

**BEFORE THE**  
**NORTH CAROLINA UTILITIES COMMISSION**

**REBUTTAL TESTIMONY**

**OF**

**DYLAN W. D'ASCENDIS, CRRA, CVA**

**ON BEHALF OF**

**PIEDMONT NATURAL GAS COMPANY, INC.**

**Docket No. G-9, Sub 781**

August 25, 2021

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**I. INTRODUCTION, PURPOSE, AND SUMMARY**

**Q. PLEASE STATE YOUR NAME, AFFILIATION, AND BUSINESS ADDRESS.**

A. My name is Dylan W. D'Ascendis. I am employed by ScottMadden, Inc. as Partner. My business address is 3000 Atrium Way, Suite 241, Mount Laurel, NJ 08054.

**Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS TESTIMONY?**

A. I am submitting this rebuttal testimony (referred to throughout as my "Rebuttal Testimony") before the North Carolina Utilities Commission ("Commission") on behalf of Piedmont Natural Gas Company, Inc. ("Piedmont" or the "Company").

**Q. DID YOU FILE DIRECT TESTIMONY IN THIS PROCEEDING?**

A. Yes, I did.

**Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

A. The purpose of my Rebuttal Testimony is two-fold. First, given the passage of time since my Direct Testimony,<sup>1</sup> I update my cost of common equity ("ROE") analyses to reflect current data. Second, I respond to the direct testimonies of Mr. John R. Hinton, who testifies on behalf of the Public Staff – North Carolina Utilities Commission ("Public Staff"), Mr. Kevin W. O'Donnell, who testifies on behalf of Carolina Utility Customers Association ("CUCA"), and Mr. Nicholas Phillips, Jr., who testifies on behalf of Carolina Industrial Group for Fair Utility Rates IV ("CIGFUR") (collectively, "the Opposing Witnesses") as they relate to the Company's ROE on its North Carolina jurisdictional rate base.

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<sup>1</sup> My Direct Testimony used market data as of January 29, 2021.

1    **Q.    PLEASE SUMMARIZE YOUR CONCLUSIONS.**

2    A.    Due to the passage of time since the analysis in my Direct Testimony, I have updated my  
3       ROE analyses as of July 30, 2021. Based on these updated analyses, my range of  
4       reasonable ROEs attributable to Piedmont is between 9.59% and 12.72% (unadjusted) and  
5       9.70% to 12.83% (adjusted). Therefore, my specific ROE recommendation of 10.25% for  
6       Piedmont in this case continues to be reasonable, if not conservative. In view of current  
7       markets and the updated results of my ROE models, ROEs of 9.42% (Staff) and 9.00%  
8       (CUCA) are insufficient at this time.<sup>2</sup>

9    **Q.    DO YOU HAVE GENERAL COMMENTS REGARDING MR. HINTON'S AND**  
10   **MR. O'DONNELL'S RECOMMENDED ROES?**

11   A.    Yes, I do. Mr. Hinton's and Mr. O'Donnell's recommended ROEs are insufficient, in part,  
12       due to their substantial<sup>3</sup> (Hinton) and exclusive (O'Donnell) reliance on the discounted  
13       cash flow ("DCF") model results which tend to understate Piedmont's return requirement  
14       in the current market. There is both academic and practical support for the use of multiple  
15       models in an ROE analysis, which will be explained in detail below.

16   **Q.    HAVE YOU PREPARED EXHIBITS IN SUPPORT OF YOUR**  
17   **RECOMMENDATION?**

18   A.    Yes. I have prepared Exhibit DWD-1R through DWD-14R, which were prepared by me  
19       or under my direction.

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<sup>2</sup> While Mr. Phillips recommends that the Commission should not approve an ROE greater than 9.56% in this proceeding, he does not provide an independent analysis of the Company's cost of common equity. Given the evidence in this proceeding, Mr. Phillips' recommendation of an ROE no higher than 9.56% is also insufficient at this time.

<sup>3</sup> Mr. Hinton gives three-quarters weight to his DCF model results and one-quarter weight to his RPM results as will be discussed below.

1 **Q. HOW IS THE REMAINDER OF YOUR REBUTTAL TESTIMONY**  
2 **ORGANIZED?**

3 A. The remainder of my Rebuttal Testimony is organized as follows:

- 4 • Section II – Provides my updated analyses;
- 5 • Section III – Discusses the undue weighting of DCF model results by Mr. Hinton
- 6 and Mr. O'Donnell;
- 7 • Section IV – Contains my response to Mr. Hinton;
- 8 • Section V – Contains my response to Mr. O'Donnell;
- 9 • Section VI – Contains my response to Mr. Phillips; and
- 10 • Section VII – Summarizes my conclusions and recommendations.

11 **Q. PLEASE SUMMARIZE THE KEY ISSUES AND RECOMMENDATIONS**  
12 **OFFERED BY OPPOSING WITNESSES THAT YOU ADDRESS IN YOUR**  
13 **REBUTTAL TESTIMONY.**

14 A. My Rebuttal Testimony responds to substantive recommendations offered by the Opposing  
15 Witnesses in their direct testimonies. I will address the following issues common to Mr.  
16 Hinton's and Mr. O'Donnell's direct testimonies:

- 17 • Their selection of their proxy group companies;
- 18 • Their undue weighting of DCF model results in their ROE recommendations;
- 19 • Their choice of growth rates in their DCF models;
- 20 • Their application of the comparable earnings model ("CEM"); and
- 21 • Their failure to reflect flotation costs.

1 Specific to Mr. Hinton's direct testimony, I will address the following:

- 2 • His application of the risk premium model ("RPM");
- 3 • His opinion that mechanisms in place for the Company reduce risk; and
- 4 • His use of interest coverage ratios to justify his recommended ROE.

5 Specific to Mr. O'Donnell's direct testimony, I will address the following:

- 6 • His interpretation of capital market conditions;
- 7 • His use of the plowback ratio in his DCF model; and
- 8 • His application of the Capital Asset Pricing Model ("CAPM").

9 These factors serve to bias Mr. Hinton's and Mr. O'Donnell's ROE  
10 recommendations downward. My Rebuttal Testimony addresses these factors in detail, as  
11 well as other issues specific to each witness, and addresses the unfounded critiques of my  
12 Direct Testimony by the Opposing Witnesses.

13 **II. UPDATED ANALYSES**

14 **Q. HAVE YOU UPDATED YOUR COST OF COMMON EQUITY ANALYSES FOR**  
15 **YOUR REBUTTAL TESTIMONY?**

16 A. Yes, I have. Due to the passage of time since my Direct Testimony analysis (data as of  
17 January 29, 2021), I have updated my analysis using data as of July 30, 2021.

18 **Q. HAVE YOU UPDATED YOUR UTILITY PROXY GROUP FOR YOUR UPDATED**  
19 **ANALYSES?**

20 A. Yes, I have. Using fiscal year 2020 data, NiSource Inc. fails the criteria of having at least  
21 60% of net operating income and assets attributable to natural gas distribution operations.  
22 As such, I have eliminated them from my updated Utility Proxy Group.

1 Q. HAVE YOU APPLIED ANY OF YOUR ROE MODELS DIFFERENTLY IN YOUR  
2 UPDATED ANALYSES?

3 A. No, I have not.

4 Q. WHAT ARE THE RESULTS OF YOUR UPDATED ANALYSES?

5 A. Using data available as of July 30, 2021, my updated results are presented in page 1 of  
6 Exhibit DWD-1R and in Table 1, below.

