments.
3 Because equity investors are the residual claimants on the Company's cash flows
4 (which is to say that the equity return is subordinate to interest payments), they are
5 particularly concerned with the strength of regulatory support and its effect on
6 future cash flows.

7 **Q. Please explain how credit rating agencies consider regulatory risk in**
8 **establishing a company's credit rating.**

9 A. Both S&P and Moody's consider the overall regulatory framework in establishing
10 credit ratings. Moody's establishes credit ratings based on four key factors: (1)
11 regulatory framework; (2) the ability to recover costs and earn returns; (3)
12 diversification; and (4) financial strength, liquidity and key financial metrics. Of
13 these criteria, regulatory framework and the ability to recover costs and earn returns
14 are each given a broad rating factor of 25.0 percent. Therefore, Moody's assigns
15 regulatory risk a 50.0 percent weighting in the overall assessment of business and
16 financial risk for regulated utilities.⁸³

17 S&P also identifies the regulatory framework as an important factor in credit ratings
18 for regulated utilities, stating: "One significant aspect of regulatory risk that
19 influences credit quality is the regulatory environment in the jurisdictions in which

⁸³ Moody's Investors Service, Rating Methodology: Regulated Electric and Gas Utilities, June 23, 2017, at 4.

1 a utility operates.”⁸⁴ S&P identifies four specific factors that it uses to assess the
2 credit implications of the regulatory jurisdictions of investor-owned regulated
3 utilities: (1) regulatory stability; (2) tariff-setting procedures and design; (3)
4 financial stability; and (4) regulatory independence and insulation.⁸⁵

5 **Q. How does the regulatory environment in which a utility operates affect its**
6 **access to and cost of capital?**

7 A. The regulatory environment can significantly affect both the access to, and cost of
8 capital in several ways. First, the proportion and cost of debt capital available to
9 utility companies are influenced by the rating agencies’ assessment of the
10 regulatory environment. As noted by Moody’s, “[f]or rate regulated utilities, which
11 typically operate as a monopoly, the regulatory environment and how the utility
12 adapts to that environment are the most important credit considerations.”⁸⁶
13 Moody’s further highlighted the relevance of a stable and predictable regulatory
14 environment to a utility’s credit quality, noting: “[b]roadly speaking, the
15 Regulatory Framework is the foundation for how all the decisions that affect
16 utilities are made (including the setting of rates), as well as the predictability and
17 consistency of decision-making provided by that foundation.”⁸⁷

⁸⁴ Standard & Poor’s Global Ratings, Ratings Direct, U.S. and Canadian Regulatory Jurisdictions Support Utilities’ Credit Quality—But Some More So Than Others, June 25, 2018, at 2.

⁸⁵ *Id.*, at 1.

⁸⁶ Moody’s Investors Service, Rating Methodology: Regulated Electric and Gas Utilities, June 23, 2017, at 6.

⁸⁷ *Ibid.*

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1 **Q. Have you conducted any analysis of the regulatory framework in New**
2 **Hampshire relative to the jurisdictions in which the companies in your proxy**
3 **group operate?**

4 A. Yes. I have evaluated the regulatory framework in New Hampshire on factors that
5 are important in terms of providing a regulated utility an opportunity to earn its
6 authorized ROE. Specifically, I have considered test year convention (i.e., forecast
7 vs. historical); and the prevalence of capital cost recovery between rate cases. The
8 results of this regulatory risk assessment are shown in Attachment AEB-11 and are
9 summarized below.

10 Test year convention: The Commission typically uses a historical test year
11 adjusted for known and measurable changes in New Hampshire, while a
12 majority (i.e., 72 percent) of the electric operating companies held by the proxy
13 group provide service in jurisdictions that use a fully or partially forecast test
14 year. Forecast test years have been relied on for several years and produce cost
15 estimates that are more reflective of future costs which results in more accurate
16 recovery of incurred costs and mitigates the regulatory lag associated with
17 historical test years. As Lowry, Hovde, Getachew, and Makos explain in their
18 2010 report, *Forward Test Years for US Electric Utilities*:

19 This report provides an in depth discussion of the test year
20 issue. It includes the results of empirical research which
21 explores why the unit costs of electric IOUs are rising and
22 shows that utilities operating under forward test years realize
23 higher returns on capital and have credit ratings that are
24 materially better than those of utilities operating under
25 historical test years. The research suggests that shifting to a

1 future test year is a prime strategy for rebuilding utility credit
2 ratings as insurance against an uncertain future.⁸⁸

3 Capital cost recovery: In recent years, PSNH has adjusted base rates through
4 annual filings before the Commission to recover capital investments and
5 increases in operation and maintenance expenses associated with the
6 Company's Reliability Enhancement Program ("REP"), although, this program
7 will expire as of the effective date of temporary rates, which is expected to be
8 July 1, 2019. In this proceeding, the Company is requesting a capital cost
9 recovery mechanism, which is intended to recover costs associated with
10 targeted, accelerated infrastructure upgrades and clean innovation projects
11 covering total capital costs of approximately \$40 million per year. In addition,
12 the Company has a Transmission Cost Adjustment Mechanism ("TCAM") that
13 recovers transmission-related costs such as capital expenditures. As shown in
14 Attachment AEB-11, 28 percent of the electric operating companies held by the
15 proxy group have some form of capital cost recovery mechanism in place.

16 **Q. Has RRA provided recent commentary regarding its regulatory ranking for**
17 **PSNH?**

18 **A.** Yes. In May 2019, RRA updated its evaluation of the regulatory environment in
19 New Hampshire and noted the following:

20 New Hampshire regulation is somewhat more restrictive than
21 average from an investor perspective according to Regulatory
22 Research Associates, a group within S&P Global Market
23 Intelligence. While many of the rate proceedings before the

⁸⁸ M.N. Lowry, D. Hovde, L. Getachew, and M. Makos, *Forward Test Years for US Electric Utilities*, prepared for Edison Electric Institute, August 2010, at 1.

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1 PUC in recent years have been resolved via settlements, in
2 some instances the stipulated equity returns have been
3 somewhat below the prevailing industry averages when
4 established. While rate decisions take a full year to be
5 adjudicated, the utilities are permitted to implement interim
6 rates upon demonstration that a reasonable return is not being
7 earned. Retail customer choice for generation service has been
8 in place for some time in the state. However, the 2018 sale of
9 the fossil and hydro generation facilities owned by Public
10 Service Co. of New Hampshire, or PSNH, marked the end of
11 the state's electric industry restructuring transition process.
12 The sale of the generation assets was a component of a
13 comprehensive settlement that provided for the divestiture of
14 the company's generation assets and ultimate issuance of
15 bonds for the securitization of stranded costs following the
16 sale of the plants. Generation service for non-switching
17 customers is procured through a competitive wholesale
18 process. Previously, the power to meet PSNH's obligations
19 from non-switching customers was obtained from a
20 combination of company-owned assets and purchased power
21 contracts. There is little natural gas service in the state, but the
22 PUC has adopted automatic commodity cost recovery
23 provisions for the few small gas distribution companies. Most
24 of the state's utilities utilize lost revenue adjustment
25 mechanisms that make the companies whole for the impact of
26 energy conservation programs. Only one gas utility has a full
27 decoupling mechanism in place. RRA continues to accord
28 New Hampshire an Average/3 rating.⁸⁹

29 **Q. How do the returns that have been authorized in New Hampshire compare**
30 **with the authorized returns in other jurisdictions?**

31 A. As noted in RRA's evaluation above, the authorized ROEs for electric and natural
32 gas utilities in New Hampshire, while mainly the result of settlement agreements
33 approved by the Commission, have been below the average authorized ROEs for
34 electric and natural gas utilities across the U.S. For example, the Commission

⁸⁹ Regulatory Research Associates, Profile of New Hampshire Public Utilities Commission, accessed May 8, 2019.

1 recently issued Orders in Docket No. DG 17-070 for Northern Utilities and Docket
2 No. DG 17-048 for Liberty Utilities (EnergyNorth). In each case, the Commission
3 approved a settlement agreement which for Northern Utilities resulted in an
4 authorized ROE of 9.50 percent.⁹⁰ For Liberty Utilities (EnergyNorth), the
5 Commission reduced the proposed ROE in the settlement agreement by 10-basis
6 point to reflect the reduction in risk associated with the approval of a revenue
7 decoupling mechanism and thus, authorized Liberty Utilities (EnergyNorth) a ROE
8 of 9.30 percent.⁹¹ Therefore, the authorized ROEs of 9.50 percent for Northern
9 Utilities and 9.30 percent for Liberty Utilities (EnergyNorth) are 20 and 40 basis
10 points lower than the average authorized ROE for electric and natural gas utilities
11 in 2017 through 2019 of 9.70 percent.⁹²

12 This point is further supported by Figure 13 which shows the authorized returns for
13 electric utilities in other jurisdictions since January 2009, and the returns authorized
14 in New Hampshire for electric utilities. As shown in Figure 13, the authorized
15 returns for electric utilities in New Hampshire have been at the low end of the range
16 produced by the authorized ROEs from other state jurisdictions for 2009 through
17 2019. This is concerning because, as noted previously, New Hampshire utility

⁹⁰ Northern Utilities, Inc., Docket No. DG 17-070, Order No. 26,129, May 2, 2018, at 14-15.

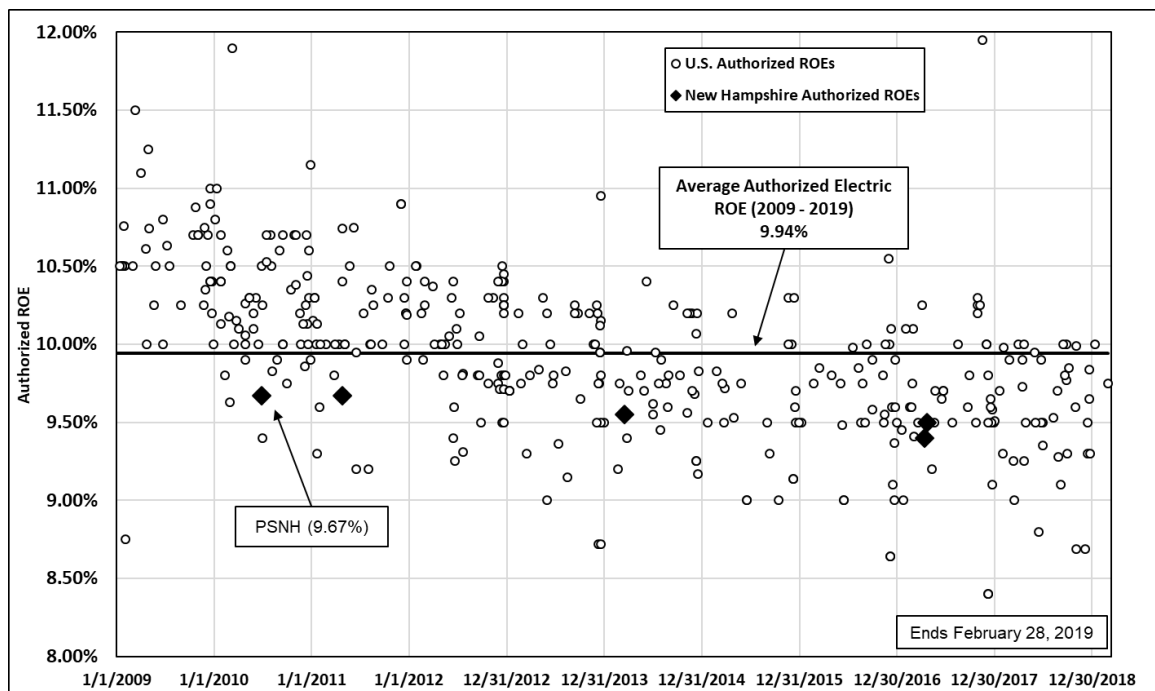
⁹¹ Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities, Docket No. DG 17-048, Order No. 26,122, April 27, 2018, at 43.

⁹² The average authorized ROE of 9.70 percent excludes rate cases in New York since the ROE determinations are based on a formulaic approach that has generally resulted in the lowest returns for any state regulatory jurisdiction for electric and natural gas distribution companies. Similarly, the average excludes electric rate cases in Illinois since the authorized ROEs are also based on a formulaic approach which produces results well below 9.00 percent.

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1 subsidiaries must compete for discretionary capital within their own corporate
2 structure, which must in turn compete for capital with other utilities and businesses.
3 Placing PSNH at the low end of authorized ROEs outside New Hampshire over the
4 longer term could negatively affect PSNH's access to discretionary capital.

5 **Figure 13: Comparison of New Hampshire and U.S. Authorized Returns for**
6 **Electric Utilities⁹³**



7
8 **Q. What are your conclusions regarding the perceived risks related to the New**
9 **Hampshire regulatory environment?**

10 A. I conclude that PSNH has slightly greater than average regulatory risk when
11 compared to the proxy group. As discussed throughout this section of my
12 testimony, both Moody's and S&P have identified the supportiveness of the

⁹³ Source: SNL Financial. Rate case decisions from January 1, 2009 through February 28, 2019. The chart does not display the 12.88% ROE that was authorized for Alaska Electric Light and Power on September 2, 2011.

1 regulatory environment as an important consideration in developing their overall
2 credit ratings for regulated utilities. Considering the regulatory adjustment
3 mechanisms, many of the companies in the proxy group have timely cost recovery
4 through forecasted test years, and cost recovery trackers. As of July 1, 2019,
5 PSNH's capital cost recovery mechanism will expire. Therefore, absent the
6 Commission's approval of the capital tracker that is being requested in this
7 proceeding, the Company would not have the ability to recover the cost of capital
8 investments made between rate proceedings. Furthermore, the Company is not
9 permitted the use of a forecasted test year to mitigate risk. The RRA evaluation of
10 New Hampshire considers the regulatory environment to be somewhat restrictive
11 from an investor perspective due to various factors such as authorized ROEs that
12 are below prevailing national averages. The perceived increase in risk related to
13 the New Hampshire regulatory environment indicates that the authorized ROE and
14 equity ratio for PSNH should be higher than the proxy group mean.

15 **B. Flotation Costs**

16 **Q. What are flotation costs?**

17 A. Flotation costs are the costs associated with the sale of new issues of common stock.
18 These costs include out-of-pocket expenditures for preparation, filing,
19 underwriting, and other issuance costs.

20 **Q. Why is it important to consider flotation costs in the allowed ROE?**

21 A. A regulated utility must have the opportunity to earn an ROE that is both
22 competitive and compensatory to attract and retain new investors. To the extent

1 that a company is denied the opportunity to recover prudently incurred flotation
2 costs, actual returns will fall short of expected (or required) returns, thereby diluting
3 equity share value.

4 **Q. Are flotation costs part of the utility's invested costs or part of the utility's**
5 **expenses?**

6 A. Flotation costs are part of the invested costs of the utility, which are properly
7 reflected on the balance sheet under "paid in capital." They are not current
8 expenses, and, therefore, are not reflected on the income statement. Rather, like
9 investments in rate base or the issuance costs of long-term debt, flotation costs are
10 incurred over time. As a result, the great majority of a utility's flotation cost is
11 incurred prior to the test year and remains part of the cost structure that exists during
12 the test year and beyond, and as such, should be recognized for ratemaking
13 purposes. Therefore, failure to allow recovery of past flotation costs may deny
14 PSNH the opportunity to earn its required ROR in the future.

15 **Q. Please provide an example of why a flotation cost adjustment is necessary to**
16 **compensate investors for the capital they have invested.**

17 A. Suppose Eversource issues stock with a value of \$100, and an equity investor
18 invests \$100 in Eversource in exchange for that stock. Further suppose that, after
19 paying the flotation costs associated with the equity issuance, which include fees
20 paid to underwriters and attorneys, among others, Eversource ends up with only
21 \$97 of issuance proceeds, rather than the \$100 the investor contributed. Eversource
22 invests that \$97 in plant used to serve its customers, which becomes part of rate
23 base. Absent a flotation cost adjustment, the investor will thereafter earn a return

1 on only the \$97 invested in rate base, even though she contributed \$100. Making
2 a small flotation cost adjustment gives the investor a reasonable opportunity to earn
3 the authorized return, rather than the lower return that results when the authorized
4 return is applied to an amount less than what the investor contributed.

5 **Q. Is the date of Eversource's last issued common equity important in the**
6 **determination of flotation costs?**

7 A. No. Just prior to its merger with NSTAR LLC that formed Eversource, PSNH's
8 parent, Northeast Utilities ("NU") had two equity issuances. As shown in
9 Attachment AEB-12, NU closed on equity issuances of approximately \$439 million
10 and \$383 million (for a total of 42 million shares of common stock) in December
11 2005 and March 2009, respectively. The vintage of the issuance, however, is not
12 particularly important because the investor suffers a shortfall in every year that he
13 should have a reasonable opportunity to earn a return on the full amount of capital
14 that he has contributed. Returning to my earlier example, the investor who
15 contributed \$100 is entitled to a reasonable opportunity to earn a return on \$100 not
16 only in the first year after the investment, but in every subsequent year in which he
17 has the \$100 invested. Leaving aside depreciation, which is dealt with separately,
18 there is no basis to conclude that the investor is entitled to earn a return on \$100 in
19 the first year after issuance, but thereafter is entitled to earn a return on only \$97.
20 As long as the \$100 is invested, the investor should have a reasonable opportunity
21 to earn a return on the entire amount.

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1 **Q. Is the need to consider flotation costs recognized by the academic and**
2 **financial communities?**

3 A. Yes. The need to reimburse shareholders for the lost returns associated with equity
4 issuance costs is recognized by the academic and financial communities in the same
5 spirit that investors are reimbursed for the costs of issuing debt. This treatment is
6 consistent with the philosophy of a fair ROR. According to Dr. Shannon Pratt:

7 Flotation costs occur when new issues of stock or debt are sold
8 to the public. The firm usually incurs several kinds of flotation
9 or transaction costs, which reduce the actual proceeds received
10 by the firm. Some of these are direct out-of-pocket outlays,
11 such as fees paid to underwriters, legal expenses, and
12 prospectus preparation costs. Because of this reduction in
13 proceeds, the firm's required returns on these proceeds equate
14 to a higher return to compensate for the additional costs.
15 Flotation costs can be accounted for either by amortizing the
16 cost, thus reducing the cash flow to discount, or by
17 incorporating the cost into the cost of capital. Because
18 flotation costs are not typically applied to operating cash flow,
19 one must incorporate them into the cost of capital.⁹⁴

20 **Q. How did you calculate the flotation costs for PSNH?**

21 A. My flotation cost calculation is based on the costs of issuing equity that were
22 incurred by Eversource in its two most recent common equity issuances. Those
23 issuance costs were applied to my proxy group. Based on the issuance costs
24 provided in Attachment AEB-12, flotation costs for PSNH are approximately 0.13
25 percent (i.e., 13 basis points).

⁹⁴ Shannon P. Pratt, Cost of Capital Estimation and Applications, Second Edition, at 220-221.