7 **Table 1: Updated Cost of Common Equity Results**

Discounted Cash Flow Model	9.59%
Risk Premium Model	10.71%
Capital Asset Pricing Model	12.02%
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	<u>12.72%</u>
Indicated Range	9.59% - 12.72%
Size Adjustment	0.00%
Flotation Cost Adjustment	<u>0.11%</u>
Recommended Range	9.70% - 12.83%
Recommended Cost of Common Equity	<u>10.25%</u>

8  
9 In view of the unadjusted and adjusted ranges of ROE, I maintain my original ROE  
10 recommendation of 10.25%. Upon reviewing my updated results, two items became  
11 apparent: (1) the indicated results of my ROE models have generally increased from my  
12 analyses presented in my Direct Testimony, which is a directional indicator that the  
13 investor-required return has increased since my Direct Testimony, and (2) since my

recommended ROE of 10.25% is in the bottom half of my ranges of ROEs, it is a conservative measure of the Company's ROE at this time.

**III. UNDUE WEIGHTING OF DCF MODEL RESULTS**

**Q. DO YOU HAVE A GENERAL COMMENT REGARDING MR. HINTON'S AND MR. O'DONNELL'S ROE RECOMMENDATIONS?**

A. Yes, I do. As mentioned previously, Mr. Hinton's and Mr. O'Donnell's recommended ROEs of 9.42% and 9.00% are inadequate, in part, because they place undue weight on their DCF model results, which tend to mis-specify the investor-required return when market-to-book ("M/B") ratios are not at unity (*i.e.*, 1.0).

**Q. DO THE OPPOSING WITNESSES RELY PRIMARILY ON THE DCF MODEL TO ARRIVE AT THEIR ROE RECOMMENDATION FOR THE COMPANY?**

A. Yes, they do. Mr. Hinton's ROE recommendation of 9.42% is based on the average of four model results, three of which are his DCF results.<sup>4</sup> Mr. O'Donnell's ROE recommendation of 9.00%<sup>5</sup> is based on the upper end of his DCF model results as he believes that the DCF model is superior to all other ROE models.<sup>6</sup> As discussed in my Direct Testimony,<sup>7</sup> the use of multiple models adds reliability to the estimation of the common equity cost rate, and the prudence of using multiple cost of common equity models is supported in both the financial literature and regulatory precedent.

**Q. CAN YOU PLEASE PROVIDE SOME EXAMPLES FROM THE FINANCIAL LITERATURE WHICH SUPPORT THE USE OF MULTIPLE COST OF**

<sup>4</sup> Hinton Direct Testimony, at 38.

<sup>5</sup> O'Donnell Direct Testimony, at 4.

<sup>6</sup> *Ibid.*, at 41.

<sup>7</sup> D'Ascendis Direct Testimony, at 17.



1       **COMMON EQUITY MODELS IN DETERMINING THE INVESTOR-REQUIRED**  
2       **RETURN?**

3       A.     Yes. In one example, Morin states:

4               Each methodology requires the exercise of considerable judgment on the  
5               reasonableness of the assumptions underlying the methodology and on the  
6               reasonableness of the proxies used to validate a theory. The inability of the  
7               DCF model to account for changes in relative market valuation, discussed  
8               below, is a vivid example of the potential shortcomings of the DCF model  
9               when applied to a given company. Similarly, the inability of the CAPM to  
10              account for variables that affect security returns other than beta tarnishes its  
11              use.

12             **No one individual method provides the necessary level of precision for**  
13             **determining a fair return, but each method provides useful evidence to**  
14             **facilitate the exercise of an informed judgment.** Reliance on any single  
15             method or preset formula is inappropriate when dealing with investor  
16             expectations because of possible measurement difficulties and vagaries in  
17             individual companies' market data. (emphasis added)

18                               \* \* \*

19             The financial literature supports the use of multiple methods. Professor  
20             Eugene Brigham, a widely respected scholar and finance academician,  
21             asserts (footnote omitted):

22             Three methods typically are used: (1) the Capital Asset Pricing Model  
23             (CAPM), (2) the discounted cash flow (DCF) method, and (3) the bond-  
24             yield-plus-risk-premium approach. **These methods are not mutually**  
25             **exclusive – no method dominates the others**, and all are subject to error  
26             when used in practice. Therefore, when faced with the task of estimating a  
27             company's cost of equity, we generally use all three methods and then  
28             choose among them on the basis of our confidence in the data used for each  
29             in the specific case at hand. (emphasis added)

30             Another prominent finance scholar, Professor Stewart Myers, in an early pioneering  
31             article on regulatory finance, stated<sup>(footnote omitted)</sup>:

32             Use more than one model when you can. Because estimating the  
33             opportunity cost of capital is difficult, **only a fool throws away useful**  
34             **information.** That means you should not use any one model or measure  
35             mechanically and exclusively. Beta is helpful as one tool in a kit, to be used

1 in parallel with DCF models or other techniques for interpreting capital  
2 market data. (emphasis added)

3 Reliance on multiple tests recognizes that no single methodology produces  
4 a precise definitive estimate of the cost of equity. As stated in Bonbright,  
5 Danielsen, and Kamerschen (1988), 'no single or group test or technique is  
6 conclusive.' Only a fool discards relevant evidence. (italics in original)  
7 (emphasis added)

8 \* \* \*

9 While it is certainly appropriate to use the DCF methodology to estimate  
10 the cost of equity, there is no proof that the DCF produces a more accurate  
11 estimate of the cost of equity than other methodologies. Sole reliance on  
12 the DCF model ignores the capital market evidence and financial theory  
13 formalized in the CAPM and other risk premium methods. **The DCF model**  
14 **is one of many tools to be employed in conjunction with other methods**  
15 **to estimate the cost of equity.** It is not a superior methodology that  
16 supplants other financial theory and market evidence. The broad usage of  
17 the DCF methodology in regulatory proceedings in contrast to its virtual  
18 disappearance in academic textbooks does not make it superior to other  
19 methods. The same is true of the Risk Premium and CAPM methodologies.  
20 (emphasis added)<sup>8</sup>

21 Finally, Brigham and Gapenski note:

22 In practical work, *it is often best to use all three methods* – CAPM, bond  
23 yield plus risk premium, and DCF – and then apply judgment when the  
24 methods produce different results. People experienced in estimating equity  
25 capital costs recognize that both careful analysis and some very fine  
26 judgments are required. It would be nice to pretend that these judgments  
27 are unnecessary and to specify an easy, precise way of determining the exact  
28 cost of equity capital. Unfortunately, this is not possible. Finance is in large  
29 part a matter of judgment, and we simply must face this fact. (italics in  
30 original)<sup>9</sup>

31 In the academic literature cited above, three methods are consistently mentioned:

32 the DCF, CAPM, and the RPM, all of which I used in my analyses.

<sup>8</sup> Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, at 428-431. ("Morin")

<sup>9</sup> Eugene F. Brigham and Louis C. Gapenski, Financial Management – Theory and Practice, 4th Ed. (The Dryden Press, 1985) at 256.

1    **Q.    CAN YOU ALSO PROVIDE SPECIFIC EXAMPLES WHERE THIS**  
2            **COMMISSION HAS CONSIDERED MULTIPLE COST OF COMMON EQUITY**  
3            **MODELS?**

4    **A.**    Yes. The Commission in Docket W-354, Sub 360, concerning Carolina Water Service of  
5            North Carolina, stated:

6            The average of witness D'Ascendis' utility proxy group DCF result of  
7            9.15%, traditional CAPM result of 10.67%, total market RPM of 10.56%,  
8            witness Hinton's DCF result of 8.70% and RPM of 9.70% is 9.75%. The  
9            Commission approved return on equity of 9.75% is thus supported by the  
10           average of the results of the above listed cost of equity models which the  
11           Commission finds are entitled to substantial weight based on the record in  
12           this proceeding.

13           Also, in Docket E-2, Sub 1142, concerning Duke Energy Progress, LLC, the  
14           Commission stated:

15           Thus, the Commission finds and concludes that the Stipulation, along with  
16           the expert testimony of witnesses Hevert (risk premium analysis),  
17           O'Donnell (comparable earnings), and Parcell (comparable earnings), are  
18           credible and substantial evidence of the appropriate rate of return on equity  
19           and are entitled to substantial weight in the Commission's determination of  
20           this issue.