1 **Q. Do the results of your models, summarized in Figure 14 include an adjustment**
2 **for flotation cost recovery?**

3 A. No. I did not make an explicit adjustment for flotation costs to any of my
4 quantitative analyses. Rather, I provide flotation costs as another factor to be
5 considered in the development of the range that is established from my Constant
6 Growth DCF, Projected DCF, CAPM, and Risk Premium analyses and my
7 recommended ROE.

8 **IX. CAPITAL STRUCTURE**

9 **Q. Is the capital structure of the Company an important consideration in the**
10 **determination of the appropriate return on equity?**

11 A. Yes, it is. Assuming other factors equal, a higher debt ratio increases the risk to
12 investors. For debt holders, higher debt ratios result in a greater portion of the
13 available cash flow being required to meet debt service, thereby increasing the risk
14 associated with the payments on debt. The result of increased risk is a higher
15 interest rate. The incremental risk of a higher debt ratio is more significant for
16 common equity shareholders. Common shareholders are the residual claimants on
17 the cash flow of the Company. Therefore, the greater the debt service requirement,
18 the less cash flow available for common equity holders.

19 **Q. What is PSNH's proposed capital structure?**

20 A. The Company's proposal is to establish a capital structure consisting of 54.85
21 percent common equity, 41.98 percent long-term debt, and 3.17 percent short-term
22 debt.

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1 **Q. Did you conduct any analysis to determine if this requested equity ratio was**
2 **reasonable?**

3 A. Yes, I did. I reviewed the Company's historical actual capital structure and the
4 capital structures of the utility operating subsidiaries of the proxy companies. Since
5 the return on equity is set based on the return that is derived from the risk-
6 comparable proxy group, it is reasonable to look to the proxy group average capital
7 structure to benchmark the equity ratio for the Company.

8 **Q. Please discuss your analysis of the capital structures of the proxy group**
9 **companies.**

10 A. I calculated the mean proportions of common equity, long-term debt, short-term
11 debt and preferred equity over the most recent eight quarters⁹⁵ for each of
12 companies in my proxy group at the operating subsidiary level. My analysis of the
13 capital structures of the companies in my proxy group is provided in Attachment
14 AEB-13. As shown in Attachment AEB-13, the equity ratios for the proxy group
15 at the operating utility company level ranged from 46.72 percent to 59.97 percent
16 with a mean of 53.41 percent. PSNH's equity ratio of 54.85 is close to the average
17 of the proxy group and well within the range established by the capital structures
18 of the operating companies in the proxy group.

⁹⁵ The source data for this analysis is the operating company data provided in FERC Form 1 reports. Due to the timing of those filings, my average capital structure analysis uses the quarterly capital structures reported for the proxy group companies for the period from the first quarter of 2017 through the fourth quarter of 2018.

1 **Q. Are there other factors to be considered in setting the Company's capital**
2 **structure?**

3 A. Yes. The credit rating agencies' response to the TCJA must also be considered
4 when determining the equity ratio. As discussed previously in my testimony, all
5 three rating agencies have noted that the TCJA has negative implications for utility
6 cash flows. S&P and Fitch Ratings have specifically identified increasing the equity
7 ratio as one approach to ensure that utilities have sufficient cash flows following
8 the tax cuts and the loss of bonus depreciation. Furthermore, Moody's
9 unprecedented downgrade of the rating outlook for the entire utilities sector in June
10 2018 stresses the importance of maintaining adequate cash flow metrics for the
11 industry as a whole and PSNH in the context of this proceeding. Finally, in its recent
12 credit opinion, S&P is projecting a decline in the cash flow metrics for 2018-2020
13 for PSNH's parent company, Eversource due in part to the effect of the TCJA.⁹⁶

14 **Q. Is there a relationship between the equity ratio and the authorized ROE?**

15 A. Yes. The equity ratio is the primary indicator of financial risk for a regulated utility
16 such as PSNH. To the extent the equity ratio is reduced, it is necessary to increase
17 the authorized ROE to compensate investors for the greater financial risk associated
18 with a lower equity ratio.

⁹⁶ Standard and Poor's Global Ratings, "Research Update: Eversource Energy and Subsidiaries Outlooks Revised To Negative On Announcement of Offshore Wind Joint Venture", February 12, 2019.

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1 **Q. What is your conclusion regarding an appropriate capital structure for**
2 **PSNH?**

3 A. Considering the actual capital structures of the proxy group operating companies, I
4 believe that PSNH's proposed common equity ratio of 54.85 percent is reasonable.
5 The proposed equity ratio is well within the range established by the capital
6 structures of the utility operating subsidiaries of the proxy companies. In addition,
7 based on the cash flow concerns raised by credit rating agencies as a result of the
8 TCJA, it is reasonable to rely on a higher equity ratio than the Company may have
9 relied on in prior cases.

10 **X. CONCLUSIONS AND RECOMMENDATION**

11 **Q. What is your conclusion regarding a fair ROE for PSNH?**

12 A. Based on the quantitative and qualitative analyses presented in my Direct
13 Testimony, and in light of the business and financial risks of PSNH compared to
14 the proxy group, and the effects of Federal tax reform on the cash flow metrics of
15 utilities, it is my view that an ROE of 10.40 would fairly balance the interests of
16 customers and shareholders. This ROE would enable the Company to maintain its
17 financial integrity and therefore its ability to attract capital at reasonable rates under
18 a variety of economic and financial market conditions, while continuing to provide
19 safe, reliable and affordable electric utility service to customers in New Hampshire.

1

Figure 14: Summary of Analytical Results⁹⁷

Constant Growth DCF using Earnings Growth Rates			
	Mean Low	Mean	Mean High
30-Day Average Price	9.37%	9.65%	10.82%
90-Day Average Price	9.42%	9.70%	10.86%
180-Day Average Price	9.09%	9.76%	10.93%
Constant Growth DCF using Earnings and Retention Growth Rates			
30-Day Average Price	8.75%	9.49%	11.82%
90-Day Average Price	8.83%	9.53%	11.86%
180-Day Average Price	8.47%	9.60%	11.33%
Projected DCF			
2021-2023 Projection	9.22%	10.25%	10.89%
Capital Asset Pricing Model			
	Current Risk-Free Rate (3.04%)	Q2 2019 – Q2 2020 Projected Risk-Free Rate (3.28%)	2020-2024 Projected Risk-Free Rate (3.90%)
Bloomberg Beta	10.18%	10.26%	10.47%
Value Line Beta	9.41%	9.51%	9.76%
Bond Yield Plus Risk Premium			
	Current Risk-Free Rate (3.04%)	Q2 2019 – Q2 2020 Projected Risk-Free Rate (3.28%)	2020-2024 Projected Risk-Free Rate (3.90%)
Bond Yield Plus Risk Premium	9.82%	9.93%	10.21%

2

3 **Q. What is your conclusion with respect to PSNH's proposed capital structure?**

4 A. My conclusion is that PSNH's proposed common equity ratio of 54.85 percent is
5 reasonable when compared to the capital structures of the companies in the proxy
6 group. Furthermore, authorization of the Company's equity ratio would likely be

⁹⁷ The analytical results included in Figure 14 reflect the results of the Constant Growth and Projected DCF analysis excluding the results for individual companies that did not meet the minimum threshold of 7.00 percent.

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1 viewed by the rating agencies as a constructive response to the declining cash flow

2 metrics caused by the TCJA.

3 **Q. Does this conclude your Direct Testimony?**

4 A. Yes, it does.



Ann E. Bulkley
Senior Vice President

Ms. Bulkley has more than two decades of management and economic consulting experience in the energy industry. Ms. Bulkley has extensive state and federal regulatory experience on both electric and natural gas issues including rate of return, cost of equity and capital structure issues. Ms. Bulkley has provided expert testimony on the cost of capital in more than 30 regulatory proceedings before regulatory commissions in Arizona, Arkansas, Colorado, Connecticut, Kansas, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New Mexico, New York, North Dakota, Oklahoma, Pennsylvania, Texas, South Dakota, West Virginia, and the Federal Energy Regulatory Commission. In addition, Ms. Bulkley has prepared and provided supporting analysis for at least forty Federal and State regulatory proceedings. In addition, Ms. Bulkley has worked on acquisition teams with investors seeking to acquire utility assets, providing valuation services including an understanding of regulation, market expected returns, and the assessment of utility risk factors. Ms. Bulkley has assisted clients with valuations of public utility and industrial properties for ratemaking, purchase and sale considerations, ad valorem tax assessments, and accounting and financial purposes. In addition, Ms. Bulkley has experience in the areas of contract and business unit valuation, strategic alliances, market restructuring and regulatory and litigation support. Prior to joining Concentric, Ms. Bulkley held senior expertise-based consulting positions at several firms, including Reed Consulting Group and Navigant Consulting, Inc. where she specialized in valuation. Ms. Bulkley holds an M.A. in economics from Boston University and a B.A. in economics and finance from Simmons College. Ms. Bulkley is a Certified General Appraiser licensed in the Commonwealth of Massachusetts and the State of New Hampshire.

REPRESENTATIVE PROJECT EXPERIENCE

Regulatory Analysis and Ratemaking

Ms. Bulkley has provided a range of advisory services relating to regulatory policy analysis and many aspects of utility ratemaking. Specific services have included: cost of capital and return on equity testimony, cost of service and rate design analysis and testimony, development of ratemaking strategies; development of merchant function exit strategies; analysis and program development to address residual energy supply and/or provider of last resort obligations; stranded costs assessment and recovery; performance-based ratemaking analysis and design; and many aspects of traditional utility ratemaking (e.g., rate design, rate base valuation).

Cost of Capital



Ms. Bulkley has provided expert testimony on the cost of capital in more than 30 regulatory proceedings before regulatory commissions in Arizona, Arkansas, Colorado, Connecticut, Kansas, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New Mexico, New York, North Dakota, Oklahoma, Pennsylvania, Texas, South Dakota, West Virginia, and the Federal Energy Regulatory Commission. In addition, Ms. Bulkley has prepared and provided supporting analysis for at least forty Federal and State regulatory proceedings in which she did not testify.

Valuation

Ms. Bulkley has provided valuation services to utility clients, unregulated generators and private equity clients for a variety of purposes including ratemaking, fair value, ad valorem tax, litigation and damages, and acquisition. Ms. Bulkley's appraisal practices are consistent with the national standards established by the Uniform Standards of Professional Appraisal Practice. In addition, Ms. Bulkley has relied on other simulation based valuation methodologies.

Representative projects/clients have included:

- Northern Indiana Fuel and Light: Provided expert testimony regarding the fair value of the company's natural gas distribution system assets. Valuation relied on cost approach.
- Kokomo Gas: Provided expert testimony regarding the fair value of the company's natural gas distribution system assets. Valuation relied on cost approach.
- Prepared fair value rate base analyses for Northern Indiana Public Service Company for several electric rate proceedings. Valuation approaches used in this project included income, cost and comparable sales approaches.
- Confidential Utility Client: Prepared valuation of fossil and nuclear generation assets for financing purposes for regulated utility client.
- Prepared a valuation of a portfolio of generation assets for a large energy utility to be used for strategic planning purposes. Valuation approach included an income approach, a real options analysis and a risk analysis.
- Assisted clients in the restructuring of NUG contracts through the valuation of the underlying assets. Performed analysis to determine the option value of a plant in a competitively priced electricity market following the settlement of the NUG contract.
- Prepared market valuations of several purchase power contracts for large electric utilities in the sale of purchase power contracts. Assignment included an assessment of the regional power market, analysis of the underlying purchase power contracts, a traditional discounted cash flow valuation approach, as well as a risk analysis. Analyzed bids from potential acquirers using income and risk analysis approached. Prepared an assessment of the credit issues and value at risk for the selling utility.
- Prepared appraisal of a portfolio of generating facilities for a large electric utility to be used for financing purposes.
- Prepared an appraisal of a fleet of fossil generating assets for a large electric utility to establish the value of assets transferred from utility property.
- Conducted due diligence on an electric transmission and distribution system as part of a buy-side due diligence team.



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- Provided analytical support for and prepared appraisal reports of generation assets to be used in ad valorem tax disputes.
- Provided analytical support and prepared testimony regarding the valuation of electric distribution system assets in five communities in a condemnation proceeding.
- Valued purchase power agreements in the transfer of assets to a deregulated electric market.

Ratemaking

Ms. Bulkley has assisted several clients with analysis to support investor-owned and municipal utility clients in the preparation of rate cases. Sample engagements include:

- Assisted several investor-owned and municipal clients on cost allocation and rate design issues including the development of expert testimony supporting recommended rate alternatives.
- Worked with Canadian regulatory staff to establish filing requirements for a rate review of a newly regulated electric utility. Analyzed and evaluated rate application. Attended hearings and conducted investigation of rate application for regulatory staff. Prepared, supported and defended recommendations for revenue requirements and rates for the company. Developed rates for gas utility for transportation program and ancillary services.

Strategic and Financial Advisory Services

Ms. Bulkley has assisted several clients across North America with analytically based strategic planning, due diligence and financial advisory services.

Representative projects include:

- Preparation of feasibility studies for bond issuances for municipal and district steam clients.
- Assisted in the development of a generation strategy for an electric utility. Analyzed various NERC regions to identify potential market entry points. Evaluated potential competitors and alliance partners. Assisted in the development of gas and electric price forecasts. Developed a framework for the implementation of a risk management program.
- Assisted clients in identifying potential joint venture opportunities and alliance partners. Contacted interviewed, and evaluated potential alliance candidates based on company-established criteria for several LDCs and marketing companies. Worked with several LDCs and unregulated marketing companies to establish alliances to enter into the retail energy market. Prepared testimony in support of several merger cases and participated in the regulatory process to obtain approval for these mergers.
- Assisted clients in several buy-side due diligence efforts, providing regulatory insight and developing valuation recommendations for acquisitions of both electric and gas properties.

PROFESSIONAL HISTORY

Concentric Energy Advisors, Inc. (2002 – Present)



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Senior Vice President
Vice President
Assistant Vice President
Project Manager

Navigant Consulting, Inc. (1995 - 2002)
Project Manager

Cahners Publishing Company (1995)
Economist

EDUCATION

M.A., Economics, Boston University, 1995

B.A., Economics and Finance, Simmons College, 1991

Certified General Appraiser licensed in the Commonwealth of Massachusetts and the States of Michigan and New Hampshire



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Arizona Corporation Commission				
Tucson Electric Power Company	04/19	Tucson Electric Power Company	Docket No. E-01933A-19-0028	Return on Equity
Tucson Electric Power Company	11/15	Tucson Electric Power Company	Docket No. E-01933A-15-0322	Return on Equity
UNS Electric	05/15	UNS Electric	Docket No. E-04204A-15-0142	Return on Equity
UNS Electric	12/12	UNS Electric	Docket No. E-04204A-12-0504	Return on Equity
Arkansas Public Service Commission				
Arkansas Oklahoma Gas Corporation	10/13	Arkansas Oklahoma Gas Corporation	Docket No. 13-078-U	Return on Equity
Colorado Public Utilities Commission				
Public Service Company of Colorado	01/19	Public Service Company of Colorado	19AL-0063ST	Return on Equity
Atmos Energy Corporation	05/15	Atmos Energy Corporation	Docket No. 15AL-0299G	Return on Equity
Atmos Energy Corporation	04/14	Atmos Energy Corporation	Docket No. 14AL-0300G	Return on Equity
Atmos Energy Corporation	05/13	Atmos Energy Corporation	Docket No. 13AL-0496G	Return on Equity
Connecticut Public Utilities Regulatory Authority				
Connecticut Natural Gas Corporation	06/18	Connecticut Natural Gas Corporation	Docket No. 18-05-16	Return on Equity
Yankee Gas Services Co. d/b/a Eversource Energy	06/18	Yankee Gas Services Co. d/b/a Eversource Energy	Docket No. 18-05-10	Return on Equity



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SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
The Southern Connecticut Gas Company	06/17	The Southern Connecticut Gas Company	Docket No. 17-05-42	Return on Equity
The United Illuminating Company	07/16	The United Illuminating Company	Docket No. 16-06-04	Return on Equity
Federal Energy Regulatory Commission				
Sea Robin Pipeline Company LLC	11/18	Sea Robin Pipeline Company LLC	Docket# RP19-__-000	Return on Equity
Tallgrass Interstate Gas Transmission	10/15	Tallgrass Interstate Gas Transmission	RP16-137	Return on Equity
Indiana Utility Regulatory Commission				
Indiana and Michigan American Water Company	09/18	Indiana and Michigan American Water Company	IURC Cause No. 45142	Return on Equity
Northern Indiana Public Service Company	09/17	Northern Indiana Public Service Company	Cause No. 44988	Fair Value
Indianapolis Power and Light Company	12/16	Indianapolis Power and Light Company	Cause No.44893	Fair Value
Northern Indiana Public Service Company	10/15	Northern Indiana Public Service Company	Cause No. 44688	Fair Value
Indianapolis Power and Light Company	09/15	Indianapolis Power and Light Company	Cause No. 44576 Cause No. 44602	Fair Value
Kokomo Gas and Fuel Company	09/10	Kokomo Gas and Fuel Company	Cause No. 43942	Fair Value
Northern Indiana Fuel and Light Company, Inc.	09/10	Northern Indiana Fuel and Light Company, Inc.	Cause No. 43943	Fair Value
Kansas Corporation Commission				



SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Atmos Energy Corporation	08/15	Atmos Energy Corporation	Docket No. 16-ATMG-079-RTS	Return on Equity
Kentucky Public Service Commission				
Kentucky American Water Company	11/18	Kentucky American Water Company	Docket No. 2018-00358	Return on Equity
Maine Public Utilities Commission				
Central Maine Power	10/18	Central Maine Power	Docket No. 2018-00194	Return on Equity
Maryland Public Service Commission				
Maryland American Water Company	06/18	Maryland American Water Company	Case No. 9487	Return on Equity
Massachusetts Appellate Tax Board				
FirstLight Hydro Generating Company	06/17	FirstLight Hydro Generating Company	Docket No. F-325471 Docket No. F-325472 Docket No. F-325473 Docket No. F-325474	Valuation of Electric Generation Assets
Massachusetts Department of Public Utilities				
Berkshire Gas Company	05/18	Berkshire Gas Company	DPU 18-40	Rate Case
Unitil Corporation	01/04	Fitchburg Gas and Electric	DTE 03-52	Integrated Resource Plan; Gas Demand Forecast
Michigan Public Service Commission				
Wisconsin Electric Power Company	12/11	Wisconsin Electric Power Company	Case No. U-16830	Return on Equity
Michigan Tax Tribunal				
New Covert Generating Co., LLC.	03/18	The Township of New Covert Michigan	MTT Docket No. 000248TT and 16-001888-TT	Valuation of Electric Generation Assets



SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Covert Township	07/14	New Covert Generating Co., LLC.	Docket No. 399578	Valuation of Electric Generation Assets
Minnesota Public Utilities Commission				
Minnesota Energy Resources Corporation	10/17	Minnesota Energy Resources Corporation	Docket No. G011/GR-17-563	Return on Equity
Missouri Public Service Commission				
Missouri American Water Company	06/17	Missouri American Water Company	Case No. WR-17-2085 Case No. SR-17-2086	Return on Equity
Montana Public Service Commission				
Montana-Dakota Utilities Co.	09/18	Montana-Dakota Utilities Co.	D0218.9.60	Return on Equity
New Hampshire-Merrimack County Superior Court				
Northern New England Telephone Operations, LLC d/b/a FairPoint Communications, NNE	04/18	Northern New England Telephone Operations, LLC d/b/a FairPoint Communications, NNE	220-2012-CV-1100	Valuation of Utility Property



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New Hampshire-Rockingham Superior Court				
Eversource Energy	05/18	Public Service Commission of New Hampshire	218-2016-CV-00899 218-2017-CV-00917	Valuation of Utility Property
New Jersey Board of Public Utilities				
Public Service Electric and Gas Company	04/19	Public Service Electric and Gas Company	E018060629 G018060630	Return on Equity
Public Service Electric and Gas Company	02/18	Public Service Electric and Gas Company	GR17070776	Return on Equity
Public Service Electric and Gas Company	01/18	Public Service Electric and Gas Company	ER18010029 GR18010030	Return on Equity
New Mexico Public Regulation Commission				
Southwestern Public Service Company	10/17	Southwestern Public Service Company	Case No. 17-00255-UT	Return on Equity
Southwestern Public Service Company	12/16	Southwestern Public Service Company	Case No. 16-00269-UT	Return on Equity
Southwestern Public Service Company	10/15	Southwestern Public Service Company	Case No. 15-00296-UT	Return on Equity
Southwestern Public Service Company	06/15	Southwestern Public Service Company	Case No. 15-001398-UT	Return on Equity
New York State Department of Public Service				
Central Hudson Gas and Electric Corporation	07/17	Central Hudson Gas and Electric Corporation	Gas 17-G-0460 Electric 17-E-0459	Return on Equity
Niagara Mohawk Power Corporation	04/17	National Grid USA	Case No. C-17-E-0238	Return on Equity



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SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Corning Natural Gas Corporation	06/16	Corning Natural Gas Corporation	Case No. 16-G-0369	Return on Equity
National Fuel Gas Company	04/16	National Fuel Gas Company	Case No. 16-G-0257	Return on Equity
KeySpan Energy Delivery	01/16	KeySpan Energy Delivery	Case No. 15-G-0059	Return on Equity
New York State Electric and Gas Company	05/15	New York State Electric and Gas Company	Case No. 15-G-0284	Return on Equity
North Dakota Public Service Commission				
Northern States Power Company	12/12	Northern States Power Company	C-PU-12-813	Return on Equity
Northern States Power Company	12/10	Northern States Power Company	C-PU-10-657	Return on Equity
Oklahoma Corporation Commission				
Arkansas Oklahoma Gas Corporation	01/13	Arkansas Oklahoma Gas Corporation	Cause No. PUD 201200236	Return on Equity
Pennsylvania Public Utility Commission				
American Water Works Company Inc.	04/17	Pennsylvania-American Water Company	Docket No. R-2017-2595853	Return on Equity
South Dakota Public Utilities Commission				
Northern States Power Company	06/14	Northern States Power Company	Docket No. EL14-058	Return on Equity



Texas Public Utility Commission				
Southwestern Public Service Company	01/14	Southwestern Public Service Company	Docket No. 42004	Return on Equity
Virginia State Corporation Commission				
Virginia American Water Company, Inc.	11/18	Virginia American Water Company, Inc.	Docket No. PUR-2018-00175	Return on Equity
Washington Utilities Transportation Commission				
Cascade Natural Gas Corporation	04/19	Cascade Natural Gas Corporation	Docket NO. UG-19__	Return on Equity
West Virginia Public Service Commission				
West Virginia American Water Company	04/18	West Virginia American Water Company	Case No. 18-0573-W-42T Case No. 18-0576-S-42T	Return on Equity
Wisconsin Public Service Commission				
Wisconsin Electric Power Company and Wisconsin Gas LLC	03/19	Wisconsin Electric Power Company and Wisconsin Gas LLC	Docket No. 05-UR-109	Return on Equity
Wisconsin Public Service Corporation	03/19	Wisconsin Public Service Corporation	6690-UR-126	Return on Equity

SUMMARY OF ROE ANALYSES RESULTS¹

Constant Growth DCF - Earnings Growth			
	Mean Low	Mean	Mean High
30-Day Average	9.37%	9.65%	10.82%
90-Day Average	9.42%	9.70%	10.86%
180-Day Average	9.09%	9.76%	10.93%
Constant Growth Average	9.29%	9.70%	10.87%
Constant Growth DCF - Earnings & Retention Growth			
	Mean Low	Mean	Mean High
30-Day Average	8.75%	9.49%	11.82%
90-Day Average	8.83%	9.53%	11.86%
180-Day Average	8.47%	9.60%	11.33%
Constant Growth Average	8.68%	9.54%	11.67%
Projected DCF			
	Mean Low	Mean	Mean High
2021-2023 Projection	9.22%	10.25%	10.89%
CAPM			
	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
Bloomberg Beta	10.18%	10.26%	10.47%
Value Line Beta	9.41%	9.51%	9.76%
Treasury Yield Plus Risk Premium			
	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
Risk Premium Analysis	9.82%	9.93%	10.21%
Risk Premium Mean Result	9.99%		

Notes:

[1] The analytical results included in the table reflect the results of the Constant Growth and Projected DCF analysis excluding the results for individual companies that did not meet the minimum threshold of 7 percent.

PROXY GROUP SCREENING DATA AND RESULTS - FINAL PROXY GROUP

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
			S&P Credit Rating Between BBB- and AAA	Covered by More Than 1 Analyst	Positive Growth Rates from at least two sources (Value Line, Yahoo! First Call, and Zacks)	Company-Owned Generation <60% of MWh Sales to Ultimate Customers	% Regulated Operating Income > 70%	% Regulated Electric Operating Income ≥ 80%	Announced Merger
Company	Ticker	Dividends							
ALLETE, Inc.	ALE	Yes	BBB+	Yes	Yes	59.89%	83.27%	97.38%	No
Alliant Energy Corporation	LNT	Yes	A-	Yes	Yes	58.02%	100.55%	94.54%	No
Avangrid, Inc.	AGR	Yes	BBB+	Yes	Yes	53.45%	83.91%	85.10%	No
FirstEnergy Corporation	FE	Yes	BBB	Yes	Yes	31.50%	103.36%	100.00%	No
Hawaiian Electric Industries, Inc.	HE	Yes	BBB-	Yes	Yes	53.75%	80.94%	100.00%	No
NorthWestern Corporation	NWE	Yes	BBB	Yes	Yes	57.42%	97.42%	85.31%	No
Portland General Electric Company	POR	Yes	BBB+	Yes	Yes	56.69%	100.00%	100.00%	No
PPL Corporation	PPL	Yes	A-	Yes	Yes	43.89%	112.52%	95.53%	No

Notes:

[1] Source: Bloomberg Professional

[2] Source: Bloomberg Professional

[3] Source: Yahoo! Finance and Zacks

[4] Source: Yahoo! Finance, Value Line Investment Survey, and Zacks

[5] Source: SNL Financial (pulled from FERC Form 1) 2015-2017

[6] to [7] Source: Form 10-Ks for 2017, 2016 & 2015

[8] SNL Financial News Releases

30-DAY CONSTANT GROWTH DCF -- PSNH PROXY GROUP

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	All Proxy Group			With Exclusions		
		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Growth Rate	Low ROE	Mean ROE	High ROE	Low ROE	Mean ROE	High ROE
ALLETE, Inc.	ALE	\$2.35	\$77.59	3.03%	3.10%	3.50%	6.00%	n/a	4.75%	6.58%	7.85%	9.12%		7.85%	9.12%
Alliant Energy Corporation	LNT	\$1.42	\$44.35	3.20%	3.31%	6.50%	7.25%	6.00%	6.58%	9.30%	9.89%	10.57%	9.30%	9.89%	10.57%
Avangrid, Inc.	AGR	\$1.76	\$49.52	3.55%	3.73%	12.00%	9.20%	8.40%	9.87%	12.10%	13.60%	15.77%	12.10%	13.60%	15.77%
FirstEnergy Corporation	FE	\$1.52	\$39.36	3.86%	3.98%	6.50%	Negative	6.00%	6.25%	9.98%	10.23%	10.49%	9.98%	10.23%	10.49%
Hawaiian Electric Industries, Inc.	HE	\$1.28	\$37.34	3.43%	3.53%	3.50%	7.80%	6.20%	5.83%	6.99%	9.36%	11.36%		9.36%	11.36%
NorthWestern Corporation	NWE	\$2.20	\$64.39	3.42%	3.46%	2.50%	2.59%	3.10%	2.73%	5.96%	6.19%	6.57%			
Portland General Electric Company	POR	\$1.45	\$48.17	3.01%	3.07%	4.00%	4.90%	4.00%	4.30%	7.07%	7.37%	7.98%	7.07%	7.37%	7.98%
PPL Corporation	PPL	\$1.64	\$30.94	5.30%	5.40%	3.00%	3.59%	5.00%	3.86%	8.38%	9.27%	10.43%	8.38%	9.27%	10.43%
Mean				3.60%	3.70%	5.19%	5.90%	5.53%	5.52%	8.29%	9.22%	10.29%	9.37%	9.65%	10.82%

Notes:

- [1] Source: Bloomberg Professional.
[2] Source: Bloomberg Professional, equals 30-day average as of February 28, 2019
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])
[12] Equals [9] if greater than 7.00%
[13] Equals [10] if greater than 7.00%
[14] Equals [11] if greater than 7.00%

Public Service Company of New Hampshire
d/b/a Eversource Energy
Docket No. DE 19-057
Attachment AEB-4 (Perm)
May 28, 2019
Page 2 of 3

90-DAY CONSTANT GROWTH DCF -- PSNH PROXY GROUP

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	All Proxy Group			With Exclusions		
		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Growth Rate	Low ROE	Mean ROE	High ROE	Low ROE	Mean ROE	High ROE
ALLETE, Inc.	ALE	\$2.35	\$77.35	3.04%	3.11%	3.50%	6.00%	n/a	4.75%	6.59%	7.86%	9.13%		7.86%	9.13%
Alliant Energy Corporation	LNT	\$1.42	\$43.96	3.23%	3.34%	6.50%	7.25%	6.00%	6.58%	9.33%	9.92%	10.60%	9.33%	9.92%	10.60%
Avangrid, Inc.	AGR	\$1.76	\$49.52	3.55%	3.73%	12.00%	9.20%	8.40%	9.87%	12.10%	13.60%	15.77%	12.10%	13.60%	15.77%
FirstEnergy Corporation	FE	\$1.52	\$38.41	3.96%	4.08%	6.50%	Negative	6.00%	6.25%	10.08%	10.33%	10.59%	10.08%	10.33%	10.59%
Hawaiian Electric Industries, Inc.	HE	\$1.28	\$37.22	3.44%	3.54%	3.50%	7.80%	6.20%	5.83%	7.00%	9.37%	11.37%		9.37%	11.37%
NorthWestern Corporation	NWE	\$2.20	\$62.43	3.52%	3.57%	2.50%	2.59%	3.10%	2.73%	6.07%	6.30%	6.68%			
Portland General Electric Company	POR	\$1.45	\$47.21	3.07%	3.14%	4.00%	4.90%	4.00%	4.30%	7.13%	7.44%	8.05%	7.13%	7.44%	8.05%
PPL Corporation	PPL	\$1.64	\$30.43	5.39%	5.49%	3.00%	3.59%	5.00%	3.86%	8.47%	9.36%	10.52%	8.47%	9.36%	10.52%
Mean				3.65%	3.75%	5.19%	5.90%	5.53%	5.52%	8.35%	9.27%	10.34%	9.42%	9.70%	10.86%

Notes:

- [1] Source: Bloomberg Professional.
[2] Source: Bloomberg Professional, equals 90-day average as of February 28, 2019
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
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[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])
[12] Equals [9] if greater than 7.00%
[13] Equals [10] if greater than 7.00%
[14] Equals [11] if greater than 7.00%

180-DAY CONSTANT GROWTH DCF -- PSNH PROXY GROUP

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	All Proxy Group			With Exclusions		
		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Growth Rate	Low ROE	Mean ROE	High ROE	Low ROE	Mean ROE	High ROE
ALLETE, Inc.	ALE	\$2.35	\$76.86	3.06%	3.13%	3.50%	6.00%	n/a	4.75%	6.61%	7.88%	9.15%		7.88%	9.15%
Alliant Energy Corporation	LNT	\$1.42	\$43.32	3.28%	3.39%	6.50%	7.25%	6.00%	6.58%	9.38%	9.97%	10.65%	9.38%	9.97%	10.65%
Avangrid, Inc.	AGR	\$1.76	\$49.80	3.53%	3.71%	12.00%	9.20%	8.40%	9.87%	12.08%	13.58%	15.75%	12.08%	13.58%	15.75%
FirstEnergy Corporation	FE	\$1.52	\$37.44	4.06%	4.19%	6.50%	Negative	6.00%	6.25%	10.18%	10.44%	10.69%	10.18%	10.44%	10.69%
Hawaiian Electric Industries, Inc.	HE	\$1.28	\$36.11	3.54%	3.65%	3.50%	7.80%	6.20%	5.83%	7.11%	9.48%	11.48%	7.11%	9.48%	11.48%
NorthWestern Corporation	NWE	\$2.20	\$60.62	3.63%	3.68%	2.50%	2.59%	3.10%	2.73%	6.17%	6.41%	6.79%			
Portland General Electric Company	POR	\$1.45	\$46.11	3.14%	3.21%	4.00%	4.90%	4.00%	4.30%	7.21%	7.51%	8.12%	7.21%	7.51%	8.12%
PPL Corporation	PPL	\$1.64	\$29.78	5.51%	5.61%	3.00%	3.59%	5.00%	3.86%	8.59%	9.48%	10.64%	8.59%	9.48%	10.64%
Mean					3.72%	3.82%	5.19%	5.90%	5.53%	8.42%	9.34%	10.41%	9.09%	9.76%	10.93%

Notes:

- [1] Source: Bloomberg Professional.
[2] Source: Bloomberg Professional, equals 180-day average as of February 28, 2019
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])
[12] Equals [9] if greater than 7.00%
[13] Equals [10] if greater than 7.00%
[14] Equals [11] if greater than 7.00%

Public Service Company of New Hampshire
d/b/a Eversource Energy
Docket No. DE 19-057
Attachment AEB-5 (Perm)
May 28, 2019
Page 1 of 1

Page 1 of 1

RETENTION GROWTH																						
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]
		All Dividends to Net Profit Projection Year 1	All Dividends to Net Profit Projection Year 2	All Dividends to Net Profit Projection Years 3-5	Average Retention Ratio	Return on Common Equity Projection Year 1	Return on Common Equity Projection Year 2	Return on Common Equity Projection Years 3-5	Average Return on Common Equity	B x R	Common Shares Outstanding Year 0	Common Shares Outstanding Years 3-5	Common Shares Outstanding Growth Rate	Price Projection Years 3-5 High	Price Projection Years 3-5 Low	Price Projection Years 3-5 Mid	Projected Book Value per Share Years 3-5	Market-to-Book Ratio	S	V	S x V	BR + SV
Company	Ticker																					
ALLETE, Inc.	ALE	67.00%	66.00%	66.00%	33.67%	8.00%	8.00%	9.00%	8.33%	2.81%	51.10	53.50	0.92%	\$ 80.00	\$ 55.00	\$ 67.50	46.75	1.44	1.33%	30.74%	0.41%	3.21%
Alliant Energy Corporation	LNT	62.00%	63.00%	64.00%	37.00%	10.50%	10.50%	10.50%	10.50%	3.89%	231.35	245.00	1.15%	\$ 45.00	\$ 35.00	\$ 40.00	24.30	1.65	1.90%	39.25%	0.75%	4.63%
Avangrid, Inc.	AGR	70.00%	67.00%	67.00%	32.00%	5.00%	5.50%	6.50%	5.67%	1.81%	309.01	309.00	0.00%	\$ 65.00	\$ 45.00	\$ 55.00	54.25	1.01	0.00%	1.36%	0.00%	1.81%
FirstEnergy Corporation	FE	63.00%	59.00%	55.00%	41.00%	18.00%	18.00%	17.50%	17.83%	7.31%	445.33	550.00	3.58%	\$ 55.00	\$ 40.00	\$ 47.50	19.50	2.44	8.72%	58.95%	5.14%	12.45%
Hawaiian Electric Industries, Inc.	HE	66.00%	61.00%	62.00%	37.00%	9.50%	9.50%	9.50%	9.50%	3.52%	108.79	113.00	0.76%	\$ 35.00	\$ 30.00	\$ 32.50	23.75	1.37	1.04%	26.92%	0.28%	3.80%
NorthWestern Corporation	NWE	65.00%	65.00%	68.00%	34.00%	9.00%	9.00%	9.00%	9.00%	3.06%	49.37	51.00	0.65%	\$ 75.00	\$ 55.00	\$ 65.00	42.50	1.53	1.00%	34.62%	0.35%	3.41%
Portland General Electric Company	POR	60.00%	60.00%	64.00%	38.67%	8.50%	8.50%	9.00%	8.67%	3.35%	89.11	90.00	0.20%	\$ 50.00	\$ 40.00	\$ 45.00	32.00	1.41	0.28%	28.89%	0.08%	3.43%
PPL Corporation	PPL	70.00%	70.00%	64.00%	32.00%	13.00%	13.00%	13.50%	13.17%	4.21%	693.40	782.50	2.04%	\$ 45.00	\$ 35.00	\$ 40.00	21.75	1.84	3.74%	45.63%	1.71%	5.92%
Mean																						4.83%

Notes:

[1] Source: Value Line
[2] Source: Value Line
[3] Source: Value Line
[4] Equals 1 - Average ([1], [2], [3])
[5] Source: Value Line
[6] Source: Value Line
[7] Source: Value Line
[8] Equals Average ([5], [6], [7])
[9] Equals [4] x [8]
[10] Source: Value Line
[11] Source: Value Line
[12] Equals ([11] / [12]) ^ 0.2 - 1
[13] Source: Value Line
[14] Source: Value Line
[15] Equals Average ([13], [14])
[16] Source: Value Line
[17] Equals [15] / [16]
[18] Equals [12] x [17]
[19] Equals 1 - (1 / [17])
[20] Equals [18] x [19]
[21] Equals [9] + [20]