21           In the Commission Orders cited above, there is clear language that the Commission  
22           considers multiple models in its determination of ROE. It is also my interpretation of these  
23           Orders that the Commission correctly observes capital market conditions and their effect  
24           on the model results in determining a ROE for utility companies. This, in addition to the  
25           academic literature cited above, justifies the use of the DCF, CAPM, RPM, and CEM in  
26           this proceeding.

1 **Q. WHY IS IT YOUR OPINION THAT THE DCF MODEL MIS-SPECIFIES**  
2 **INVESTOR-REQUIRED RETURN WHEN M/B RATIOS ARE NOT AT UNITY?**

3 A. Traditional rate base/rate of return regulation, where a market-based common equity cost  
4 rate is applied to a book value rate base, presumes that M/B ratios are at unity or 1.00.

5 However, that is rarely the case. Morin states:

6 The third and perhaps most important reason for caution and skepticism is  
7 that application of the DCF model produces estimates of common equity  
8 cost that are consistent with investors' expected return only when stock  
9 price and book value are reasonably similar, that is, when the M/B is close  
10 to unity. As shown below, application of the standard DCF model to utility  
11 stocks understates the investor's expected return when the market-to-book  
12 (M/B) ratio of a given stock exceeds unity. This was particularly relevant  
13 in the capital market environment of the 1990s and 2000s where utility  
14 stocks were trading at M/B ratios well above unity and have been for nearly  
15 two decades. The converse is also true, that is, the DCF model overstates  
16 that investor's return when the stock's M/B ratio is less than unity. The  
17 reason for the distortion is that the DCF market return is applied to a book  
18 value rate base by the regulator, that is, a utility's earnings are limited to  
19 earnings on a book value rate base.<sup>10</sup>

20 As Morin explains, a "simplified" DCF model, like that used by Mr. Hinton and  
21 Mr. O'Donnell, assumes an M/B ratio of 1.0 and therefore under- or over-states investors'  
22 required return when market value exceeds or is less than book value, respectively. It does  
23 so because equity investors evaluate and receive their returns on the market value of a  
24 utility's common equity, whereas regulators authorize returns on the book value of that  
25 common equity. This means that the market-based DCF will produce the total annual  
26 dollar return expected by investors only when market and book values of common equity  
27 are equal, a very rare and unlikely situation.

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<sup>10</sup> Morin, at 434.

1 **Q. WHY DO MARKET AND BOOK VALUES DIVERGE?**

2 A. Market values can diverge from book values for a myriad of reasons including, but not  
3 limited to, EPS and DPS expectations, merger/acquisition expectations, interest rates, etc.

4 As noted by Phillips:

5 Many question the assumption that market price should equal book value,  
6 believing that 'the earnings of utilities should be sufficiently high to achieve  
7 market-to-book ratios which are consistent with those prevailing for stocks  
8 of unregulated companies.<sup>11</sup>

9 In addition, Bonbright states:

10 In the first place, commissions cannot forecast, except within wide limits,  
11 the effect their rate orders will have on the market prices of the stocks of  
12 the companies they regulate. In the second place, *whatever the initial*  
13 *market prices may be, they are sure to change not only with the changing*  
14 *prospects for earnings, but with the changing outlook of an inherently*  
15 *volatile stock market.* In short, market prices are beyond the control, though  
16 not beyond the influence of rate regulation. Moreover, even if a  
17 commission did possess the power of control, any attempt to exercise it ...  
18 would result in harmful, uneconomic shifts in public utility rate levels.  
19 (italics added)<sup>12</sup>

20 **Q. CAN THE UNDER- OR OVER-STATEMENT OF INVESTORS' REQUIRED**  
21 **RETURN BY THE DCF MODEL BE DEMONSTRATED MATHEMATICALLY?**

22 A. Yes, it can. Schedule DWD-2R demonstrates how market-based DCF cost rates of 9.39%<sup>13</sup>  
23 and 9.00%<sup>14</sup>, when applied to a book value substantially below market value, will understate  
24 the investors' required return on market value. In this situation, there is no realistic  
25 opportunity for the utility to earn the expected market-based rate of return on book value. In  
26 Column [A], investors expect a 9.39% return on an average market price of \$62.90 for Mr.

<sup>11</sup> Charles F. Phillips, The Regulation of Public Utilities, Public Utilities Reports, Inc., 1993, p. 395.

<sup>12</sup> James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates  
(Public Utilities Reports, Inc., 1988), p. 334.

<sup>13</sup> The average of Mr. Hinton's three DCF cost rates, calculated from Public Staff Hinton Exhibit 9.

<sup>14</sup> O'Donnell Direct Testimony, at 55.

1 Hinton's proxy group companies. Column [B] shows that when Mr. Hinton's 9.39% return  
2 rate is applied to a book value of \$31.70,<sup>15</sup> the total annual return opportunity is \$2.977.  
3 After subtracting dividends of \$2.013, the investor only has the opportunity for \$0.964 in  
4 market appreciation, or 1.53%. The magnitude of the understatement of investors' required  
5 return on market value using Mr. Hinton's 9.39% cost rate is 4.66%, which is calculated by  
6 subtracting the market appreciation based on book value of 1.53% from Mr. Hinton's  
7 expected growth rate of 6.19%. Schedule DWD-2R also shows that the understatement of  
8 investors' required return on market value using Mr. O'Donnell's 9.00% cost rate is 4.36%.  
9 In order to synchronize investor expectations with a book value return calculation, premiums  
10 of 466 and 436 basis points would need to be added to the results of Mr. Hinton's and Mr.  
11 O'Donnell's DCF analyses, as is discussed below.

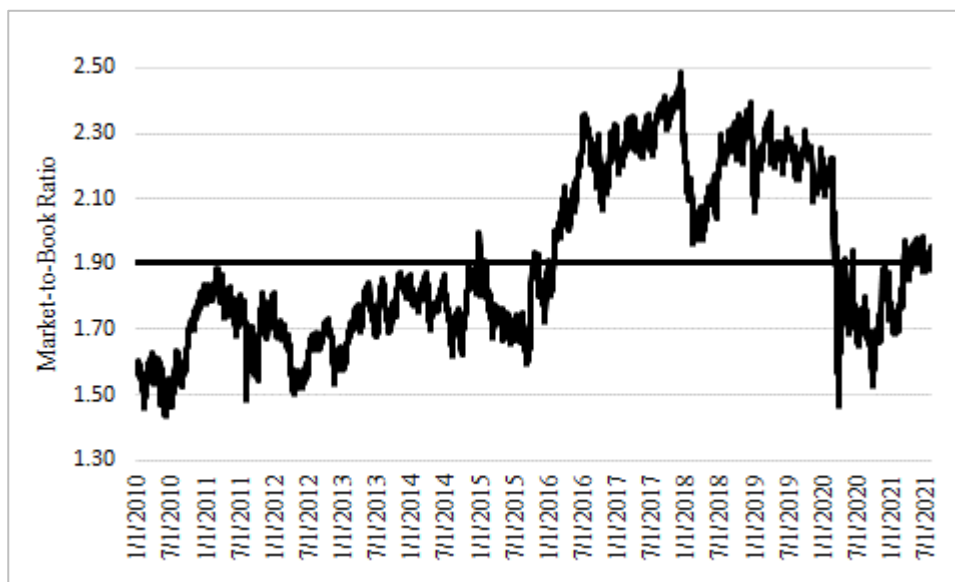
12 **Q. HOW DO THE M/B RATIOS OF THE COMBINED PROXY GROUP COMPARE**  
13 **TO THEIR TEN-YEAR AVERAGE?**

14 A. The M/B ratio of the combined proxy group (*i.e.*, all companies used by all witnesses) is  
15 currently close to its ten-year average of approximately 1.97 times.

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<sup>15</sup> Representing a market-to-book ratio of 198.27%.

**Chart 1: M/B Ratios Compared with Ten-Year Average<sup>16</sup>**



The significance of this is that the ten-year average M/B ratio of the combined proxy group has always been greater than 1.0x, which means that DCF model results have consistently understated the investor-required return during that period.

**Q. HOW CAN THE INACCURACY OR MIS-SPECIFICATION OF THE DCF MODEL BE QUANTIFIED WHEN THE M/B RATIOS ARE DIFFERENT THAN UNITY?**

A. The inaccuracy of the DCF model, when market values diverge from book values, can be measured by first calculating the market value of each proxy company's capital structure, which consists of the market value of the company's common equity (shares outstanding multiplied by price) and the fair value of the company's long-term debt and preferred stock. All of these measures, except for price, are available in each company's SEC Form 10-K.

<sup>16</sup> Source: Bloomberg Financial Services.

Second, one must de-leverage the implied cost of common equity based on the DCF. This is accomplished using the Modigliani / Miller equation<sup>17</sup> as illustrated in Schedule DWD-3R and shown below:

$$k_u = k_e - (((k_u - i)(1 - t)) D/E) - (k_u - d) P/E \text{ [Equation 1]}$$

Where:

$k_u$	=	Unlevered (i.e., 100% equity) cost of common equity;
$k_e$	=	Market determined cost of common equity;
$i$	=	Cost of debt;
$t$	=	Income tax rate;
$D$	=	Debt ratio;
$E$	=	Equity ratio;
$d$	=	Cost of preferred stock; and
$P$	=	Preferred equity ratio.

Using Mr. Hinton's proxy group-specific data, the equation becomes:

$$k_u = 9.39\% - (((k_u - 4.08\%)(1 - 21\%)) 41.91\% / 57.72\%) - (k_u - 5.90\%) 0.37\% / 57.72\%$$

Solving for  $k_u$  results in an unlevered cost of common equity of 7.45%.

Next, one must re-leverage those costs of common equity by relating them to each proxy group's average book capital structure as shown below:

$$k_e = k_u + (((k_u - i)(1 - t)) D/E) + (k_u - d) P/E \text{ [Equation 2]}$$

Once again, using average proxy group-specific data, the equation becomes:

$$k_e = 7.45\% + (((7.45\% - 4.08\%)(1 - 21\%)) 50.39\% / 49.17\%) + (7.45\% - 5.90\%) 0.44\% / 49.17\%$$

Solving for  $k_e$  results in a 10.19% indicated cost of common equity relative to the book capital structure of the proxy group, which is an increase of 80 basis points over Mr.

<sup>17</sup> The Modigliani / Miller theorem is an influential element of economic theory and forms the basis for modern theory on capital structure. See, F. Modigliani and M. Miller, *The Cost of Capital, Corporation Finance and the Theory of Investment*, The American Economic Review, Vol. 48, No. 3, (June 1958), at 261-297.



1 Hinton's average indicated DCF result of 9.39%. Schedule DWD-3R also shows that for  
2 Mr. O'Donnell's proxy group, solving for ke results in a 9.72% indicated cost of common  
3 equity relative to the book capital structure of his proxy group, an increase of 72 basis  
4 points over his average indicated DCF result of 9.00%

5 **Q. ARE YOU ADVOCATING A SPECIFIC ADJUSTMENT TO THE DCF RESULTS**  
6 **TO CORRECT FOR ITS MIS-SPECIFICATION OF THE INVESTOR-**  
7 **REQUIRED RETURN?**

8 A. No. The purpose of this discussion is to demonstrate that, like all cost of common equity  
9 models, the DCF has its limitations. The use of multiple cost of common equity models, in  
10 conjunction with informed expert judgment, provides a clearer picture of the investor-  
11 required ROE.

12 **IV. RESPONSE TO PUBLIC STAFF WITNESS HINTON**

13 **Q. PLEASE SUMMARIZE MR. HINTON'S RECOMMENDATIONS.**

14 A. Mr. Hinton recommends that the Commission establish an overall rate of return of 6.75%,  
15 based on a capital structure consisting of 48.80% long-term debt at an embedded cost rate  
16 of 4.08%, 0.67% short-term debt at an embedded cost rate of 0.20%, and 50.53% common  
17 equity at his recommended cost of common equity of 9.42%.<sup>18</sup> Mr. Hinton's ROE  
18 recommendation of 9.42% is based on the average of his three DCF results (ranging from  
19 9.10% to 9.73%) and RPM (9.50%) result.<sup>19</sup>

<sup>18</sup> Hinton Direct Testimony, at 49.

<sup>19</sup> *Ibid.*, at 38.

1 Q. DO YOU HAVE ANY GENERAL COMMENTS ON MR. HINTON'S  
2 RECOMMENDED ROE?

3 A. Yes. Mr. Hinton relies exclusively on two models, the DCF and the RPM, in his ROE  
4 analysis, using the CEM only as a check on his recommended ROE.<sup>20</sup> In Docket Nos. W-  
5 354, Subs 363, 364, and 365, Mr. Hinton also employed the CAPM, albeit as a check, in  
6 his ROE analysis.<sup>21</sup> As discussed previously, the use of multiple models adds reliability  
7 to the estimation of the common equity cost rate.

8 Q. WHAT ARE THE AREAS OF DISAGREEMENT BETWEEN YOU AND MR.  
9 HINTON?

10 A. While both Mr. Hinton and I rely on the DCF model and RPM in our analyses, there are  
11 several areas in which we disagree. As will be discussed below, in addition to disagreeing  
12 with the weight given to his DCF model results, I also do not agree with (1) his proxy  
13 group; (2) his use of growth rates other than projected growth in earnings per share ("EPS")  
14 in his application of the DCF model; (3) certain inputs used in his RPM; (4) certain  
15 assumptions and inputs in his CEM; and (5) his failure to reflect flotation costs.

16 A. Proxy Group Selection

17 Q. PLEASE DESCRIBE THE SCREENING CRITERIA BY WHICH MR. HINTON  
18 DEVELOPED HIS PROXY GROUP.

19 A. Mr. Hinton started with the ten companies in the *Value Line* Natural Gas Company group.  
20 From that group Mr. Hinton eliminates NiSource Inc. because it cut its dividend in 2015.  
21 Mr. Hinton then identified two additional companies covered by *Value Line* that have

<sup>20</sup> Hinton Direct Testimony, at 28.

<sup>21</sup> Docket Nos. W-354, Subs 363, 364, and 365, Hinton Direct Testimony, at 33-34.

natural gas distribution operations, MDU Resources Group, Inc. and National Fuel Gas Company.<sup>22</sup>

**Q. DO YOU AGREE WITH MR. HINTON'S PROXY GROUP?**

A. No. Several of the companies Mr. Hinton decides to include in his proxy groups have operations in other areas than natural gas distribution services. This is illustrated in Table 2, below:

**Table 2: Percent of 2019 Net Operating Income and Assets Attributable to Gas Distribution Operations of Mr. Hinton's Proxy Group**<sup>23</sup>

	<b>Net Oper. Income</b>	<b>Total Assets</b>
Atmos Energy Corporation	63.02%	79.32%
<b>Chesapeake Utilities Corporation</b>	<b>38.57%</b>	<b>39.82%</b>
<b>MDU Resources Group, Inc.</b>	<b>14.38%</b>	<b>33.51%</b>
<b>National Fuel Gas Company</b>	<b>20.00%</b>	<b>30.82%</b>
New Jersey Resources Corporation	87.58%	70.07%
Northwest Natural Holding Company	94.73%	95.91%
ONE Gas, Inc.	100.00%	100.00%
South Jersey Industries	98.14%	87.03%
Southwest Gas Holdings, Inc.	79.90%	83.22%
Spire, Inc.	97.06%	67.72%
<b>UGI Corporation</b>	<b>34.57%</b>	<b>25.98%</b>

This table shows that the four companies included in Mr. Hinton's proxy group, Chesapeake Utilities, MDU Resources Group, Inc., National Fuel Gas Company and UGI Corp. are not valid comparators to Piedmont at this time and should be eliminated.