30-DAY CONSTANT GROWTH DCF -- PSNH PROXY GROUP																
											All Proxy Group			With Exclusions		
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
							Yahoo!									
Company	Ticker	Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Finance Earnings Growth	Zacks Earnings Growth	Retention Growth Rate	Average Growth Rate	Low ROE	Mean ROE	High ROE	Low ROE	Mean ROE	High ROE
ALLETE, Inc.	ALE	\$2.35	\$77.59	3.03%	3.09%	3.50%	6.00%	n/a	3.21%	4.24%	6.29%	7.33%	9.12%		7.33%	9.12%
Alliant Energy Corporation	LNT	\$1.42	\$44.35	3.20%	3.30%	6.50%	7.25%	6.00%	4.63%	6.10%	7.91%	9.39%	10.57%	7.91%	9.39%	10.57%
Avangrid, Inc.	AGR	\$1.76	\$49.52	3.55%	3.69%	12.00%	9.20%	8.40%	1.81%	7.85%	5.40%	11.55%	15.77%		11.55%	15.77%
FirstEnergy Corporation	FE	\$1.52	\$39.36	3.86%	4.02%	6.50%	Negative	6.00%	12.45%	8.32%	9.98%	12.34%	16.56%	9.98%	12.34%	16.56%
Hawaiian Electric Industries, Inc.	HE	\$1.28	\$37.34	3.43%	3.52%	3.50%	7.80%	6.20%	3.80%	5.32%	6.99%	8.84%	11.36%		8.84%	11.36%
NorthWestern Corporation	NWE	\$2.20	\$64.39	3.42%	3.47%	2.50%	2.59%	3.10%	3.41%	2.90%	5.96%	6.37%	6.88%			
Portland General Electric Company	POR	\$1.45	\$48.17	3.01%	3.07%	4.00%	4.90%	4.00%	3.43%	4.08%	6.49%	7.15%	7.98%		7.15%	7.98%
PPL Corporation	PPL	\$1.64	\$30.94	5.30%	5.42%	3.00%	3.59%	5.00%	5.92%	4.38%	8.38%	9.79%	11.38%	8.38%	9.79%	11.38%
Mean				3.60%	3.70%	5.19%	5.90%	5.53%	4.83%	5.40%	7.17%	9.10%	11.20%	8.75%	9.49%	11.82%

Notes:

- [1] Source: Bloomberg Professional.
[2] Source: Bloomberg Professional, equals 30-day average as of February 28, 2019
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [9])
[5] Source: Value Line
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[7] Source: Zacks
[8] Source: Attachment AEB-5
[9] Equals Average ([5], [6], [7], [8])
[10] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7], [8]) + Minimum ([5], [6], [7], [8])
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[13] Equals [10] if greater than 7.00%
[14] Equals [11] if greater than 7.00%
[15] Equals [12] if greater than 7.00%

90-DAY CONSTANT GROWTH DCF -- PSNH PROXY GROUP																
											All Proxy Group			With Exclusions		
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
Company	Ticker	Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Retention Growth Rate	Average Growth Rate	Low ROE	Mean ROE	High ROE	Low ROE	Mean ROE	High ROE
ALLETE, Inc.	ALE	\$2.35	\$77.35	3.04%	3.10%	3.50%	6.00%	n/a	3.21%	4.24%	6.30%	7.34%	9.13%		7.34%	9.13%
Alliant Energy Corporation	LNT	\$1.42	\$43.96	3.23%	3.33%	6.50%	7.25%	6.00%	4.63%	6.10%	7.94%	9.42%	10.60%	7.94%	9.42%	10.60%
Avangrid, Inc.	AGR	\$1.76	\$49.52	3.55%	3.69%	12.00%	9.20%	8.40%	1.81%	7.85%	5.40%	11.55%	15.77%		11.55%	15.77%
FirstEnergy Corporation	FE	\$1.52	\$38.41	3.96%	4.12%	6.50%	Negative	6.00%	12.45%	8.32%	10.08%	12.44%	16.66%	10.08%	12.44%	16.66%
Hawaiian Electric Industries, Inc.	HE	\$1.28	\$37.22	3.44%	3.53%	3.50%	7.80%	6.20%	3.80%	5.32%	7.00%	8.85%	11.37%		8.85%	11.37%
NorthWestern Corporation	NWE	\$2.20	\$62.43	3.52%	3.58%	2.50%	2.59%	3.10%	3.41%	2.90%	6.07%	6.47%	6.99%			
Portland General Electric Company	POR	\$1.45	\$47.21	3.07%	3.13%	4.00%	4.90%	4.00%	3.43%	4.08%	6.56%	7.22%	8.05%		7.22%	8.05%
PPL Corporation	PPL	\$1.64	\$30.43	5.39%	5.51%	3.00%	3.59%	5.00%	5.92%	4.38%	8.47%	9.88%	11.47%	8.47%	9.88%	11.47%
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- [1] Source: Bloomberg Professional.
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[3] Equals [1] / [2]
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[7] Source: Zacks
[8] Source: Attachment AEB-5
[9] Equals Average ([5], [6], [7], [8])
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[14] Equals [11] if greater than 7.00%
[15] Equals [12] if greater than 7.00%

180-DAY CONSTANT GROWTH DCF -- PSNH PROXY GROUP

Company	Ticker	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	All Proxy Group			With Exclusions		
		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Retention Growth Rate	Average Growth Rate	[10]	[11]	[12]	[13]	[14]	[15]
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Avangrid, Inc.	AGR	\$1.76	\$49.80	3.53%	3.67%	12.00%	9.20%	8.40%	1.81%	7.85%	5.38%	11.53%	15.75%		11.53%	15.75%
FirstEnergy Corporation	FE	\$1.52	\$37.44	4.06%	4.23%	6.50%	Negative	6.00%	12.45%	8.32%	10.18%	12.55%	16.77%	10.18%	12.55%	16.77%
Hawaiian Electric Industries, Inc.	HE	\$1.28	\$36.11	3.54%	3.64%	3.50%	7.80%	6.20%	3.80%	5.32%	7.11%	8.96%	11.48%	7.11%	8.96%	11.48%
NorthWestern Corporation	NWE	\$2.20	\$60.62	3.63%	3.68%	2.50%	2.59%	3.10%	3.41%	2.90%	6.17%	6.58%	7.10%			7.10%
Portland General Electric Company	POR	\$1.45	\$46.11	3.14%	3.21%	4.00%	4.90%	4.00%	3.43%	4.08%	6.63%	7.29%	8.12%		7.29%	8.12%
PPL Corporation	PPL	\$1.64	\$29.78	5.51%	5.63%	3.00%	3.59%	5.00%	5.92%	4.38%	8.59%	10.01%	11.59%	8.59%	10.01%	11.59%
Mean				3.72%	3.82%	5.19%	5.90%	5.53%	4.83%	5.40%	7.30%	9.22%	11.33%	8.47%	9.60%	11.33%

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[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [9])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Source: Attachment AEB-5
[9] Equals Average ([5], [6], [7], [8])
[10] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7], [8]) + Minimum ([5], [6], [7], [8])
[11] Equals [4] + [9]
[12] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7], [8]) + Maximum ([5], [6], [7], [8])
[13] Equals [10] if greater than 7.00%
[14] Equals [11] if greater than 7.00%
[15] Equals [12] if greater than 7.00%

PROJECTED CONSTANT GROWTH DCF -- PSNH PROXY GROUP

Company		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	All Proxy Group			With Exclusions		
		Annualized Dividend (Years 3-5)	High	Low	Mean	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Growth Rate	Low ROE	Mean ROE	High ROE	Low ROE	Mean ROE	High ROE
ALLETE, Inc.	ALE	\$2.70	\$80.00	\$55.00	\$67.50	4.00%	4.10%	3.50%	6.00%	n/a	4.75%	7.57%	8.85%	10.12%	7.57%	8.85%	10.12%
Alliant Energy Corporation	LNT	\$1.66	\$45.00	\$35.00	\$40.00	4.15%	4.29%	6.50%	7.25%	6.00%	6.58%	10.27%	10.87%	11.55%	10.27%	10.87%	11.55%
Avangrid, Inc.	AGR	\$2.40	\$65.00	\$45.00	\$55.00	4.36%	4.58%	12.00%	9.20%	8.40%	9.87%	12.95%	14.45%	16.63%	12.95%	14.45%	16.63%
FirstEnergy Corporation	FE	\$1.90	\$55.00	\$40.00	\$47.50	4.00%	4.13%	6.50%	Negative	6.00%	6.25%	10.12%	10.38%	10.63%	10.12%	10.38%	10.63%
Hawaiian Electric Industries, Inc.	HE	\$1.40	\$35.00	\$30.00	\$32.50	4.31%	4.43%	3.50%	7.80%	6.20%	5.83%	7.88%	10.27%	12.28%	7.88%	10.27%	12.28%
NorthWestern Corporation	NWE	\$2.60	\$75.00	\$55.00	\$65.00	4.00%	4.05%	2.50%	2.59%	3.10%	2.73%	6.55%	6.78%	7.16%			7.16%
Portland General Electric Company	POR	\$1.80	\$50.00	\$40.00	\$45.00	4.00%	4.09%	4.00%	4.90%	4.00%	4.30%	8.08%	8.39%	9.00%	8.08%	8.39%	9.00%
PPL Corporation	PPL	\$1.85	\$45.00	\$35.00	\$40.00	4.63%	4.71%	3.00%	3.59%	5.00%	3.86%	7.69%	8.58%	9.74%	7.69%	8.58%	9.74%
Mean						4.18%	4.30%	5.19%	5.90%	5.53%	5.52%	8.89%	9.82%	10.89%	9.22%	10.25%	10.89%

Notes:

- [1] Source: Value Line
[2] Source: Value Line
[3] Source: Value Line
[4] Equals Average ([2], [3])
[5] Equals [1] / [4]
[6] Equals [5] x (1 + 0.50 x [10])
[7] Source: Value Line
[8] Source: Yahoo! Finance
[9] Source: Zacks
[10] Equals Average ([7], [8], [9])
[11] Equals [5] x (1 + 0.50 x Minimum ([7], [8], [9]) + Minimum ([7], [8], [9])
[12] Equals [6] + [10]
[13] Equals [5] x (1 + 0.50 x Maximum ([7], [8], [9]) + Maximum ([7], [8], [9])
[14] Equals [11] if greater than 7.00%
[15] Equals [12] if greater than 7.00%
[16] Equals [13] if greater than 7.00%

Public Service Company of New Hampshire
d/b/a Eversource Energy
Docket No. DE 19-057
Attachment AEB-8 (Perm)
May 28, 2019
Page 1 of 1

BETA
AS OF FEBRUARY 28, 2018

Proxy Group		[1] Bloomberg	[2] Value Line
ALLETE, Inc.	ALE	0.70	0.65
Alliant Energy Corporation	LNT	0.72	0.60
Avangrid, Inc.	AGR	0.49	0.40
FirstEnergy Corporation	FE	0.71	0.65
Hawaiian Electric Industries, Inc.	HE	0.69	0.60
NorthWestern Corporation	NWE	0.71	0.55
Portland General Electric Company	POR	0.67	0.60
PPL Corporation	PPL	0.64	0.70
Mean		0.666	0.594

Notes:

[1] Source: Bloomberg Professional, February 28, 2019

[1] Source: Value Line; December 14, 2018; January 25, 2019; February 15, 2019

CAPITAL ASSET PRICING MODEL

	[4]	[5]	[6]	[7]	[8]
	Risk-Free Rate (<i>R_f</i>)	Beta (<i>β</i>)	Market Return (<i>R_m</i>)	Market Risk Premium (<i>R_m - R_f</i>)	ROE (<i>K</i>)
Proxy Group Average Bloomberg Beta					
Current 30-day average of 30-year U.S. Treasury bond yield [1]	3.04%	0.666	13.77%	10.73%	10.18%
Near-term projected 30-year U.S. Treasury bond yield (Q2 2019 - Q2 2020) [2]	3.28%	0.666	13.77%	10.49%	10.26%
Projected 30-year U.S. Treasury bond yield (2020 - 2024) [3]	3.90%	0.666	13.77%	9.87%	10.47%
				MEAN	10.31%
Proxy Group Average Value Line Beta					
Current 30-day average of 30-year U.S. Treasury bond yield [1]	3.04%	0.594	13.77%	10.73%	9.41%
Near-term projected 30-year U.S. Treasury bond yield (Q2 2019 - Q2 2020) [2]	3.28%	0.594	13.77%	10.49%	9.51%
Projected 30-year U.S. Treasury bond yield (2020 - 2024) [3]	3.90%	0.594	13.77%	9.87%	9.76%
				MEAN	9.56%

Notes:

- [1] Source: Bloomberg Professional, 30-day average as of February 28, 2019
[2] Source: Blue Chip Financial Forecasts, Vol. 38, No. 3, March 1, 2019, at 2
[3] Source: Blue Chip Financial Forecasts, Vol. 37, No. 12, December 1, 2018, at 14
[4] See Notes [1], [2] and [3]
[5] Source: Attachment AEB-8
[6] Source: Attachment AEB-9, at 2
[7] Equals [6] - [4]
[8] Equals [4] + ([5] x [7])

MARKET RISK PREMIUM DERIVED FROM ANALYSTS LONG-TERM GROWTH ESTIMATES

[9] Estimated Weighted Average Dividend Yield	2.03%
[10] Estimated Weighted Average Long-Term Growth Rate	11.62%
[11] S&P 500 Estimated Required Market Return	13.77%
[12] Risk-Free Rate	3.04% 3.28% 3.90%
[13] Implied Market Risk Premium	10.73% 10.49% 9.87%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[14]	[15]	[16]	[17]	[18]
		Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
LyondellBasell Industries NV	LYB	0.13%	4.68%	0.01%	6.80%	0.01%
American Express Co	AXP	0.38%	1.45%	0.01%	14.99%	0.06%
Verizon Communications Inc	VZ	0.97%	4.23%	0.04%	2.30%	0.02%
Broadcom Inc	AVGO	0.45%	3.85%	0.02%	13.15%	0.06%
Boeing Co/The	BA	1.03%	1.87%	0.02%	15.15%	0.16%
Caterpillar Inc	CAT	0.33%	2.50%	0.01%	13.35%	0.04%
JPMorgan Chase & Co	JPM	1.42%	3.07%	0.04%	7.00%	0.10%
Chevron Corp	CVX	0.94%	3.98%	0.04%	6.36%	0.06%
Coca-Cola Co/The	KO	0.80%	3.53%	0.03%	6.72%	0.05%
AbbVie Inc	ABBV	0.48%	5.40%	0.03%	8.81%	0.04%
Walt Disney Co/The	DIS	0.70%	1.56%	0.01%	3.76%	0.03%
FleetCor Technologies Inc	FLT	0.08%	n/a	n/a	16.50%	0.01%
Extra Space Storage Inc	EXR	0.05%	3.59%	0.00%	4.39%	0.00%
Exxon Mobil Corp	XOM	1.39%	4.15%	0.06%	15.74%	0.22%
Phillips 66	PSX	0.18%	3.32%	0.01%	5.70%	0.01%
General Electric Co	GE	0.37%	0.39%	0.00%	1.60%	0.01%
HP Inc	HPQ	0.13%	3.25%	0.00%	3.08%	0.00%
Home Depot Inc/The	HD	0.87%	2.94%	0.03%	10.72%	0.09%
International Business Machines Corp	IBM	0.51%	4.55%	0.02%	0.72%	0.00%
Concho Resources Inc	CXO	0.09%	0.45%	0.00%	31.00%	0.03%
Johnson & Johnson	JNJ	1.51%	2.63%	0.04%	6.83%	0.10%
McDonald's Corp	MCD	0.58%	2.52%	0.01%	8.74%	0.05%
Merck & Co Inc	MRK	0.87%	2.71%	0.02%	8.76%	0.08%
3M Co	MMM	0.49%	2.78%	0.01%	7.70%	0.04%
American Water Works Co Inc	AWK	0.08%	1.79%	0.00%	8.45%	0.01%
Bank of America Corp	BAC	1.16%	2.06%	0.02%	9.70%	0.11%
Brighthouse Financial Inc	BHF	0.02%	n/a	n/a	11.14%	0.00%
Baker Hughes a GE Co	BHGE	0.06%	2.73%	0.00%	40.82%	0.02%
Pfizer Inc	PFE	1.00%	3.32%	0.03%	5.45%	0.05%
Procter & Gamble Co/The	PG	1.02%	2.91%	0.03%	6.51%	0.07%
AT&T Inc	T	0.94%	6.56%	0.06%	4.92%	0.05%
Travelers Cos Inc/The	TRV	0.14%	2.32%	0.00%	17.69%	0.03%
United Technologies Corp	UTX	0.45%	2.34%	0.01%	9.80%	0.04%
Analog Devices Inc	ADI	0.16%	2.02%	0.00%	11.98%	0.02%
Walmart Inc	WMT	1.19%	2.14%	0.03%	5.20%	0.06%
Cisco Systems Inc	CSCO	0.94%	2.70%	0.03%	6.84%	0.06%
Intel Corp	INTC	0.99%	2.38%	0.02%	8.54%	0.08%
General Motors Co	GM	0.23%	3.85%	0.01%	6.03%	0.01%
Microsoft Corp	MSFT	3.56%	1.64%	0.06%	11.68%	0.42%
Dollar General Corp	DG	0.13%	0.98%	0.00%	15.75%	0.02%
Cigna Corp	CI	0.27%	0.02%	0.00%	12.65%	0.03%
Kinder Morgan Inc/DE	KMI	0.18%	4.18%	0.01%	10.00%	0.02%
Citigroup Inc	C	0.62%	2.81%	0.02%	11.07%	0.07%
American International Group Inc	AIG	0.16%	2.96%	0.00%	11.00%	0.02%
Honeywell International Inc	HON	0.47%	2.13%	0.01%	7.89%	0.04%
Altria Group Inc	MO	0.41%	6.11%	0.02%	8.50%	0.03%
HCA Healthcare Inc	HCA	0.20%	1.15%	0.00%	11.56%	0.02%
Under Armour Inc	UA	0.02%	n/a	n/a	34.93%	0.01%
International Paper Co	IP	0.08%	4.36%	0.00%	6.08%	0.00%
Hewlett Packard Enterprise Co	HPE	0.09%	2.75%	0.00%	6.09%	0.01%
Abbott Laboratories	ABT	0.56%	1.65%	0.01%	11.69%	0.07%
Aflac Inc	AFL	0.15%	2.20%	0.00%	3.43%	0.01%
Air Products & Chemicals Inc	APD	0.16%	2.56%	0.00%	12.30%	0.02%
Royal Caribbean Cruises Ltd	RCL	0.10%	2.36%	0.00%	11.72%	0.01%
American Electric Power Co Inc	AEP	0.17%	3.30%	0.01%	6.08%	0.01%
Hess Corp	HES	0.07%	1.73%	0.00%	-9.49%	-0.01%
Anadarko Petroleum Corp	APC	0.09%	2.76%	0.00%	23.31%	0.02%
Aon PLC	AON	0.17%	0.93%	0.00%	10.90%	0.02%
Apache Corp	APA	0.05%	3.01%	0.00%	-5.19%	0.00%
Archer-Daniels-Midland Co	ADM	0.10%	3.29%	0.00%	1.40%	0.00%
Automatic Data Processing Inc	ADP	0.28%	2.07%	0.01%	14.00%	0.04%
Verisk Analytics Inc	VRSK	0.09%	0.79%	0.00%	9.57%	0.01%
AutoZone Inc	AZO	0.10%	n/a	n/a	13.22%	0.01%
Avery Dennison Corp	AVY	0.04%	1.93%	0.00%	5.75%	0.00%
MSCI Inc	MSCI	0.06%	1.26%	0.00%	13.10%	0.01%
Ball Corp	BLL	0.08%	0.73%	0.00%	6.50%	0.00%
Bank of New York Mellon Corp/The	BK	0.21%	2.13%	0.00%	7.33%	0.02%
Baxter International Inc	BAX	0.16%	1.02%	0.00%	12.20%	0.02%
Becton Dickinson and Co	BDX	0.28%	1.24%	0.00%	12.41%	0.03%
Berkshire Hathaway Inc	BRK/B	1.14%	n/a	n/a	-1.60%	-0.02%
Best Buy Co Inc	BBY	0.08%	2.91%	0.00%	10.65%	0.01%
H&R Block Inc	HRB	0.02%	4.14%	0.00%	10.00%	0.00%
Boston Scientific Corp	BSX	0.23%	n/a	n/a	33.46%	0.08%
Bristol-Myers Squibb Co	BMJ	0.35%	3.17%	0.01%	11.02%	0.04%
Fortune Brands Home & Security Inc	FBHS	0.03%	1.87%	0.00%	9.97%	0.00%
Brown-Forman Corp	BF/B	0.06%	1.34%	0.00%	9.86%	0.01%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[14]	[15]	[16]	[17]	[18]
		Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Cabot Oil & Gas Corp	COG	0.04%	1.14%	0.00%	26.58%	0.01%
Campbell Soup Co	CPB	0.04%	3.89%	0.00%	1.75%	0.00%
Kansas City Southern	KSU	0.05%	1.33%	0.00%	8.97%	0.00%
Hilton Worldwide Holdings Inc	HLT	0.10%	0.72%	0.00%	13.62%	0.01%
Carnival Corp	CCL	0.13%	3.46%	0.00%	10.93%	0.01%
Qorvo Inc	QRVO	0.04%	n/a	n/a	11.83%	0.00%
CenturyLink Inc	CTL	0.06%	16.38%	0.01%	-2.80%	0.00%
UDR Inc	UDR	0.05%	2.90%	0.00%	5.54%	0.00%
Clorox Co/The	CLX	0.08%	2.43%	0.00%	4.91%	0.00%
CMS Energy Corp	CMS	0.06%	2.81%	0.00%	6.61%	0.00%
Newell Brands Inc	NWL	0.03%	5.67%	0.00%	-11.86%	0.00%
Colgate-Palmolive Co	CL	0.24%	2.55%	0.01%	6.24%	0.01%
Comerica Inc	CMA	0.06%	3.08%	0.00%	16.41%	0.01%
IPG Photonics Corp	IPGP	0.03%	n/a	n/a	12.00%	0.00%
Conagra Brands Inc	CAG	0.05%	3.64%	0.00%	8.00%	0.00%
Consolidated Edison Inc	ED	0.11%	3.59%	0.00%	3.73%	0.00%
SL Green Realty Corp	SLG	0.03%	3.75%	0.00%	-0.59%	0.00%
Corning Inc	GLW	0.11%	2.30%	0.00%	10.39%	0.01%
Cummins Inc	CM	0.10%	2.96%	0.00%	6.81%	0.01%
Danaher Corp	DHR	0.38%	0.50%	0.00%	9.01%	0.03%
Target Corp	TGT	0.16%	3.52%	0.01%	6.35%	0.01%
Deere & Co	DE	0.22%	1.85%	0.00%	10.39%	0.02%
Dominion Energy Inc	D	0.25%	4.95%	0.01%	5.72%	0.01%
Dover Corp	DOV	0.05%	2.12%	0.00%	10.97%	0.01%
Alliant Energy Corp	LNT	0.04%	3.10%	0.00%	6.29%	0.00%
Duke Energy Corp	DUK	0.27%	4.14%	0.01%	4.97%	0.01%
Regency Centers Corp	REG	0.05%	3.59%	0.00%	4.78%	0.00%
Eaton Corp PLC	ETN	0.14%	3.56%	0.00%	9.23%	0.01%
Ecolab Inc	ECL	0.20%	1.09%	0.00%	13.43%	0.03%
PerkinElmer Inc	PKI	0.04%	0.30%	0.00%	15.49%	0.01%
Emerson Electric Co	EMR	0.17%	2.88%	0.00%	8.95%	0.02%
EOG Resources Inc	EOG	0.23%	0.94%	0.00%	11.57%	0.03%
Entergy Corp	ETR	0.07%	3.90%	0.00%	-0.96%	0.00%
Equifax Inc	EFX	0.05%	1.42%	0.00%	7.16%	0.00%
IQVIA Holdings Inc	IQV	0.11%	n/a	n/a	16.28%	0.02%
Gartner Inc	IT	0.05%	n/a	n/a	14.02%	0.01%
FedEx Corp	FDX	0.20%	1.44%	0.00%	14.25%	0.03%
Macy's Inc	M	0.03%	6.09%	0.00%	1.67%	0.00%
FMC Corp	FMC	0.05%	1.79%	0.00%	10.27%	0.01%
Ford Motor Co	F	0.14%	6.84%	0.01%	-0.70%	0.00%
NextEra Energy Inc	NEE	0.37%	2.66%	0.01%	4.90%	0.02%
Franklin Resources Inc	BEN	0.07%	3.19%	0.00%	10.00%	0.01%
Freeport-McMoRan Inc	FCX	0.08%	1.55%	0.00%	-12.55%	-0.01%
Gap Inc/The	GPS	0.04%	3.82%	0.00%	8.63%	0.00%
General Dynamics Corp	GD	0.20%	2.19%	0.00%	10.09%	0.02%
General Mills Inc	GIS	0.12%	4.16%	0.00%	6.43%	0.01%
Genuine Parts Co	GPC	0.07%	2.80%	0.00%	8.99%	0.01%
Atmos Energy Corp	ATO	0.05%	2.12%	0.00%	6.50%	0.00%
WW Grainger Inc	GWV	0.07%	1.79%	0.00%	12.47%	0.01%
Halliburton Co	HAL	0.11%	2.35%	0.00%	30.08%	0.03%
Harley-Davidson Inc	HOG	0.02%	4.04%	0.00%	10.30%	0.00%
Harris Corp	HRS	0.08%	1.66%	0.00%	7.00%	0.01%
HCP Inc	HCP	0.06%	4.81%	0.00%	3.23%	0.00%
Helmerich & Payne Inc	HP	0.02%	5.24%	0.00%	96.36%	0.02%
Fortive Corp	FTV	0.11%	0.34%	0.00%	13.89%	0.02%
Hershey Co/The	HSY	0.07%	2.61%	0.00%	8.00%	0.01%
Synchrony Financial	SYF	0.10%	2.58%	0.00%	1.55%	0.00%
Hormel Foods Corp	HRL	0.10%	1.94%	0.00%	5.80%	0.01%
Arthur J Gallagher & Co	AJG	0.06%	2.14%	0.00%	10.17%	0.01%
Mondelez International Inc	MDLZ	0.28%	2.21%	0.01%	7.33%	0.02%
CenterPoint Energy Inc	CNP	0.06%	3.82%	0.00%	6.92%	0.00%
Humana Inc	HUM	0.16%	0.77%	0.00%	14.11%	0.02%
Willis Towers Watson PLC	WLTW	0.09%	1.51%	0.00%	10.00%	0.01%
Illinois Tool Works Inc	ITW	0.20%	2.78%	0.01%	7.27%	0.01%
Ingersoll-Rand PLC	IR	0.11%	2.01%	0.00%	9.92%	0.01%
Foot Locker Inc	FL	0.03%	2.55%	0.00%	6.24%	0.00%
Interpublic Group of Cos Inc/The	IPG	0.04%	4.08%	0.00%	13.93%	0.01%
International Flavors & Fragrances Inc	IFF	0.06%	2.29%	0.00%	4.00%	0.00%
Jacobs Engineering Group Inc	JEC	0.04%	0.92%	0.00%	13.57%	0.01%
Hanesbrands Inc	HBI	0.03%	3.23%	0.00%	3.72%	0.00%
Kellogg Co	K	0.08%	3.98%	0.00%	3.68%	0.00%
Broadridge Financial Solutions Inc	BR	0.05%	1.92%	0.00%	10.00%	0.00%
Perrigo Co PLC	PRGO	0.03%	1.56%	0.00%	1.17%	0.00%
Kimberly-Clark Corp	KMB	0.17%	3.53%	0.01%	6.09%	0.01%
Kimco Realty Corp	KIM	0.03%	6.37%	0.00%	3.86%	0.00%
Kohl's Corp	KSS	0.05%	3.61%	0.00%	10.60%	0.00%
Oracle Corp	ORCL	0.77%	1.46%	0.01%	7.54%	0.06%
Kroger Co/The	KR	0.10%	1.91%	0.00%	6.43%	0.01%
Leggett & Platt Inc	LEG	0.02%	3.35%	0.00%	10.00%	0.00%
Lennar Corp	LEN	0.06%	0.33%	0.00%	12.74%	0.01%
Jefferies Financial Group Inc	JEF	0.03%	2.47%	0.00%	n/a	n/a
Eli Lilly & Co	LLY	0.54%	2.04%	0.01%	10.72%	0.06%
L Brands Inc	LB	0.03%	4.59%	0.00%	10.72%	0.00%
Charter Communications Inc	CHTR	0.32%	n/a	n/a	41.16%	0.13%
Lincoln National Corp	LNC	0.05%	2.37%	0.00%	9.00%	0.00%
Loews Corp	L	0.06%	0.53%	0.00%	n/a	n/a
Lowe's Cos Inc	LOW	0.35%	1.83%	0.01%	15.80%	0.06%
Host Hotels & Resorts Inc	HST	0.06%	4.08%	0.00%	4.57%	0.00%
Marsh & McLennan Cos Inc	MMC	0.19%	1.78%	0.00%	11.80%	0.02%
Masco Corp	MAS	0.05%	1.28%	0.00%	12.50%	0.01%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[14]	[15]	[16]	[17]	[18]
		Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Mattel Inc	MAT	0.02%	n/a	n/a	10.00%	0.00%
S&P Global Inc	SPGI	0.21%	1.14%	0.00%	11.05%	0.02%
Medtronic PLC	MDT	0.50%	2.21%	0.01%	7.70%	0.04%
CVS Health Corp	CVS	0.31%	3.46%	0.01%	8.68%	0.03%
DowDuPont Inc	DWDP	0.50%	2.86%	0.01%	6.17%	0.03%
Micron Technology Inc	MU	0.19%	n/a	n/a	-3.30%	-0.01%
Motorola Solutions Inc	MSI	0.10%	1.59%	0.00%	4.10%	0.00%
Choe Global Markets Inc	CBOE	0.04%	1.29%	0.00%	13.46%	0.01%
Mylan NV	MYL	0.06%	n/a	n/a	5.98%	0.00%
Laboratory Corp of America Holdings	LH	0.06%	n/a	n/a	7.61%	0.00%
Newmont Mining Corp	NEM	0.08%	1.64%	0.00%	14.10%	0.01%
Twenty-First Century Fox Inc	FOXA	0.22%	0.71%	0.00%	2.66%	0.01%
NIKE Inc	NKE	0.45%	1.03%	0.00%	18.34%	0.08%
NiSource Inc	NI	0.04%	2.97%	0.00%	5.75%	0.00%
Noble Energy Inc	NBL	0.04%	1.99%	0.00%	14.55%	0.01%
Norfolk Southern Corp	NSC	0.20%	1.92%	0.00%	13.97%	0.03%
Principal Financial Group Inc	PFG	0.06%	4.10%	0.00%	4.16%	0.00%
Eversource Energy	ES	0.09%	3.07%	0.00%	5.62%	0.01%
Northrop Grumman Corp	NOC	0.20%	1.66%	0.00%	8.89%	0.02%
Wells Fargo & Co	WFC	0.94%	3.61%	0.03%	11.26%	0.11%
Nucor Corp	NUE	0.08%	2.64%	0.00%	0.85%	0.00%
PVH Corp	PVH	0.04%	0.13%	0.00%	11.03%	0.00%
Occidental Petroleum Corp	OXY	0.21%	4.72%	0.01%	-0.50%	0.00%
Omnicom Group Inc	OMC	0.07%	3.43%	0.00%	5.22%	0.00%
ONEOK Inc	OKE	0.11%	5.35%	0.01%	16.89%	0.02%
Raymond James Financial Inc	RJF	0.05%	1.65%	0.00%	12.30%	0.01%
Parker-Hannifin Corp	PH	0.09%	1.73%	0.00%	9.52%	0.01%
Rollins Inc	ROL	0.05%	1.06%	0.00%	10.00%	0.01%
PPL Corp	PPL	0.10%	5.13%	0.00%	6.17%	0.01%
Exelon Corp	EXC	0.19%	2.98%	0.01%	4.12%	0.01%
ConocoPhillips	COP	0.32%	1.80%	0.01%	6.00%	0.02%
PulteGroup Inc	PHM	0.03%	1.63%	0.00%	7.17%	0.00%
Pinnacle West Capital Corp	PNW	0.04%	3.15%	0.00%	5.18%	0.00%
PNC Financial Services Group Inc/The	PNC	0.24%	3.02%	0.01%	7.37%	0.02%
PPG Industries Inc	PPG	0.11%	1.71%	0.00%	7.49%	0.01%
Progressive Corp/The	PGR	0.18%	0.55%	0.00%	8.00%	0.01%
Public Service Enterprise Group Inc	PEG	0.12%	3.20%	0.00%	6.73%	0.01%
Raytheon Co	RTN	0.22%	1.86%	0.00%	10.03%	0.02%
Robert Half International Inc	RHI	0.03%	1.82%	0.00%	9.25%	0.00%
Edison International	EIX	0.08%	4.09%	0.00%	5.34%	0.00%
Schlumberger Ltd	SLB	0.25%	4.54%	0.01%	33.69%	0.09%
Charles Schwab Corp/The	SCHW	0.25%	1.48%	0.00%	19.78%	0.05%
Sherwin-Williams Co/The	SHW	0.17%	1.04%	0.00%	10.74%	0.02%
JM Smucker Co/The	SJM	0.05%	3.21%	0.00%	3.20%	0.00%
Snap-on Inc	SNA	0.04%	2.38%	0.00%	7.93%	0.00%
AMETEK Inc	AME	0.07%	0.70%	0.00%	8.98%	0.01%
Southern Co/The	SO	0.21%	4.83%	0.01%	3.38%	0.01%
BB&T Corp	BBT	0.16%	3.18%	0.01%	9.85%	0.02%
Southwest Airlines Co	LUV	0.13%	1.14%	0.00%	10.01%	0.01%
Stanley Black & Decker Inc	SWK	0.08%	1.99%	0.00%	10.50%	0.01%
Public Storage	PSA	0.15%	3.78%	0.01%	5.26%	0.01%
Arista Networks Inc	ANET	0.09%	n/a	n/a	21.64%	0.02%
SunTrust Banks Inc	STI	0.12%	3.08%	0.00%	8.04%	0.01%
Sysco Corp	SY	0.14%	2.31%	0.00%	12.50%	0.02%
Texas Instruments Inc	TXN	0.41%	2.91%	0.01%	10.48%	0.04%
Textron Inc	TXT	0.05%	0.15%	0.00%	12.56%	0.01%
Thermo Fisher Scientific Inc	TMO	0.43%	0.29%	0.00%	12.00%	0.05%
Tiffany & Co	TIF	0.05%	2.31%	0.00%	10.53%	0.01%
TJX Cos Inc/The	TJX	0.26%	1.79%	0.00%	11.57%	0.03%
Torchmark Corp	TMK	0.04%	0.78%	0.00%	7.53%	0.00%
Total System Services Inc	TSS	0.07%	0.55%	0.00%	12.14%	0.01%
Johnson Controls International plc	JCI	0.13%	2.95%	0.00%	7.63%	0.01%
Ulta Beauty Inc	ULTA	0.08%	n/a	n/a	21.00%	0.02%
Union Pacific Corp	UNP	0.50%	2.10%	0.01%	13.86%	0.07%
Keysight Technologies Inc	KEYS	0.07%	n/a	n/a	17.00%	0.01%
UnitedHealth Group Inc	UNH	0.96%	1.49%	0.01%	13.73%	0.13%
Unum Group	UNM	0.03%	2.78%	0.00%	9.00%	0.00%
Marathon Oil Corp	MRO	0.06%	1.20%	0.00%	0.45%	0.00%
Varian Medical Systems Inc	VAR	0.05%	n/a	n/a	16.10%	0.01%
Ventas Inc	VTR	0.09%	5.05%	0.00%	2.08%	0.00%
VF Corp	VFC	0.14%	2.34%	0.00%	-16.64%	-0.02%
Vornado Realty Trust	VNO	0.05%	3.92%	0.00%	0.74%	0.00%
Vulcan Materials Co	VMC	0.06%	1.11%	0.00%	15.34%	0.01%
Weyerhaeuser Co	WY	0.08%	5.46%	0.00%	8.70%	0.01%
Whirlpool Corp	WHR	0.04%	3.25%	0.00%	5.75%	0.00%
Williams Cos Inc/The	WMB	0.13%	5.70%	0.01%	3.90%	0.01%
WEC Energy Group Inc	WEC	0.10%	3.09%	0.00%	4.89%	0.00%
Xerox Corp	XR	0.03%	3.24%	0.00%	-0.10%	0.00%
Adobe Inc	ADBE	0.53%	n/a	n/a	17.16%	0.09%
AES Corp/VA	AES	0.05%	3.17%	0.00%	7.67%	0.00%
Amgen Inc	AMGN	0.49%	3.05%	0.01%	5.83%	0.03%
Apple Inc	AAPL	3.38%	1.69%	0.06%	9.40%	0.32%
Autodesk Inc	ADSK	0.15%	n/a	n/a	54.78%	0.08%
Cintas Corp	CTAS	0.09%	0.99%	0.00%	12.02%	0.01%
Comcast Corp	CMCSA	0.72%	2.17%	0.02%	11.03%	0.08%
Molson Coors Brewing Co	TAP	0.05%	2.66%	0.00%	0.26%	0.00%
KLA-Tencor Corp	KLAC	0.08%	2.60%	0.00%	8.58%	0.01%
Marriott International Inc/MD	MAR	0.18%	1.31%	0.00%	12.10%	0.02%
McCormick & Co Inc/MD	MKC	0.07%	1.68%	0.00%	6.10%	0.00%
Nordstrom Inc	JWN	0.03%	3.13%	0.00%	10.55%	0.00%

Public Service Company of New Hampshire

d/b/a Eversource Energy

Docket No. DE 19-057

Attachment AEB-9 (Perm)