<sup>22</sup> Hinton Direct Testimony, at 30.

<sup>23</sup> SEC Form 10-K.

1        **B.     Discounted Cash Flow Model**

2        **Q.     PLEASE SUMMARIZE MR. HINTON'S DCF ANALYSIS.**

3        A.     Mr. Hinton calculated his dividend yield by using the *Value Line* estimate of the 12-month  
4        projected dividend yield for each of his proxy companies as reported in the *Value Line*  
5        Summary and Index for 13 weeks ended July 23, 2021.<sup>24</sup> He then added the average  
6        expected dividend yield of 3.2% to a range of growth rates from 4.8% to 7.8% to arrive at  
7        indicated DCF cost rates from 8.0% to 11.0%.<sup>25</sup> From these indicated DCF cost rates, he  
8        averaged all of them together for his historical & forecasted growth rate DCF cost rate of  
9        9.35%, averaged all of his indicated DCF cost rates using projected measures of growth for  
10       his predicted growth rate DCF cost rate of 9.73%, and then averaged all of his indicated  
11       DCF cost rates using historical measures of growth for his historical growth rate DCF cost  
12       rate of 9.10%.<sup>26</sup>

13       **Q.     PLEASE COMMENT ON MR. HINTON'S GROWTH RATE ANALYSIS IN HIS**  
14       **APPLICATION OF THE DCF MODEL.**

15       A.     Mr. Hinton states on pages 32-33 of his direct testimony that he employed EPS, dividends  
16       per share ("DPS"), and book value of equity per share ("BVPS") growth rates as reported  
17       in *Value Line*, both five- and ten-year historical and forecasted, and the five-year projected  
18       EPS growth rate as reported by Yahoo! Finance. He includes both historical and forecasted  
19       growth rates, "because it is reasonable to expect that investors consider both sets of data in  
20       determining their expectations".

<sup>24</sup> Hinton Direct Testimony, at 32.

<sup>25</sup> *Ibid.*, Hinton Exhibit 6.

<sup>26</sup> *Ibid.*, Hinton Exhibit 9.

1 As will be discussed below, there is a significant body of empirical evidence  
2 supporting the superiority of analysts' EPS growth rates in a DCF analysis, indicating that  
3 analysts' forecasts of earnings remain the best predictor of growth to use in the DCF model.  
4 Such ample evidence of the proven reliability and superiority of analysts' forecasts of EPS  
5 should not be dismissed by Mr. Hinton.

6 **Q. PLEASE DESCRIBE SOME OF THE EVIDENCE SUPPORTING THE**  
7 **RELIABILITY AND SUPERIORITY OF ANALYSTS' EPS GROWTH RATES IN**  
8 **A DCF ANALYSIS.**

9 A. As discussed in my Direct Testimony,<sup>27</sup> over the long run there can be no growth in DPS  
10 without growth in EPS. Security analysts' earnings expectations have a more significant,  
11 but not the only, influence on market prices than dividend expectations. Thus, the use of  
12 projected EPS growth rates in a DCF analysis provides a better match between investors'  
13 market price appreciation expectations and the growth rate component of the DCF, because  
14 they have a significant influence on market prices and the appreciation or "growth"  
15 experienced by investors.<sup>28</sup> This should be evident even to relatively unsophisticated  
16 investors by listening to financial news reports on radio, TV, or reading newspapers.

17 In addition, Myron Gordon, the "father" of the standard regulatory version of the  
18 DCF model widely utilized throughout the United States in rate base/rate of return  
19 regulation, recognized the significance of analysts' forecasts of growth in EPS in a speech

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<sup>27</sup> D'Ascendis Direct Testimony, at 20.

<sup>28</sup> Morin, at 298-303.

1 he gave in March 1990 before the Institute for Quantitative Research and Finance<sup>29</sup>, stating  
2 on page 12:

3 We have seen that earnings and growth estimates by security analysts were  
4 found by Malkiel and Cragg to be superior to data obtained from financial  
5 statements for the explanation of variation in price among common  
6 stocks... estimates by security analysts available from sources such as IBES  
7 are far superior to the data available to Malkiel and Cragg.

8 \* \* \*

9 Eq (7) is not as elegant as Eq (4), but it has a good deal more intuitive  
10 appeal. It says that investors buy earnings, but what they will pay for a  
11 dollar of earnings increases with the extent to which the earnings are  
12 reflected in the dividend or in appreciation through growth.

13 Professor Gordon recognized that the total return is largely affected by the terminal  
14 price, which is mostly affected by earnings (hence price/earnings ("P/E") multiples).

15 Studies performed by Cragg and Malkiel<sup>30</sup> demonstrate that analysts' forecasts are  
16 superior to historical growth rate extrapolations. While some question the accuracy of  
17 analysts' forecasts of EPS growth, the level of accuracy of those analysts' forecasts well  
18 after the fact does not really matter. What is important is the forecasts reflect widely held  
19 expectations influencing investors at the time they make their pricing decisions, and hence,  
20 the market prices they pay.

21 In addition, Jeremy J. Siegel also supports the use of security analysts' EPS growth  
22 forecasts when he states:

23 For the equity holder, the source of future cash flows is the earnings of  
24 firms. (p. 90)

<sup>29</sup> Myron J. Gordon, *The Pricing of Common Stock*, Presented before the Spring 1990 Seminar, March 27, 1990 of the Institute for Quantitative Research in Finance, Palm Beach, FL.

<sup>30</sup> John G. Cragg and Burton G. Malkiel, Expectations and the Structure of Share Prices (University of Chicago Press, 1982) Chapter 4.

\* \* \*

Some people argue that shareholders most value stocks' cash dividends.  
But this is not necessarily true. (p. 91)

\* \* \*

Since the price of a stock depends primarily on the present discounted value  
of all expected future dividends, it appears that dividend policy is crucial to  
determining the value of the stock. However, this is not generally true. (p.  
92)

\* \* \*

Since stock prices are the present value of future dividends, it would seem  
natural to assume that economic growth would be an important factor  
influencing future dividends and hence stock prices. However, this is not  
necessarily so. The determinants of stock prices are earnings and dividends  
on a per-share basis. Although economic growth may influence aggregate  
earnings and dividends favorably, economic growth does not necessarily  
increase the growth of per-share earnings or dividends. It is earnings per  
share (EPS) that is important to Wall Street because per-share data, not  
aggregate earnings or dividends, are the basis of investor returns. (italics in  
original) (pp. 93-94)<sup>31</sup>

**Q. HAVE YOU CONSIDERED WHETHER ANALYSTS' EPS GROWTH RATE  
PROJECTIONS ARE CONSISTENT WITH MANAGEMENT GUIDANCE?**

A. Yes, I have. Based on data from Company investor presentations, ten of twelve of the  
combined proxy group companies currently issue long-term earnings growth guidance.  
Looking at the sources of growth rates used by Mr. Hinton and Mr. O'Donnell, of the 36  
growth rate estimates for companies that also issue earnings guidance, only seven exceeded  
the upper bound of management guidance. On the other hand, eight were below the

<sup>31</sup> Jeremy J. Siegel, Stocks for the Long Run – The Definitive Guide to Financial Market Returns and Long-Term Investment Strategies, McGraw-Hill 2002, pp. 90-94.

guidance range; the remaining observations were within the range. Put another way, the majority of analysts' projections were within or below management guidance.