May 28, 2019

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Name	Ticker	[14]	[15]	[16]	[17]	[18]
		Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
PACCAR Inc	PCAR	0.10%	1.89%	0.00%	6.10%	0.01%
Costco Wholesale Corp	COST	0.40%	1.04%	0.00%	10.58%	0.04%
First Republic Bank/CA	FRC	0.07%	0.69%	0.00%	12.39%	0.01%
Stryker Corp	SYK	0.29%	1.10%	0.00%	8.72%	0.03%
Tyson Foods Inc	TSN	0.08%	2.43%	0.00%	-5.00%	0.00%
Lamb Weston Holdings Inc	LW	0.04%	1.15%	0.00%	11.02%	0.00%
Applied Materials Inc	AMAT	0.15%	2.09%	0.00%	9.23%	0.01%
American Airlines Group Inc	AAL	0.07%	1.12%	0.00%	15.20%	0.01%
Cardinal Health Inc	CAH	0.07%	3.51%	0.00%	4.77%	0.00%
Celgene Corp	CELG	0.24%	n/a	n/a	20.70%	0.05%
Cerner Corp	CERN	0.08%	n/a	n/a	13.20%	0.01%
Cincinnati Financial Corp	CINF	0.06%	2.58%	0.00%	n/a	n/a
DR Horton Inc	DHI	0.06%	1.54%	0.00%	11.80%	0.01%
Flowserve Corp	FLS	0.02%	1.71%	0.00%	13.05%	0.00%
Electronic Arts Inc	EA	0.12%	n/a	n/a	11.87%	0.01%
Expeditors International of Washington Inc	EXPD	0.05%	1.20%	0.00%	7.70%	0.00%
Fastenal Co	FAST	0.07%	2.73%	0.00%	14.85%	0.01%
M&T Bank Corp	MTB	0.10%	2.31%	0.00%	7.98%	0.01%
Xcel Energy Inc	XEL	0.12%	2.95%	0.00%	5.89%	0.01%
Fiserv Inc	FISV	0.14%	n/a	n/a	7.40%	0.01%
Fifth Third Bancorp	FITB	0.08%	3.19%	0.00%	3.95%	0.00%
Gilead Sciences Inc	GILD	0.34%	3.88%	0.01%	-1.48%	-0.01%
Hasbro Inc	HAS	0.04%	3.20%	0.00%	10.67%	0.00%
Huntington Bancshares Inc/OH	HBAN	0.06%	3.89%	0.00%	8.20%	0.01%
Welltower Inc	WELL	0.12%	4.68%	0.01%	6.74%	0.01%
Biogen Inc	BIIB	0.27%	n/a	n/a	5.08%	0.01%
Northern Trust Corp	NTRS	0.08%	2.58%	0.00%	10.65%	0.01%
Packaging Corp of America	PKG	0.04%	3.31%	0.00%	8.25%	0.00%
Paychex Inc	PAYX	0.11%	2.91%	0.00%	9.25%	0.01%
People's United Financial Inc	PBCT	0.03%	3.94%	0.00%	2.00%	0.00%
QUALCOMM Inc	QCOM	0.27%	4.65%	0.01%	11.71%	0.03%
Roper Technologies Inc	ROP	0.14%	0.57%	0.00%	11.33%	0.02%
Ross Stores Inc	ROST	0.15%	0.95%	0.00%	10.50%	0.02%
IDEXX Laboratories Inc	IDXX	0.08%	n/a	n/a	18.66%	0.01%
Starbucks Corp	SBUX	0.36%	2.05%	0.01%	13.22%	0.05%
KeyCorp	KEY	0.07%	3.85%	0.00%	13.17%	0.01%
State Street Corp	STT	0.11%	2.62%	0.00%	8.69%	0.01%
Norwegian Cruise Line Holdings Ltd	NCLH	0.05%	n/a	n/a	12.53%	0.01%
US Bancorp	USB	0.34%	2.86%	0.01%	6.70%	0.02%
AO Smith Corp	AOS	0.03%	1.69%	0.00%	9.33%	0.00%
Symantec Corp	SYMC	0.06%	1.33%	0.00%	7.50%	0.00%
T Rowe Price Group Inc	TROW	0.10%	3.03%	0.00%	4.27%	0.00%
Waste Management Inc	WM	0.18%	2.02%	0.00%	8.03%	0.01%
CBS Corp	CBS	0.07%	1.43%	0.00%	14.79%	0.01%
Allergan PLC	AGN	0.19%	2.15%	0.00%	5.57%	0.01%
Constellation Brands Inc	STZ	0.12%	1.75%	0.00%	8.92%	0.01%
Xilinx Inc	XLNX	0.13%	1.15%	0.00%	9.33%	0.01%
DENTSPLY SIRONA Inc	XRAY	0.04%	0.84%	0.00%	6.90%	0.00%
Zions Bancorp NA	ZION	0.04%	2.35%	0.00%	6.78%	0.00%
Alaska Air Group Inc	ALK	0.03%	2.27%	0.00%	25.37%	0.01%
Invesco Ltd	IVZ	0.03%	6.20%	0.00%	4.30%	0.00%
Linde PLC	LIN	0.39%	2.02%	0.01%	19.10%	0.07%
Intuit Inc	INTU	0.27%	0.76%	0.00%	15.82%	0.04%
Morgan Stanley	MS	0.30%	2.86%	0.01%	13.50%	0.04%
Microchip Technology Inc	MCHP	0.09%	1.68%	0.00%	12.39%	0.01%
Chubb Ltd	CB	0.25%	2.18%	0.01%	10.00%	0.03%
Hologic Inc	HOLX	0.06%	n/a	n/a	3.10%	0.00%
Citizens Financial Group Inc	CFG	0.07%	3.47%	0.00%	16.69%	0.01%
O'Reilly Automotive Inc	ORLY	0.12%	n/a	n/a	15.58%	0.02%
Allstate Corp/The	ALL	0.13%	2.12%	0.00%	7.10%	0.01%
FLIR Systems Inc	FLIR	0.03%	1.32%	0.00%	n/a	n/a
Equity Residential	EQR	0.11%	2.93%	0.00%	6.28%	0.01%
BorgWarner Inc	BWA	0.03%	1.67%	0.00%	5.78%	0.00%
Incyte Corp	INCY	0.08%	n/a	n/a	47.53%	0.04%
Simon Property Group Inc	SPG	0.23%	4.53%	0.01%	5.23%	0.01%
Eastman Chemical Co	EMN	0.05%	3.00%	0.00%	6.73%	0.00%
Twitter Inc	TWTR	0.10%	n/a	n/a	37.35%	0.04%
AvalonBay Communities Inc	AVB	0.11%	3.12%	0.00%	6.01%	0.01%
Prudential Financial Inc	PRU	0.16%	4.17%	0.01%	9.00%	0.01%
United Parcel Service Inc	UPS	0.32%	3.48%	0.01%	8.96%	0.03%
Apartment Investment & Management Co	AIV	0.03%	3.29%	0.00%	5.75%	0.00%
Walgreens Boots Alliance Inc	WBA	0.28%	2.47%	0.01%	9.77%	0.03%
McKesson Corp	MCK	0.10%	1.23%	0.00%	8.08%	0.01%
Lockheed Martin Corp	LMT	0.36%	2.84%	0.01%	7.61%	0.03%
AmerisourceBergen Corp	ABC	0.07%	1.92%	0.00%	8.70%	0.01%
Capital One Financial Corp	COF	0.16%	1.91%	0.00%	4.77%	0.01%
Waters Corp	WAT	0.07%	n/a	n/a	11.48%	0.01%
Dollar Tree Inc	DLTR	0.09%	n/a	n/a	9.96%	0.01%
Darden Restaurants Inc	DRI	0.06%	2.68%	0.00%	10.31%	0.01%
NetApp Inc	NTAP	0.07%	2.45%	0.00%	13.23%	0.01%
Citrix Systems Inc	CTXS	0.06%	1.33%	0.00%	11.85%	0.01%
DXC Technology Co	DXC	0.07%	1.15%	0.00%	6.70%	0.00%
DaVita Inc	DVA	0.04%	n/a	n/a	19.15%	0.01%
Hartford Financial Services Group Inc/The	HIG	0.07%	2.43%	0.00%	9.50%	0.01%
Iron Mountain Inc	IRM	0.04%	6.90%	0.00%	7.16%	0.00%
Estee Lauder Cos Inc/The	EL	0.14%	1.10%	0.00%	12.38%	0.02%
Cadence Design Systems Inc	CDNS	0.07%	n/a	n/a	10.35%	0.01%
Universal Health Services Inc	UHS	0.05%	0.29%	0.00%	9.54%	0.00%
E*TRADE Financial Corp	ETFC	0.05%	1.14%	0.00%	12.08%	0.01%
Skyworks Solutions Inc	SWKS	0.06%	1.86%	0.00%	8.87%	0.01%

STANDARD AND POOR'S 500 INDEX

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		Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
National Oilwell Varco Inc	NOV	0.04%	0.71%	0.00%	77.76%	0.03%
Quest Diagnostics Inc	DGX	0.05%	2.45%	0.00%	6.92%	0.00%
Activision Blizzard Inc	ATVI	0.13%	0.88%	0.00%	6.65%	0.01%
Rockwell Automation Inc	ROK	0.09%	2.17%	0.00%	8.94%	0.01%
Kraft Heinz Co/The	KHC	0.17%	4.82%	0.01%	2.60%	0.00%
American Tower Corp	AMT	0.32%	1.91%	0.01%	15.31%	0.05%
HollyFrontier Corp	HFC	0.04%	2.58%	0.00%	7.07%	0.00%
Regeneron Pharmaceuticals Inc	REGN	0.19%	n/a	n/a	13.88%	0.03%
Amazon.com Inc	AMZN	3.34%	n/a	n/a	37.60%	1.25%
Jack Henry & Associates Inc	JKHY	0.04%	1.21%	0.00%	11.00%	0.00%
Ralph Lauren Corp	RL	0.03%	2.00%	0.00%	6.84%	0.00%
Boston Properties Inc	BXP	0.08%	2.86%	0.00%	6.24%	0.01%
Amphenol Corp	APH	0.12%	0.98%	0.00%	10.64%	0.01%
Arconic Inc	ARNC	0.04%	0.43%	0.00%	14.35%	0.01%
Pioneer Natural Resources Co	PXD	0.10%	0.45%	0.00%	26.85%	0.03%
Valero Energy Corp	VLO	0.14%	4.41%	0.01%	19.17%	0.03%
Synopsys Inc	SNPS	0.06%	n/a	n/a	14.50%	0.01%
L3 Technologies Inc	LLL	0.07%	1.61%	0.00%	5.00%	0.00%
Western Union Co/The	WU	0.03%	4.48%	0.00%	5.00%	0.00%
CH Robinson Worldwide Inc	CHRW	0.05%	2.21%	0.00%	9.07%	0.00%
Accenture PLC	ACN	0.43%	1.81%	0.01%	10.27%	0.04%
TransDigm Group Inc	TDG	0.10%	n/a	n/a	11.07%	0.01%
Yum! Brands Inc	YUM	0.12%	1.78%	0.00%	13.12%	0.02%
Prologis Inc	PLD	0.18%	3.03%	0.01%	6.87%	0.01%
FirstEnergy Corp	FE	0.09%	3.73%	0.00%	-0.02%	0.00%
VeriSign Inc	VRSN	0.09%	n/a	n/a	8.80%	0.01%
Quanta Services Inc	PWR	0.02%	0.45%	0.00%	25.00%	0.01%
Henry Schein Inc	HSIC	0.04%	n/a	n/a	7.11%	0.00%
Ameren Corp	AEE	0.07%	2.67%	0.00%	6.70%	0.00%
ANSYS Inc	ANSS	0.06%	n/a	n/a	10.37%	0.01%
NVIDIA Corp	NVDA	0.39%	0.41%	0.00%	7.86%	0.03%
Sealed Air Corp	SEE	0.03%	1.47%	0.00%	6.04%	0.00%
Cognizant Technology Solutions Corp	CTSH	0.17%	1.13%	0.00%	11.40%	0.02%
SVB Financial Group	SIVB	0.05%	n/a	n/a	11.00%	0.01%
Intuitive Surgical Inc	ISRG	0.26%	n/a	n/a	12.62%	0.03%
Affiliated Managers Group Inc	AMG	0.02%	1.17%	0.00%	4.37%	0.00%
Take-Two Interactive Software Inc	TTWO	0.04%	n/a	n/a	10.30%	0.00%
Republic Services Inc	RSG	0.10%	1.91%	0.00%	13.01%	0.01%
eBay Inc	EBAY	0.14%	1.51%	0.00%	10.67%	0.02%
Goldman Sachs Group Inc/The	GS	0.30%	1.63%	0.00%	7.27%	0.02%
SBA Communications Corp	SBAC	0.08%	n/a	n/a	27.95%	0.02%
Sempra Energy	SRE	0.14%	3.21%	0.00%	10.10%	0.01%
Moody's Corp	MCO	0.14%	1.16%	0.00%	12.80%	0.02%
Booking Holdings Inc	BKNG	0.32%	n/a	n/a	12.50%	0.04%
F5 Networks Inc	FFIV	0.04%	n/a	n/a	9.39%	0.00%
Akamai Technologies Inc	AKAM	0.05%	n/a	n/a	14.50%	0.01%
Devon Energy Corp	DVN	0.05%	1.22%	0.00%	1.15%	0.00%
Alphabet Inc	GOOGL	1.40%	n/a	n/a	15.22%	0.21%
Red Hat Inc	RHT	0.13%	n/a	n/a	18.40%	0.02%
Teleflex Inc	TFX	0.06%	0.47%	0.00%	12.45%	0.01%
Allegion PLC	ALLE	0.04%	1.20%	0.00%	11.24%	0.00%
Netflix Inc	NFLX	0.65%	n/a	n/a	32.07%	0.21%
Agilent Technologies Inc	A	0.10%	0.83%	0.00%	9.50%	0.01%
Anthem Inc	ANTM	0.32%	1.06%	0.00%	11.14%	0.04%
CME Group Inc	CME	0.27%	1.65%	0.00%	13.40%	0.04%
Juniper Networks Inc	JNPR	0.04%	2.81%	0.00%	8.63%	0.00%
BlackRock Inc	BLK	0.29%	2.98%	0.01%	9.69%	0.03%
DTE Energy Co	DTE	0.09%	3.06%	0.00%	5.53%	0.01%
Celanese Corp	CE	0.05%	2.11%	0.00%	7.05%	0.00%
Nasdaq Inc	NDAQ	0.06%	1.92%	0.00%	9.11%	0.01%
Philip Morris International Inc	PM	0.56%	5.25%	0.03%	9.06%	0.05%
salesforce.com Inc	CRM	0.52%	n/a	n/a	23.98%	0.12%
Huntington Ingalls Industries Inc	HII	0.04%	1.64%	0.00%	40.00%	0.01%
MetLife Inc	MET	0.18%	3.72%	0.01%	8.46%	0.02%
Under Armour Inc	UA	0.02%	n/a	n/a	37.34%	0.01%
Tapestry Inc	TPR	0.04%	3.86%	0.00%	11.75%	0.00%
Fluor Corp	FLR	0.02%	2.23%	0.00%	17.99%	0.00%
CSX Corp	CSX	0.25%	1.32%	0.00%	10.47%	0.03%
Edwards Lifesciences Corp	EW	0.15%	n/a	n/a	14.00%	0.02%
Ameriprise Financial Inc	AMP	0.07%	2.73%	0.00%	11.80%	0.01%
TechnipFMC PLC	FTI	0.04%	2.33%	0.00%	15.43%	0.01%
Zimmer Biomet Holdings Inc	ZBH	0.11%	0.77%	0.00%	4.74%	0.00%
CBRE Group Inc	CBRE	0.07%	n/a	n/a	8.55%	0.01%
Mastercard Inc	MA	0.94%	0.59%	0.01%	19.66%	0.19%
CarMax Inc	KMX	0.04%	n/a	n/a	12.92%	0.01%
Intercontinental Exchange Inc	ICE	0.18%	1.43%	0.00%	8.02%	0.01%
Fidelity National Information Services Inc	FIS	0.14%	1.29%	0.00%	12.00%	0.02%
Chipotle Mexican Grill Inc	CMG	0.07%	n/a	n/a	20.31%	0.01%
Wynn Resorts Ltd	WYNN	0.06%	2.37%	0.00%	31.10%	0.02%
Assurant Inc	AIZ	0.03%	2.33%	0.00%	n/a	n/a
NRG Energy Inc	NRG	0.05%	0.29%	0.00%	46.03%	0.02%
Monster Beverage Corp	MNST	0.14%	n/a	n/a	15.00%	0.02%
Regions Financial Corp	RF	0.07%	3.41%	0.00%	10.88%	0.01%
Mosaic Co/The	MOS	0.05%	0.32%	0.00%	8.40%	0.00%
Expedia Group Inc	EXPE	0.07%	1.04%	0.00%	17.20%	0.01%
Evergy Inc	EVERG	0.06%	3.40%	0.00%	7.43%	0.00%
Discovery Inc	DISCA	0.02%	n/a	n/a	12.30%	0.00%
CF Industries Holdings Inc	CF	0.04%	2.84%	0.00%	19.75%	0.01%
Viacom Inc	VIAB	0.04%	2.74%	0.00%	4.93%	0.00%
Alphabet Inc	GOOG	1.62%	n/a	n/a	15.22%	0.25%

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STANDARD AND POOR'S 500 INDEX