**Table 3: EPS Growth Rates and Management Guidance**

Company		Guidance Range <sup>32</sup>		Projected EPS Growth Rate <sup>33</sup>			
		Lower	Upper	Yahoo!	Value Line	CFRA	Schwab
Atmos Energy	ATO	6.00	8.00	7.20	7.00	8.00	7.20
Chesapeake Utilities	CPK	7.75	9.50	4.70	8.50	3.60	-
MDU Resources Group Inc.	MDU	5.00	8.00	7.20	10.50	-	-
National Fuel Gas Company	NFG	-	-	8.50	19.00	-	-
New Jersey Resources	NJR	6.00	10.00	6.00	2.00	8.00	6.00
NiSource Inc	NI	7.00	9.00	-	9.50	5.00	3.50
Northwest Natural	NWN	3.00	5.00	3.80	5.50	4.00	3.80
ONE Gas Inc	OGS	5.00	7.00	5.00	6.50	5.00	5.00
South Jersey Ind	SJI	5.00	8.00	4.80	11.50	6.00	4.80
Southwest Gas	SWX	-	-	4.00	9.00	6.00	4.00
Spire Inc	SR	5.00	7.00	7.30	10.00	4.00	7.30
UGI Corp	UGI	6.00	10.00	7.70	6.00	8.00	7.70

I understand twelve companies constitute a relatively small sample for such an analysis. Nonetheless, the consistency between management guidance and analysts' projections suggests analysts' projected EPS growth rates are proper inputs to the DCF model.

<sup>32</sup> Source: Company investor presentations and Annual Reports.

<sup>33</sup> Source: Hinton Exhibit 6, Exhibit KWO-2.



1 **Q. IS THERE EMPIRICAL EVIDENCE THAT INVESTORS WOULD DISREGARD**  
2 **ANALYST ESTIMATES IN EPS GROWTH?**

3 A. No, there is not. The article, “Do Analyst Conflicts Matter? Evidence from Stock  
4 Recommendations,” examines whether conflicts of interest with investment banking [IB]  
5 and brokerage businesses induced sell-side analysts to issue optimistic stock  
6 recommendations and whether investors were misled by such biases. The authors  
7 conclude, “Overall, our findings do not support the view that conflicted analysts are able  
8 to systematically mislead investors with optimistic stock recommendations.”

9 Agrawal and Chen further state:

10 Overall, our empirical findings suggest that while analysts do respond to IB  
11 and brokerage conflicts by inflating their stock recommendations, the  
12 market discounts these recommendations after taking analysts’ conflicts  
13 into account. These findings are reminiscent of the story of the nail soup  
14 told by Brealey and Myers (1991), except that here analysts (rather than  
15 accountants) are the ones who put the nail in the soup and investors (rather  
16 than analysts) are the ones to take it out. Our finding that the market is not  
17 fooled by biases stemming from conflicts of interest echoes similar findings  
18 in the literature on conflicts of interest in universal banking (for example,  
19 Kroszner and Rajan, 1994, 1997; Gompers and Lerner 1999) and on bias in  
20 the financial media (for examples, Bhattacharya et al. forthcoming; Reuter  
21 and Zitzewitz 2006). Finally, while we cannot rule out the possibility that  
22 some investors may have been naïve, our findings do not support the notion  
23 that the marginal investor was systematically misled over the last decade by  
24 analysts’ recommendations.<sup>34</sup>

25 Finally, while Easton and Sommers’ article, “Effect of Analysts’ Optimism on  
26 Estimates of the Expected Rate of Return Implied by Earnings Forecasts” does state that  
27 on average, the difference between the estimate of the expected rate of return based on  
28 analysts’ earnings forecasts and the estimates based on current earnings realizations is 2.84

<sup>34</sup> Anup Agrawal and Mark A. Chen, *Do Analysts’ Conflicts Matter? Evidence from Stock Recommendations*, *Journal of Law and Economics*, August 2008, Vol. 51.

1 percent, they also state that analysts' accuracy<sup>35</sup> and optimism<sup>36</sup> in the implied estimates of  
2 the expected rate of return differs with firm size:

3 ...the mean scaled absolute forecast error, a measure of the accuracy of the  
4 forecasts, declines monotonically from 0.102 for the decile of smallest firms  
5 to 0.012 for the decile of largest firms. Similarly, the median absolute scaled  
6 forecast error declines monotonically from 0.042 to 0.006.

7 Analysts' optimism, measured as the mean (median) scaled forecast error,  
8 declines monotonically from -0.075 (-0.023) for the decile of the smallest  
9 firms to -0.005 (-0.002) for the decile of the largest firms.<sup>37</sup>

10 In plain language, as firm size increases, analyst accuracy increases and analyst  
11 optimism diminishes. Since the combined proxy group consists of large and mid-cap  
12 companies, analyst accuracy should not be a concern.

13 In view of the above, given the overwhelming academic and empirical support  
14 regarding the superiority of security analysts' EPS growth rate forecasts, such EPS growth  
15 rate projections should have been relied on by Mr. Hinton in his DCF analysis.

16 **Q. IN REVIEWING THE FINANCIAL LITERATURE, DID YOU DISCOVER ANY**  
17 **PUBLICATIONS THAT SUPPORTED THE USE OF PROJECTED DPS OR BVPS**  
18 **GROWTH RATES FOR USE IN A DCF MODEL?**

19 A. No, I did not.

20 **Q. LIKEWISE, ARE YOU AWARE OF ANY SOURCES OF DATA WHICH**  
21 **PROVIDE PROJECTED DPS OR BVPS GROWTH RATES TO INVESTORS?**

22 A. *Value Line* is the only widespread, readily available source of which I am aware that

<sup>35</sup> As measured by the mean (median) absolute forecast error.

<sup>36</sup> As measured by the mean (median) forecast error.

<sup>37</sup> Peter D. Easton and Gregory A. Sommers, *Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts*, Journal of Accounting Research, Vol. 45 No. 5 (December 2007), at 1007.

1 publishes projected DPS and BVPS growth rates. If investors indeed valued projected DPS  
2 and BVPS growth rates, there would be a market for those data. As they are not relied on  
3 by investors to determine their required returns on investments, there is not. Conversely,  
4 projected EPS growth rates are widely available to investors.

5 **Q. WHAT WOULD MR. HINTON'S DCF RESULT BE HAD HE ONLY RELIED ON**  
6 **EPS GROWTH FORECASTS?**

7 A. As shown on Schedule DWD-4R, the mean DCF derived cost rate based on EPS growth  
8 forecasts is 10.1%. This result should be viewed with caution, however, as the DCF model  
9 tends to mis-specify the investor-required return, as previously discussed.

10 **C. Application of the Risk Premium Model**

11 **Q. PLEASE SUMMARIZE MR. HINTON'S RPM.**

12 A. Mr. Hinton's RPM estimates the relationship between average allowed equity returns for  
13 natural gas utility companies published by Regulatory Research Associates, Inc. ("RRA")  
14 and annual average Moody's Investor Service ("Moody's") A-rated utility bond yields.  
15 Using data from the years 2007 through 2021, Mr. Hinton conducts a regression analysis,  
16 which he then combines with recent monthly yields on Moody's A-rated public utility  
17 bonds, to develop his risk premium estimate of 5.29% and a corresponding ROE of 9.50%.

18 **Q. DO YOU HAVE ANY CONCERNS REGARDING MR. HINTON'S APPLICATION**  
19 **OF THE RPM?**

20 A. Yes, I do. While I agree with Mr. Hinton's methodology (*i.e.*, regression analysis of  
21 historical equity risk premiums), I disagree with his exclusive use of current interest rates  
22 and his use of annual average return data instead of individual rate case data.

1 **Q. DO YOU BELIEVE THAT MR. HINTON SHOULD RELY EXCLUSIVELY ON**  
2 **CURRENT INTEREST RATES IN THE APPLICATION OF HIS RPM?**

3 A. No. Because both cost of capital and ratemaking are prospective in nature, Mr. Hinton  
4 should also consider using projected interest rates in his RPM. The cost of capital,  
5 including the cost rate of common equity, is expectational in that it reflects investors'  
6 expectations of future capital markets, including an expectation of interest rate levels, as  
7 well as future risks. Ratemaking is prospective in that the rates set in this proceeding will  
8 be in effect for a period in the future.

9 Even though Mr. Hinton relies, in part, on projected growth rates in his DCF  
10 analyses, noting that growth in the DCF is expected,<sup>38</sup> he fails to apply that logic to  
11 selecting an appropriate interest rate in his RPM.

12 **Q. MR. HINTON STATES THAT HE DOES NOT BELIEVE INTEREST RATE**  
13 **FORECASTS ARE RELIABLE IN DETERMINING THE ROE BECAUSE THEY**  
14 **DO NOT MATERIALIZE AS EXPECTED. PLEASE RESPOND.**

15 A. Whether Mr. Hinton believes those forecasts will prove to be accurate is irrelevant to  
16 estimating the market-required cost of common equity. Published industry forecasts, such  
17 as *Blue Chip Financial Forecasts*' ("*Blue Chip*") consensus interest rate projections,  
18 reflect industry expectations. Additionally, investors' expectations are not improper inputs  
19 to cost of common equity estimation models simply because prior projections were not  
20 proven correct in hindsight. As the Federal Energy Regulatory Commission ("FERC")  
21 noted in Opinion No. 531, "the cost of common equity to a regulated enterprise depends

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<sup>38</sup> Hinton Direct Testimony, at 29.

1 upon what the market expects, not upon what ultimately happens.”<sup>39</sup> Because our analyses  
2 are predicated on market expectations, the expected increase in bond yields is a measurable,  
3 observable, and relevant data point that should be reflected in Mr. Hinton’s analysis.  
4 Therefore, Mr. Hinton should have used forecasted interest rates in his analysis.

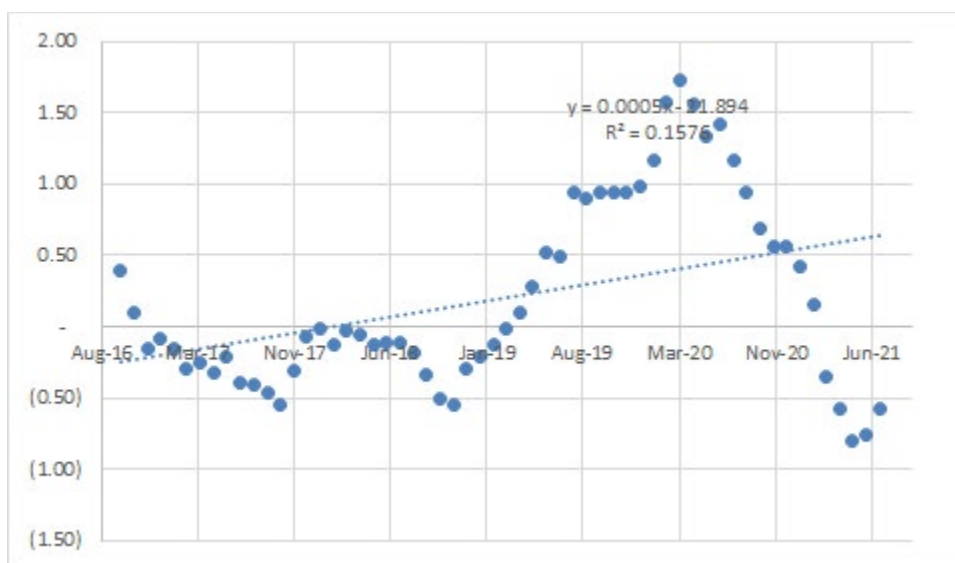
5 **Q. ARE CURRENT INTEREST RATES ACCURATE PREDICTORS OF FUTURE**  
6 **INTEREST RATES?**

7 A. No, they are not. Current interest rates are not proven to be a better predictor of future  
8 interest rates. In Chart 2 (below) I compare actual monthly yields to the three-month yield  
9 average from 12 months prior. This chart demonstrates that current Treasury yields have  
10 not been accurate predictors of future yields. Those results make intuitive sense. With  
11 the recent market dislocation, Treasury yields have decreased significantly and have been  
12 volatile. As interest rates decreased, historical Treasury yields over-projected current  
13 yields. As interest rates subsequently increased, the opposite was true.

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<sup>39</sup> Opinion No. 531, 150 FERC ¶ 61,165 at P 88.

**Chart 2: Forecast Error of Three-Month Average Treasury Yields<sup>40</sup>**



**Q. DO YOU AGREE WITH MR. HINTON'S USE OF ANNUAL AUTHORIZED RETURNS AND INTEREST RATE DATA IN HIS RPM?**

A. No, I do not. Instead of using yearly average authorized returns and Moody's A-rated public utility bond yields, it is preferable to use the authorized returns and Moody's A-rated public utility bond yields on a case-by-case basis. One reason why one should use individual cases instead of an annual average is that some years have more rate case decisions than others, and years with less rate case decisions will garner unnecessary weight. Another reason to use individual cases over an annual average is that interest rates and market conditions change during the year (*e.g.* the beginning and end of 2008), if one uses annual average authorized returns and annual average interest rates, the fluctuation between the interest rates and equity risk premiums during the year are lost.

<sup>40</sup>

Source: Federal Reserve Schedule H.15.

1 Q. WHAT IS THE RESULT OF THE REGRESSION ANALYSIS AFTER  
2 REFLECTING A PROSPECTIVE MOODY'S A-RATED PUBLIC UTILITY  
3 BOND YIELD AND USING INDIVIDUAL RATE CASE DATA IN PLACE OF  
4 ANNUAL RATE CASE DATA?

5 A. As shown on page 1 of Schedule DWD-5R, the analysis is based on a regression of 188  
6 rate cases for natural gas utility companies from January 5, 2007 through July 30, 2021. It  
7 shows the implicit equity risk premium relative to the yields on Moody's A-rated public  
8 utility bonds immediately prior to the issuance of each regulatory decision.<sup>41</sup>

9 I determined the appropriate prospective Moody's A-rated public utility yield by  
10 relying on a consensus forecast of about 50 economists of the expected yield on Moody's  
11 Aaa-rated corporate bonds for the six calendar quarters ending with the third calendar  
12 quarter of 2022, and *Blue Chip's* long-term projections for 2023 to 2027, and 2028 to  
13 2032.<sup>42</sup> As described on page 12 of Schedule DWD-1R, the average expected yield on  
14 Moody's Aaa-rated corporate bonds is 3.48%. I then derived an expected yield on  
15 Moody's A2-rated public utility bonds, by making an upward adjustment of 0.38%, which  
16 represents a recent spread between Moody's Aaa-rated corporate bonds and Moody's A2-  
17 rated public utility bonds.<sup>43</sup> Adding the recent 0.38% spread to the expected Moody's Aaa-  
18 rated corporate bond yield of 3.48% results in an expected Moody's A2-rated public utility  
19 bond yield of 3.86%.

<sup>41</sup> If the Order was in the first half of the month, the Moody's A-rated utility bond from two months prior would be used. If the Order was in the second half of the month, the Moody's A-rated public utility bond from the last prior month was used.

<sup>42</sup> *Blue Chip Financial Forecasts*, August 3, 2021, at 2, June 1, 2021, at 14.

<sup>43</sup> As explained on page 12 of Schedule DWD-1R.

1 I then used the regression results to estimate the equity risk premium applicable to  
2 the projected yield on Moody's A2-rated public utility bonds of 3.86%. Given the expected  
3 Moody's A-rated utility bond yield of 3.86%, the indicated equity risk premium is 5.86%,  
4 which results in an indicated ROE of 9.72%, as shown on Schedule DWD-5R. Also shown  
5 on Schedule DWD-5R, using Mr. Hinton's current bond yield, the indicated ROE using  
6 the RPM is 9.60%.