		[14]	[15]	[16]	[17]	[18]
Name	Ticker	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
TE Connectivity Ltd	TEL	0.12%	2.14%	0.00%	11.18%	0.01%
Cooper Cos Inc/The	COO	0.06%	0.02%	0.00%	4.70%	0.00%
Discover Financial Services	DFS	0.10%	2.23%	0.00%	8.80%	0.01%
TripAdvisor Inc	TRIP	0.03%	n/a	n/a	11.39%	0.00%
Visa Inc	V	1.07%	0.68%	0.01%	15.59%	0.17%
Mid-America Apartment Communities Inc	MAA	0.05%	3.71%	0.00%	7.00%	0.00%
Xylem Inc/NY	XYL	0.06%	1.27%	0.00%	14.00%	0.01%
Marathon Petroleum Corp	MPC	0.17%	3.42%	0.01%	16.14%	0.03%
Advanced Micro Devices Inc	AMD	0.10%	n/a	n/a	15.67%	0.02%
Tractor Supply Co	TSCO	0.05%	1.30%	0.00%	12.09%	0.01%
ResMed Inc	RMD	0.06%	1.44%	0.00%	12.50%	0.01%
Mettler-Toledo International Inc	MTD	0.07%	n/a	n/a	12.66%	0.01%
Copart Inc	CPRT	0.06%	n/a	n/a	20.00%	0.01%
Fortinet Inc	FTNT	0.06%	n/a	n/a	22.10%	0.01%
Albemarle Corp	ALB	0.04%	1.61%	0.00%	11.41%	0.00%
Essex Property Trust Inc	ESS	0.08%	2.79%	0.00%	6.06%	0.00%
Realty Income Corp	O	0.09%	3.91%	0.00%	4.39%	0.00%
Seagate Technology PLC	STX	0.05%	5.41%	0.00%	3.37%	0.00%
Westrock Co	WRK	0.04%	4.87%	0.00%	4.73%	0.00%
IHS Markit Ltd	INFO	0.09%	n/a	n/a	11.21%	0.01%
Wabtec Corp	WAB	0.03%	0.66%	0.00%	14.00%	0.00%
Western Digital Corp	WDC	0.06%	3.98%	0.00%	2.72%	0.00%
PepsiCo Inc	PEP	0.67%	3.21%	0.02%	5.48%	0.04%
Diamondback Energy Inc	FANG	0.07%	0.49%	0.00%	17.55%	0.01%
Nektar Therapeutics	NKTR	0.03%	n/a	n/a	n/a	n/a
Maxim Integrated Products Inc	MXIM	0.06%	3.38%	0.00%	8.93%	0.01%
Church & Dwight Co Inc	CHD	0.07%	1.38%	0.00%	8.21%	0.01%
Duke Realty Corp	DRE	0.04%	2.91%	0.00%	4.50%	0.00%
Federal Realty Investment Trust	FRT	0.04%	3.05%	0.00%	6.15%	0.00%
MGM Resorts International	MGM	0.06%	1.94%	0.00%	3.32%	0.00%
Twenty-First Century Fox Inc	FOX	0.17%	0.72%	0.00%	2.66%	0.00%
JB Hunt Transport Services Inc	JBHT	0.05%	0.97%	0.00%	18.78%	0.01%
Lam Research Corp	LRCX	0.11%	2.50%	0.00%	-0.42%	0.00%
Mohawk Industries Inc	MHK	0.04%	n/a	n/a	7.59%	0.00%
Pentair PLC	PNR	0.03%	1.69%	0.00%	10.29%	0.00%
Vertex Pharmaceuticals Inc	VRTX	0.20%	n/a	n/a	49.41%	0.10%
Facebook Inc	FB	1.59%	n/a	n/a	21.88%	0.35%
United Rentals Inc	URI	0.04%	n/a	n/a	17.76%	0.01%
Alexandria Real Estate Equities Inc	ARE	0.06%	2.86%	0.00%	4.80%	0.00%
ABIOMED Inc	ABMD	0.06%	n/a	n/a	29.00%	0.02%
Delta Air Lines Inc	DAL	0.14%	2.82%	0.00%	13.07%	0.02%
United Continental Holdings Inc	UAL	0.10%	n/a	n/a	14.17%	0.01%
News Corp	NWS	0.01%	1.50%	0.00%	-9.13%	0.00%
Centene Corp	CNC	0.10%	n/a	n/a	13.68%	0.01%
Macerich Co/The	MAC	0.03%	6.88%	0.00%	-0.12%	0.00%
Martin Marietta Materials Inc	MLM	0.05%	1.02%	0.00%	13.29%	0.01%
PayPal Holdings Inc	PYPL	0.48%	n/a	n/a	22.12%	0.11%
Coty Inc	COTY	0.03%	4.55%	0.00%	8.76%	0.00%
DISH Network Corp	DISH	0.03%	n/a	n/a	-20.68%	-0.01%
Alexion Pharmaceuticals Inc	ALXN	0.13%	n/a	n/a	15.94%	0.02%
Everest Re Group Ltd	RE	0.04%	2.48%	0.00%	10.00%	0.00%
WellCare Health Plans Inc	WCG	0.05%	n/a	n/a	17.08%	0.01%
News Corp	NWSA	0.02%	1.54%	0.00%	-9.13%	0.00%
Global Payments Inc	GPN	0.09%	0.03%	0.00%	14.67%	0.01%
Crown Castle International Corp	CCI	0.20%	3.79%	0.01%	15.50%	0.03%
Aptiv PLC	APTIV	0.09%	1.06%	0.00%	10.66%	0.01%
Advance Auto Parts Inc	AAP	0.05%	0.15%	0.00%	16.17%	0.01%
Capri Holdings Ltd	CPRI	0.03%	n/a	n/a	6.73%	0.00%
Align Technology Inc	ALGN	0.09%	n/a	n/a	23.19%	0.02%
Illumina Inc	ILMN	0.19%	n/a	n/a	25.16%	0.05%
Alliance Data Systems Corp	ADS	0.04%	1.46%	0.00%	2.54%	0.00%
LKQ Corp	LKQ	0.04%	n/a	n/a	13.85%	0.01%
Nielsen Holdings PLC	NLSN	0.04%	5.34%	0.00%	n/a	n/a
Garmin Ltd	GRMN	0.07%	2.72%	0.00%	7.28%	0.00%
Cimarex Energy Co	XEC	0.03%	1.11%	0.00%	66.37%	0.02%
Zoetis Inc	ZTS	0.19%	0.70%	0.00%	15.36%	0.03%
Digital Realty Trust Inc	DLR	0.10%	3.82%	0.00%	18.00%	0.02%
Equinix Inc	EQIX	0.15%	2.32%	0.00%	20.00%	0.03%
Discovery Inc	DISCK	0.04%	n/a	n/a	12.30%	0.00%

Notes:

[9] Equals sum of Col. [16]
[10] Equals sum of Col. [18]
[11] Equals ([9] x (1 + (0.5 x [10]))) + [10]
[12] Source: Attachment AEB-9, at 1
[13] Equals [11] - [12]
[14] Equals weight in S&P 500 based on market capitalization
[15] Source: Bloomberg Professional, as of February 28, 2019
[16] Equals [14] x [15]
[17] Source: Bloomberg Professional, as of February 28, 2019
[18] Equals [14] x [17]

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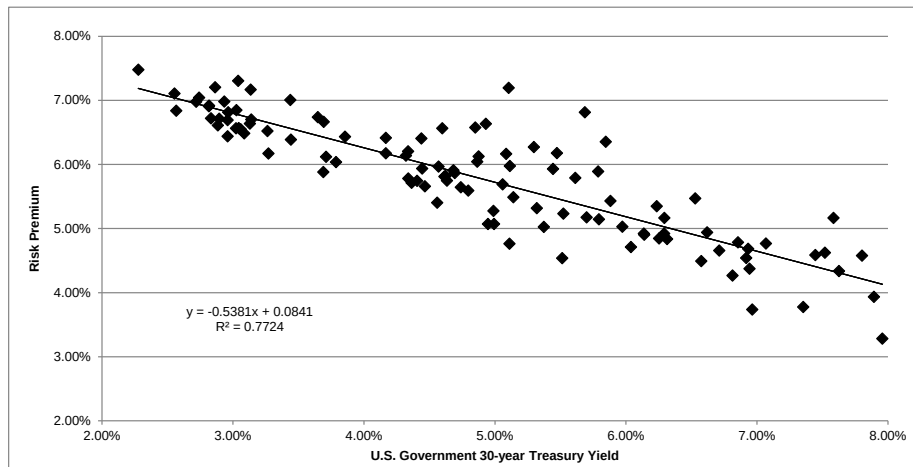
BOND YIELD PLUS RISK PREMIUM			
	[1]	[2]	[3]
	Average Authorized Electric ROE	U.S. Govt. 30-year Treasury	Risk Premium
1992.1	12.38%	7.80%	4.58%
1992.2	11.83%	7.89%	3.93%
1992.3	12.03%	7.45%	4.59%
1992.4	12.14%	7.52%	4.62%
1993.1	11.84%	7.07%	4.77%
1993.2	11.64%	6.86%	4.79%
1993.3	11.15%	6.31%	4.84%
1993.4	11.04%	6.14%	4.90%
1994.1	11.07%	6.57%	4.49%
1994.2	11.13%	7.35%	3.78%
1994.3	12.75%	7.58%	5.17%
1994.4	11.24%	7.96%	3.28%
1995.1	11.96%	7.63%	4.34%
1995.2	11.32%	6.94%	4.37%
1995.3	11.37%	6.71%	4.66%
1995.4	11.58%	6.23%	5.35%
1996.1	11.46%	6.29%	5.17%
1996.2	11.46%	6.92%	4.54%
1996.3	10.70%	6.96%	3.74%
1996.4	11.56%	6.62%	4.94%
1997.1	11.08%	6.81%	4.27%
1997.2	11.62%	6.93%	4.68%
1997.3	12.00%	6.53%	5.47%
1997.4	11.06%	6.14%	4.92%
1998.1	11.31%	5.88%	5.43%
1998.2	12.20%	5.85%	6.35%
1998.3	11.65%	5.47%	6.18%
1998.4	12.30%	5.10%	7.20%
1999.1	10.40%	5.37%	5.03%
1999.2	10.94%	5.79%	5.15%
1999.3	10.75%	6.04%	4.71%
1999.4	11.10%	6.25%	4.85%
2000.1	11.21%	6.29%	4.92%
2000.2	11.00%	5.97%	5.03%
2000.3	11.68%	5.79%	5.89%
2000.4	12.50%	5.69%	6.81%
2001.1	11.38%	5.44%	5.93%
2001.2	10.88%	5.70%	5.18%
2001.3	10.76%	5.52%	5.23%
2001.4	11.57%	5.30%	6.27%
2002.1	10.05%	5.51%	4.54%
2002.2	11.41%	5.61%	5.79%
2002.3	11.25%	5.08%	6.17%
2002.4	11.57%	4.93%	6.64%
2003.1	11.43%	4.85%	6.58%
2003.2	11.16%	4.60%	6.56%
2003.3	9.88%	5.11%	4.76%
2003.4	11.09%	5.11%	5.98%
2004.1	11.00%	4.88%	6.12%
2004.2	10.64%	5.32%	5.32%
2004.3	10.75%	5.06%	5.69%
2004.4	10.91%	4.86%	6.04%
2005.1	10.56%	4.69%	5.87%
2005.2	10.13%	4.47%	5.66%
2005.3	10.85%	4.44%	6.41%
2005.4	10.59%	4.68%	5.91%
2006.1	10.38%	4.63%	5.75%
2006.2	10.63%	5.14%	5.49%
2006.3	10.06%	4.99%	5.07%
2006.4	10.39%	4.74%	5.65%
2007.1	10.39%	4.80%	5.59%
2007.2	10.27%	4.99%	5.28%
2007.3	10.02%	4.95%	5.07%
2007.4	10.43%	4.61%	5.81%
2008.1	10.15%	4.41%	5.75%
2008.2	10.54%	4.57%	5.97%
2008.3	10.38%	4.44%	5.94%
2008.4	10.39%	3.65%	6.74%
2009.1	10.45%	3.44%	7.01%
2009.2	10.58%	4.17%	6.42%
2009.3	10.46%	4.32%	6.14%
2009.4	10.54%	4.34%	6.21%
2010.1	10.45%	4.62%	5.82%
2010.2	10.08%	4.36%	5.71%
2010.3	10.29%	3.86%	6.43%
2010.4	10.34%	4.17%	6.17%
2011.1	9.96%	4.56%	5.40%
2011.2	10.12%	4.34%	5.78%
2011.3	10.36%	3.69%	6.67%
2011.4	10.34%	3.04%	7.31%

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BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
	Average Authorized Electric ROE	U.S. Govt. 30-year Treasury	Risk Premium
2012.1	10.30%	3.14%	7.17%
2012.2	9.92%	2.93%	6.98%
2012.3	9.78%	2.74%	7.04%
2012.4	10.07%	2.86%	7.21%
2013.1	9.77%	3.13%	6.64%
2013.2	9.84%	3.14%	6.70%
2013.3	9.83%	3.71%	6.12%
2013.4	9.82%	3.79%	6.04%
2014.1	9.57%	3.69%	5.88%
2014.2	9.83%	3.44%	6.39%
2014.3	9.79%	3.26%	6.52%
2014.4	9.78%	2.96%	6.81%
2015.1	9.66%	2.55%	7.11%
2015.2	9.50%	2.88%	6.61%
2015.3	9.40%	2.96%	6.44%
2015.4	9.65%	2.96%	6.69%
2016.1	9.70%	2.72%	6.98%
2016.2	9.41%	2.57%	6.84%
2016.3	9.76%	2.28%	7.48%
2016.4	9.55%	2.83%	6.72%
2017.1	9.61%	3.04%	6.57%
2017.2	9.61%	2.90%	6.71%
2017.3	9.73%	2.82%	6.91%
2017.4	9.74%	2.82%	6.92%
2018.1	9.59%	3.02%	6.57%
2018.2	9.57%	3.09%	6.49%
2018.3	9.61%	3.06%	6.55%
2018.4	9.44%	3.27%	6.17%
2019.1	9.88%	3.03%	6.85%
AVERAGE	10.66%	4.87%	5.79%
MEDIAN	10.54%	4.85%	5.89%

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.878846
R Square	0.772370
Adjusted R Square	0.770242
Standard Error	0.004400
Observations	109

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.007030	0.007030	363.060777	0.000000
Residual	107	0.002072	0.000019		
Total	108	0.009102			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.0841	0.001437	58.54	0.000000	0.081282	0.086980	0.081282	0.086980
U.S. Govt. 30-year Treasury	(0.5381)	0.028243	(19.05)	0.000000	(0.594128)	(0.482153)	(0.594128)	(0.482153)

	[7]	[8]	[9]
	U.S. Govt. 30-year Treasury	Risk Premium	ROE
Current 30-Day Average [4]	3.04%	6.78%	9.82%
Blue Chip Consensus Forecast (Q2 2019 - Q2 2020) [5]	3.28%	6.65%	9.93%
Blue Chip Consensus Forecast (2020-2024) [6]	3.90%	6.31%	10.21%
AVERAGE			9.99%

Notes:

[1] Source: Regulatory Research Associates, accessed March 12, 2019.

[2] Source: Bloomberg Professional, quarterly bond yields are the average of each trading day in the quarter

[3] Equals Column [1] - Column [2]

[4] Source: Bloomberg Professional, 30-day average as of February 28, 2019

[5] Source: Blue Chip Financial Forecasts, Vol. 38, No. 3, March 1, 2019, at 2

[6] Source: Blue Chip Financial Forecasts, Vol. 37, No. 12, December 1, 2018, at 14

[7] See notes [4], [5] & [6]

[8] Equals $0.084131 + (-0.538140 \times \text{Column [7]})$

[9] Equals Column [7] + Column [8]

**COMPARISON OF PSNH AND PROXY GROUP COMPANIES
REGULATORY FRAMEWORK - ADJUSTMENT CLAUSES**

Proxy Group Company	Operation State	Operation	Test Year	New Capital	
				Generation Capacity	Generic Infrastructure
ALLETE, Inc.	Minnesota	Electric	1	Partially Forecast	
Alliant Energy Corporation	Iowa	Electric	1	Historical	
	Wisconsin	Electric	1	Fully Forecast	
Avangrid, Inc.	Connecticut	Electric	1	Historical	
	Maine	Electric	1	Partially Forecast	
	New York	Electric	1	Fully Forecast	
FirstEnergy Corp.	Maryland	Electric	1	Partially Forecast	
	New Jersey	Electric	1	Partially Forecast	
	Ohio	Electric	1	Partially Forecast	x
	Pennsylvania	Electric	1	Fully Forecast	x
	West Virginia	Electric	1	Historical	x
Hawaiian Electric Industries, Inc.	Hawaii	Electric	1	Fully Forecast	x
NorthWestern Corporation	Montana	Electric	1	Historical	
	South Dakota	Electric	1	Historical	
Portland General Electric Company	Oregon	Electric	1	Fully Forecast	
PPL Corporation	Kentucky	Electric	1	Fully Forecast	
	Pennsylvania	Electric	1	Fully Forecast	x
	Virginia	Electric	1	Fully Forecast	
Proxy Companies				Historical: 5 Forecast: 13	
Total Jurisdictions	18				
Percent of Jurisdictions			Forecast: 72%	5.6%	27.8%
Public Service Co. of New Hampshire	New Hampshire		Historical		x

Notes:

- [1] S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated September 28, 2018. Operating subsidiaries not covered in this report were excluded from this exhibit.
[2] This exhibit only includes the adjustment mechanisms for the electric operating subsidiaries. Natural Gas subsidiaries were excluded from this exhibit.

FLOTATION COST ADJUSTMENT

Company	Date [i]	Shares Issued (000)	Offering Price	Under-writing Discount [ii]	Offering Expense (\$000)	Net Proceeds Per Share	Total Flotation Costs (\$000)	Equity Issue Before Costs (\$000)	Net Proceeds (\$000)	Flotation Cost Percentage
Eversource Energy	12/6/2005	23,000	\$ 19.09	\$ 0.6200	\$ 340	\$ 18.46	\$ 14,600	\$ 439,070	\$ 424,470	3.33%
Eversource Energy	3/16/2009	18,975	\$ 20.20	\$ 0.6565	\$ 335	\$ 19.53	\$ 12,792	\$ 383,295	\$ 370,503	3.34%
							\$ 27,392	\$ 822,365	\$ 794,973	3.33%

Notes:

[i] Offering Completion Date

[ii] Underwriting discount was calculated as the market price minus the offering price when not explicitly given in the prospectus.

The flotation cost adjustment is derived by dividing the dividend yield by $1 - F$ (where F = flotation costs expressed in percentage terms), or by 0.9667, and adding that result to the constant growth rate to determine the cost of equity. Using the formulas shown previously in my testimony, the Constant Growth DCF calculation is modified as follows to accommodate an adjustment for flotation costs:

$$k = \frac{D \times (1 + 0.5g)}{P \times (1 - F)} + g$$

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
						Expected Dividend Adjusted for Flotation Costs	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Earnings Growth	ROE	ROE Adjusted for Flotation Costs
Company	Ticker	Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield							
ALLETE, Inc.	ALE	\$2.35	\$77.59	3.03%	3.10%	3.21%	3.50%	6.00%	n/a	4.75%	7.85%	7.96%
Alliant Energy Corporation	LNT	\$1.42	\$44.35	3.20%	3.31%	3.42%	6.50%	7.25%	6.00%	6.58%	9.89%	10.00%
Avangrid, Inc.	AGR	\$1.76	\$49.52	3.55%	3.73%	3.86%	12.00%	9.20%	8.40%	9.87%	13.60%	13.72%
FirstEnergy Corporation	FE	\$1.52	\$39.36	3.86%	3.98%	4.12%	6.50%	Negative	6.00%	6.25%	10.23%	10.37%
Hawaiian Electric Industries, Inc.	HE	\$1.28	\$37.34	3.43%	3.53%	3.65%	3.50%	7.80%	6.20%	5.83%	9.36%	9.48%
NorthWestern Corporation	NWE	\$2.20	\$64.39	3.42%	3.46%	3.58%	2.50%	2.59%	3.10%	2.73%	6.19%	6.31%
Portland General Electric Company	POR	\$1.45	\$48.17	3.01%	3.07%	3.18%	4.00%	4.90%	4.00%	4.30%	7.37%	7.48%
PPL Corporation	PPL	\$1.64	\$30.94	5.30%	5.40%	5.59%	3.00%	3.59%	5.00%	3.86%	9.27%	9.45%
Mean											9.22%	9.35%
Flotation Cost Adjustment											[12]	0.13%

Notes:

[1] Source: Bloomberg Professional.

[2] Source: Bloomberg Professional, equals 30-day average as of February 28, 2019

[3] Equals [1] / [2]

[4] Equals [3] x (1 + 0.5 x [9])

[5] Equals [4] / (1 - Flotation Cost)

[6] Source: Value Line

[7] Source: Yahoo! Finance

[8] Source: Zacks

[9] Equals Average ([6], [7], [8])

[10] Equals [4] + [9]

[11] Equals [5] + [9]

[12] Equals Average ([11]) - Average ([10])

CAPITAL STRUCTURE ANALYSIS

COMMON EQUITY RATIO [1]										
Combined Utility Proxy Group Company	Ticker	2018Q4	2018Q3	2018Q2	2018Q1	2017Q4	2017Q3	2017Q2	2017Q1	Average
ALLETE, Inc.	ALE	61.24%	60.33%	60.26%	60.43%	60.03%	59.64%	59.10%	58.70%	59.97%
Alliant Energy Corporation	LNT	51.27%	49.65%	49.68%	48.48%	48.57%	49.42%	48.65%	48.86%	49.32%
Avangrid, Inc.	AGR	56.10%	55.39%	53.42%	54.41%	53.74%	53.25%	53.42%	53.52%	54.16%
FirstEnergy Corporation	FE	57.42%	58.23%	57.00%	55.81%	56.81%	55.99%	54.98%	53.65%	56.24%
Hawaiian Electric Industries, Inc.	HE	57.55%	54.69%	54.28%	55.34%	57.33%	58.00%	56.96%	57.68%	56.48%
NorthWestern Corporation	NWE	47.88%	48.36%	48.41%	47.48%	45.83%	45.40%	44.74%	45.64%	46.72%
Portland General Electric Company	POR	50.19%	50.51%	50.29%	50.14%	49.80%	50.17%	50.32%	50.28%	50.21%
PPL Corporation	PPL	53.35%	53.91%	53.53%	53.22%	53.79%	54.08%	56.35%	55.02%	54.16%
MEAN		54.37%	53.88%	53.36%	53.16%	53.24%	53.24%	53.06%	52.92%	53.41%
LOW		47.88%	48.36%	48.41%	47.48%	45.83%	45.40%	44.74%	45.64%	46.72%
HIGH		61.24%	60.33%	60.26%	60.43%	60.03%	59.64%	59.10%	58.70%	59.97%

COMMON EQUITY RATIO - UTILITY OPERATING COMPANIES [2]										
Company Name	Ticker	2018Q4	2018Q3	2018Q2	2018Q1	2017Q4	2017Q3	2017Q2	2017Q1	Average
ALLETE (Minnesota Power)	ALE	61.39%	60.43%	60.33%	60.38%	60.04%	59.73%	59.16%	58.71%	60.02%
Superior Water, Light and Power Company	ALE	55.76%	56.58%	57.34%	62.68%	59.67%	55.83%	56.26%	58.21%	57.79%
Interstate Power and Light Company	LNT	51.26%	47.96%	48.62%	48.01%	48.37%	49.64%	48.78%	47.98%	48.83%
Wisconsin Power and Light Company	LNT	51.29%	52.04%	51.09%	49.09%	48.82%	49.13%	48.46%	50.03%	50.00%
Central Maine Power Company	AGR	63.20%	62.83%	62.27%	64.17%	63.80%	63.96%	63.26%	62.82%	63.29%
New York State Electric & Gas Corporation	AGR	53.50%	53.68%	49.19%	48.08%	47.49%	46.76%	49.97%	48.37%	49.63%
Rochester Gas and Electric Corporation	AGR	48.89%	48.16%	47.78%	50.80%	49.63%	48.94%	48.46%	45.83%	48.56%
United Illuminating Company	AGR	56.46%	53.89%	51.64%	51.84%	50.85%	49.62%	47.98%	53.98%	52.03%
Cleveland Electric Illuminating Company	FE	55.19%	56.50%	56.27%	55.45%	55.23%	51.93%	52.02%	51.18%	54.22%
Jersey Central Power & Light Company	FE	67.54%	66.41%	64.90%	62.05%	65.30%	65.26%	62.73%	58.69%	64.11%
Metropolitan Edison Company	FE	50.71%	52.40%	50.43%	49.22%	52.33%	52.00%	50.54%	49.40%	50.88%
Monongahela Power Company	FE	46.68%	50.71%	49.50%	50.57%	49.15%	48.18%	46.60%	46.37%	48.47%
Ohio Edison Company	FE	69.93%	69.14%	67.33%	66.89%	64.91%	62.27%	62.80%	62.74%	65.75%
Pennsylvania Electric Company	FE	52.81%	52.71%	52.77%	51.43%	51.56%	53.29%	52.05%	51.61%	52.28%
Pennsylvania Power Company	FE	49.03%	57.01%	54.79%	52.23%	52.41%	55.74%	52.84%	52.09%	53.27%
Potomac Edison Company	FE	52.35%	52.92%	52.65%	52.64%	51.59%	51.27%	51.15%	50.74%	51.91%
Toledo Edison Company	FE	60.39%	62.25%	60.71%	59.04%	58.47%	55.49%	60.01%	61.00%	59.67%
West Penn Power Company	FE	49.75%	50.13%	48.01%	47.15%	52.82%	52.10%	50.33%	49.77%	50.01%
Hawaiian Electric Company, Inc.	HE	57.55%	54.69%	54.28%	55.34%	57.33%	58.00%	56.96%	57.68%	56.48%
NorthWestern Corporation	NWE	47.88%	48.36%	48.41%	47.48%	45.83%	45.40%	44.74%	45.64%	46.72%
Portland General Electric Company	POR	50.19%	50.51%	50.29%	50.14%	49.80%	50.17%	50.32%	50.28%	50.21%
Kentucky Utilities Company	PPL	52.46%	53.43%	53.13%	53.26%	53.53%	53.93%	58.21%	58.25%	54.53%
Louisville Gas and Electric Company	PPL	52.26%	53.06%	52.59%	52.66%	52.71%	53.42%	57.15%	57.10%	53.87%
PPL Electric Utilities Corporation	PPL	54.52%	54.65%	54.28%	53.50%	54.57%	54.54%	54.43%	51.04%	53.94%

Notes:

[1] Ratios are weighted by actual common capital, preferred capital, long-term debt and short-term debt of Operating Subsidiaries.

[2] Natural Gas and Electric Operating Subsidiaries with data listed as N/A from SNL Financial have been excluded from the analysis.

CAPITAL STRUCTURE ANALYSIS

		LONG-TERM DEBT RATIO [1]								
Combined Utility Proxy Group Company	Ticker	2018Q4	2018Q3	2018Q2	2018Q1	2017Q4	2017Q3	2017Q2	2017Q1	Average
ALLETE, Inc.	ALE	38.71%	39.67%	39.74%	39.45%	39.77%	40.12%	40.69%	41.17%	39.92%
Alliant Energy Corporation	LNT	45.15%	47.92%	47.87%	48.93%	48.88%	45.54%	46.41%	47.40%	47.26%
Avangrid, Inc.	AGR	43.48%	42.35%	42.95%	40.58%	41.40%	44.14%	44.80%	41.98%	42.71%
FirstEnergy Corporation	FE	40.06%	39.67%	39.61%	41.18%	42.90%	43.24%	42.13%	43.31%	41.51%
Hawaiian Electric Industries, Inc.	HE	41.71%	42.81%	43.03%	41.01%	42.52%	41.81%	41.65%	42.27%	42.10%
NorthWestern Corporation	NWE	52.12%	51.64%	51.59%	52.52%	46.03%	47.51%	47.31%	48.24%	49.62%
Portland General Electric Company	POR	49.81%	49.49%	49.71%	49.86%	50.20%	49.83%	49.68%	49.72%	49.79%
PPL Corporation	PPL	43.79%	44.38%	44.67%	44.25%	44.73%	44.70%	42.15%	40.57%	43.66%
MEAN		44.35%	44.74%	44.90%	44.72%	44.55%	44.61%	44.35%	44.33%	44.57%
LOW		38.71%	39.67%	39.61%	39.45%	39.77%	40.12%	40.69%	40.57%	39.92%
HIGH		52.12%	51.64%	51.59%	52.52%	50.20%	49.83%	49.68%	49.72%	49.79%

		LONG-TERM DEBT RATIO - UTILITY OPERATING COMPANIES [2]								
Company Name	Ticker	2018Q4	2018Q3	2018Q2	2018Q1	2017Q4	2017Q3	2017Q2	2017Q1	Average
ALLETE (Minnesota Power)	ALE	38.61%	39.57%	39.67%	39.62%	39.96%	40.27%	40.84%	41.29%	39.98%
Superior Water, Light and Power Company	ALE	42.31%	43.42%	42.66%	32.58%	32.15%	33.74%	34.37%	35.91%	37.14%
Interstate Power and Light Company	LNT	44.51%	48.66%	47.72%	48.17%	47.78%	46.20%	47.07%	47.55%	47.21%
Wisconsin Power and Light Company	LNT	46.04%	46.85%	48.08%	49.94%	50.35%	44.65%	45.53%	47.20%	47.33%
Central Maine Power Company	AGR	36.78%	35.08%	35.75%	35.81%	36.18%	36.02%	36.72%	37.16%	36.19%
New York State Electric & Gas Corporation	AGR	45.02%	45.82%	47.28%	40.12%	41.61%	50.11%	49.49%	48.98%	46.05%
Rochester Gas and Electric Corporation	AGR	51.11%	51.84%	52.24%	49.20%	50.36%	51.06%	51.54%	37.11%	49.31%
United Illuminating Company	AGR	43.54%	38.67%	38.27%	39.59%	39.95%	41.69%	43.99%	44.38%	41.26%
Cleveland Electric Illuminating Company	FE	44.36%	43.50%	43.67%	44.49%	44.70%	44.13%	43.81%	48.75%	44.68%
Jersey Central Power & Light Company	FE	29.70%	29.37%	29.42%	32.66%	34.70%	34.74%	34.12%	40.17%	33.11%
Metropolitan Edison Company	FE	44.59%	44.18%	44.54%	45.12%	47.67%	47.42%	46.71%	47.00%	45.90%
Monongahela Power Company	FE	48.85%	49.29%	46.55%	49.43%	50.85%	51.82%	51.30%	42.01%	48.76%
Ohio Edison Company	FE	30.07%	30.86%	32.67%	33.11%	35.09%	37.73%	37.20%	37.26%	34.25%
Pennsylvania Electric Company	FE	45.19%	44.88%	45.13%	45.45%	47.47%	46.71%	45.87%	46.60%	45.91%
Pennsylvania Power Company	FE	50.97%	40.83%	41.53%	41.55%	44.97%	44.26%	44.16%	45.49%	44.22%
Potomac Edison Company	FE	47.65%	47.08%	47.35%	47.36%	48.41%	48.73%	48.85%	49.26%	48.09%
Toledo Edison Company	FE	39.55%	37.75%	36.82%	38.39%	38.92%	40.50%	37.47%	36.55%	38.24%
West Penn Power Company	FE	43.23%	44.20%	44.16%	45.14%	47.18%	47.90%	41.73%	42.81%	44.54%
Hawaiian Electric Company, Inc.	HE	41.71%	42.81%	43.03%	41.01%	42.52%	41.81%	41.65%	42.27%	42.10%
NorthWestern Corporation	NWE	52.12%	51.64%	51.59%	52.52%	46.03%	47.51%	47.31%	48.24%	49.62%
Portland General Electric Company	POR	49.81%	49.49%	49.71%	49.86%	50.20%	49.83%	49.68%	49.72%	49.79%
Kentucky Utilities Company	PPL	43.19%	44.15%	44.34%	45.23%	45.60%	46.07%	40.90%	41.12%	43.82%
Louisville Gas and Electric Company	PPL	41.39%	42.80%	43.08%	44.04%	42.39%	41.49%	38.01%	38.06%	41.41%
PPL Electric Utilities Corporation	PPL	45.48%	45.35%	45.72%	43.70%	45.43%	45.46%	45.57%	41.67%	44.80%

Notes:

[1] Ratios are weighted by actual common capital, preferred capital, long-term debt and short-term debt of Operating Subsidiaries.

[2] Natural Gas and Electric Operating Subsidiaries with data listed as N/A from SNL Financial have been excluded from the analysis.

CAPITAL STRUCTURE ANALYSIS

		PREFERRED EQUITY RATIO [1]								
Combined Utility Proxy Group Company	Ticker	2018Q4	2018Q3	2018Q2	2018Q1	2017Q4	2017Q3	2017Q2	2017Q1	Average
ALLETE, Inc.	ALE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Alliant Energy Corporation	LNT	1.97%	1.98%	2.10%	2.18%	2.20%	2.32%	2.36%	2.44%	2.19%
Avangrid, Inc.	AGR	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
FirstEnergy Corporation	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hawaiian Electric Industries, Inc.	HE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
NorthWestern Corporation	NWE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Portland General Electric Company	POR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PPL Corporation	PPL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
MEAN		0.25%	0.25%	0.26%	0.27%	0.28%	0.29%	0.30%	0.31%	0.27%
LOW		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
HIGH		1.97%	1.98%	2.10%	2.18%	2.20%	2.32%	2.36%	2.44%	2.19%

		PREFERRED EQUITY RATIO - UTILITY OPERATING COMPANIES [2]								
Company Name	Ticker	2018Q4	2018Q3	2018Q2	2018Q1	2017Q4	2017Q3	2017Q2	2017Q1	Average
ALLETE (Minnesota Power)	ALE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Superior Water, Light and Power Company	ALE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Interstate Power and Light Company	LNT	3.38%	3.37%	3.66%	3.81%	3.85%	4.07%	4.15%	4.27%	3.82%
Wisconsin Power and Light Company	LNT	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Central Maine Power Company	AGR	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
New York State Electric & Gas Corporation	AGR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rochester Gas and Electric Corporation	AGR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
United Illuminating Company	AGR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cleveland Electric Illuminating Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Jersey Central Power & Light Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Metropolitan Edison Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Monongahela Power Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ohio Edison Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Pennsylvania Electric Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Pennsylvania Power Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Potomac Edison Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Toledo Edison Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
West Penn Power Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hawaiian Electric Company, Inc.	HE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
NorthWestern Corporation	NWE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Portland General Electric Company	POR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Kentucky Utilities Company	PPL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Louisville Gas and Electric Company	PPL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PPL Electric Utilities Corporation	PPL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Notes:

[1] Ratios are weighted by actual common capital, preferred capital, long-term debt and short-term debt of Operating Subsidiaries.

[2] Natural Gas and Electric Operating Subsidiaries with data listed as N/A from SNL Financial have been excluded from the analysis.

CAPITAL STRUCTURE ANALYSIS

		SHORT-TERM DEBT RATIO [1]								
Combined Utility Proxy Group Company	Ticker	2018Q4	2018Q3	2018Q2	2018Q1	2017Q4	2017Q3	2017Q2	2017Q1	Average
ALLETE, Inc.	ALE	0.05%	0.00%	0.00%	0.11%	0.20%	0.24%	0.21%	0.13%	0.12%
Alliant Energy Corporation	LNT	1.61%	0.45%	0.35%	0.41%	0.35%	2.73%	2.59%	1.30%	1.23%
Avangrid, Inc.	AGR	0.42%	2.26%	3.62%	5.01%	4.85%	2.61%	1.77%	4.49%	3.13%
FirstEnergy Corporation	FE	2.52%	2.11%	3.40%	3.02%	0.28%	0.77%	2.88%	3.04%	2.25%
Hawaiian Electric Industries, Inc.	HE	0.73%	2.50%	2.69%	3.65%	0.16%	0.19%	1.39%	0.05%	1.42%
NorthWestern Corporation	NWE	0.00%	0.00%	0.00%	0.00%	8.14%	7.09%	7.95%	6.11%	3.66%
Portland General Electric Company	POR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PPL Corporation	PPL	2.86%	1.71%	1.79%	2.53%	1.48%	1.22%	1.49%	4.41%	2.19%
MEAN		1.02%	1.13%	1.48%	1.84%	1.93%	1.86%	2.29%	2.44%	1.75%
LOW		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
HIGH		2.86%	2.50%	3.62%	5.01%	8.14%	7.09%	7.95%	6.11%	3.66%

		SHORT-TERM DEBT RATIO - UTILITY OPERATING COMPANIES [2]								
Company Name	Ticker	2018Q4	2018Q3	2018Q2	2018Q1	2017Q4	2017Q3	2017Q2	2017Q1	Average
ALLETE (Minnesota Power)	ALE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Superior Water, Light and Power Company	ALE	1.93%	0.00%	0.00%	4.74%	8.18%	10.43%	9.37%	5.88%	5.07%
Interstate Power and Light Company	LNT	0.85%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.20%	0.14%
Wisconsin Power and Light Company	LNT	2.67%	1.10%	0.83%	0.96%	0.82%	6.22%	6.00%	2.77%	2.67%
Central Maine Power Company	AGR	0.00%	2.08%	1.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%
New York State Electric & Gas Corporation	AGR	1.49%	0.50%	3.53%	11.80%	10.90%	3.12%	0.53%	2.65%	4.31%
Rochester Gas and Electric Corporation	AGR	0.00%	0.00%	-0.02%	0.00%	0.00%	0.00%	0.00%	17.06%	2.13%
United Illuminating Company	AGR	0.00%	7.44%	10.09%	8.56%	9.20%	8.69%	8.04%	1.64%	6.71%
Cleveland Electric Illuminating Company	FE	0.44%	0.00%	0.06%	0.06%	0.06%	3.94%	4.17%	0.06%	1.10%
Jersey Central Power & Light Company	FE	2.75%	4.22%	5.67%	5.30%	0.00%	0.00%	3.15%	1.14%	2.78%
Metropolitan Edison Company	FE	4.69%	3.43%	5.03%	5.66%	0.00%	0.58%	2.75%	3.61%	3.22%
Monongahela Power Company	FE	4.47%	0.00%	3.95%	0.00%	0.00%	0.00%	2.10%	11.62%	2.77%
Ohio Edison Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Pennsylvania Electric Company	FE	2.01%	2.41%	2.10%	3.12%	0.96%	0.00%	2.08%	1.79%	1.81%
Pennsylvania Power Company	FE	0.00%	2.16%	3.68%	6.22%	2.62%	0.00%	3.00%	2.42%	2.51%
Potomac Edison Company	FE	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Toledo Edison Company	FE	0.06%	0.00%	2.47%	2.58%	2.61%	4.01%	2.52%	2.45%	2.09%
West Penn Power Company	FE	7.02%	5.66%	7.83%	7.72%	0.00%	0.00%	7.94%	7.41%	5.45%
Hawaiian Electric Company, Inc.	HE	0.73%	2.50%	2.69%	3.65%	0.16%	0.19%	1.39%	0.05%	1.42%
NorthWestern Corporation	NWE	0.00%	0.00%	0.00%	0.00%	8.14%	7.09%	7.95%	6.11%	3.66%
Portland General Electric Company	POR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Kentucky Utilities Company	PPL	4.35%	2.42%	2.53%	1.51%	0.88%	0.00%	0.89%	0.63%	1.65%
Louisville Gas and Electric Company	PPL	6.35%	4.14%	4.33%	3.31%	4.90%	5.08%	4.84%	4.84%	4.72%
PPL Electric Utilities Corporation	PPL	0.00%	0.00%	0.00%	2.80%	0.00%	0.00%	0.00%	7.29%	1.26%

Notes:

[1] Ratios are weighted by actual common capital, preferred capital, long-term debt and short-term debt of Operating Subsidiaries.

[2] Natural Gas and Electric Operating Subsidiaries with data listed as N/A from SNL Financial have been excluded from the analysis.