7 **D. Application of the Comparable Earnings Model**

8 **Q. PLEASE DESCRIBE MR. HINTON'S CEM ANALYSIS**

9 A. Mr. Hinton examined five years of historical earned returns on equity for his natural gas  
10 proxy groups and arrived at a 10.0% average and 9.5% median indicated equity return.<sup>44</sup>  
11 Mr. Hinton did not rely on the results of this data for his recommended ROE, but only as a  
12 check on his DCF and RPM.<sup>45</sup> I would note that his average ROE using his CEM is in  
13 excess of 50 basis points over his recommended ROE of 9.42%.

14 **Q. DO YOU HAVE ANY COMMENT ON THE PROXY GROUPS MR. HINTON**  
15 **USED IN HIS CEM ANALYSIS?**

16 A. Yes. Mr. Hinton used his natural gas proxy group in his CEM analysis.<sup>46</sup> Any proxy group  
17 selected for a CEM analysis should be broad-based in order to obviate company-specific  
18 aberrations and should exclude utilities to avoid circularity. Since the achieved returns on  
19 book common equity of utilities is a function of the regulatory process itself, they are  
20 substantially influenced by regulatory return on common equity awards. Therefore, the

<sup>44</sup> Hinton Direct Testimony, at Public Staff Hinton Exhibit 8.

<sup>45</sup> *Ibid.*, at 38.

<sup>46</sup> *Ibid.*



1 achieved ROEs of utilities are not representative of the returns that could be earned in a  
2 truly competitive market. Hence, Mr. Hinton's use of his gas proxy group utilities in his  
3 CEM analysis is a circular exercise. Additionally, as previously discussed, the cost of  
4 capital and ratemaking are expectational in nature and, as such, need to use projected data.  
5 As shown in Schedule DWD-6R, average and median projected earned returns for Mr.  
6 Hinton's proxy group are 10.35% and 10.50%, respectively.

7 **E. Conclusion of Hinton Adjusted Results**

8 **Q. WHAT ARE THE RESULTS OF MR. HINTON'S ROE MODELS AFTER**  
9 **MAKING THE ADJUSTMENTS DESCRIBED TO HIS DCF, RPM, AND CEM?**

10 A. As shown in Table 4, below, Mr. Hinton's adjusted results are as follows:

11 **Table 4: Mr. Hinton's Adjusted ROE Model Results**

Model	Range	Midpoint
Discounted Cash Flow	10.10%	10.10%
Risk Premium Model	9.60% - 9.72%	9.66%
Comparable Earnings Model	10.35% - 10.50%	10.43%
Average	9.60% - 10.50%	10.06%

12 Using the midpoints of Mr. Hinton's adjusted RPM and CEM, the average of his adjusted  
13 results is 10.06%, which does not reflect flotation costs.

14 **Q. DOES MR. HINTON INCLUDE FLOTATION COSTS IN HIS RECOMMENDED**  
15 **ROE?**

16 A. It does not appear so. As stated in my Direct Testimony, flotation costs should be included  
17 in an ROE recommendation because they are not reflected in any of the ROE model

1 results.<sup>47</sup> Adding my flotation cost adjustment of 0.11% to Mr. Hinton's adjusted average  
2 model result of 10.06% results in a Company-specific ROE of 10.17%, which is within my  
3 recommended range of ROEs and similar to my ultimate ROE recommendation of 10.25%.

4 **Q. MR. HINTON JUSTIFIES HIS RECOMMENDED ROE OF 9.42% BY**  
5 **REVIEWING THE INTEREST COVERAGE RATIO AND CONFIRMING THAT**  
6 **HIS ROE WOULD ALLOW THE COMPANY A SINGLE "A" RATING.<sup>48</sup> DOES**  
7 **ONE MEASURE OF FINANCIAL RISK SUCH AS PRE-TAX INTEREST**  
8 **COVERAGE INDICATE A SPECIFIC CREDIT RATING?**

9 A. No. While I do not take issue with Mr. Hinton's inputs or calculations in determining  
10 Piedmont's pre-tax interest coverage ratio, I note that the ratios of pre-tax coverage needed  
11 to qualify for a single "A" rating range from 3.0 to 6.0. As can be seen in Schedule DWD-  
12 7R, ROE's ranging from as low as 5.76% to as high as 14.55% all allow Piedmont to  
13 qualify for a single "A" rating based on its pre-tax coverage ratio. Clearly a significantly  
14 large range of results indicates that simply relying on a single measure, out of a multitude  
15 of measures reviewed by the bond/credit ratings agencies, to determine a company's bond  
16 rating is without significance.

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<sup>47</sup> D'Ascendis Direct Testimony, at 50-51.

<sup>48</sup> Hinton Direct Testimony, at 39.

1       **F.     Consideration of Mechanisms in Place for Piedmont**

2       **Q.     MR. HINTON DISCUSSES THE COMPANY'S INTEGRITY MANAGEMENT**  
3       **RIDER AND MARGIN DECOUPLING TRACKER MECHANISMS THAT HE**  
4       **CLAIMS IMPACT RISK FOR PIEDMONT.<sup>49</sup> IS HIS CLAIM VALID?**

5       A.     No. The cost of capital is a comparative exercise, so if the mechanism is common  
6       throughout the companies that one bases their analyses on, the comparative risk is zero,  
7       because any impact of the perceived reduced risk of the mechanism(s) by investors would  
8       be reflected in the market data of the proxy group. To that point, as shown on Schedule  
9       DWD-8R, ten of the eleven companies in Mr. Hinton's proxy group have a capital  
10      investment rider and ten of his eleven proxy group companies have a decoupling  
11      mechanism in at least one of their jurisdictions.

12      **Q.     DOES MR. HINTON DISCUSS THE COMMONALITY OF DECOUPLING**  
13      **MECHANISMS FOR GAS UTILITIES IN OTHER CASES?**

14      A.     Yes, he does. In Docket No. W-2018, Sub 526 concerning Aqua North Carolina, Inc., Mr.  
15      Hinton states:

16                     In North Carolina, Piedmont Natural Gas Company, Inc.'s Consumption  
17                     Utilization Tracker program was first approved in Docket G-9, Sub 499,  
18                     and later renamed Margin Decoupling Tracker (MDT), and Public Service  
19                     of North Carolina, Inc. has a similar program which has worked to help  
20                     stabilize its earnings.

21                     However, in those rate proceedings where the trackers were approved, there  
22                     was no explicit recognition of the decrease in the Company's business risk  
23                     in those proceedings or subsequent proceedings, indicating that any direct  
24                     benefit to customers was lost. This was, in part, due to the fact that similar  
25                     trackers were in operation with various other LDCs, and an argument could

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<sup>49</sup>       *Ibid.*, at 40.

1 be made the risk reduction was somewhat captured in the market prices of  
2 the Company's common stock.<sup>50</sup>

3 This statement echoes my response in the previous question. Our agreement on the  
4 issue should lead the Commission to the conclusion that any risk reduction due to  
5 Piedmont's mechanisms are already reflected in the market data of the proxy group.

6 **G. Response to Staff Witness Hinton's Criticisms of Company Analysis**

7 **Q. DOES MR. HINTON HAVE ANY CRITICISMS OF YOUR DIRECT**  
8 **TESTIMONY?**

9 A. Yes. Mr. Hinton has concerns regarding my exclusive use of projected EPS growth rates  
10 in my DCF model analysis and that one of the expected returns used in my CAPM  
11 calculation was "unsustainable".<sup>51</sup> I have already discussed the superiority of using  
12 projected EPS growth rates in the DCF model and will not repeat that discussion here.

13 **Q. MR. HINTON STATES THAT YOUR EXPECTED MARKET RETURN**  
14 **ESTIMATE DERIVED FROM BLOOMBERG FINANCIAL SERVICES**  
15 **("BLOOMBERG") INFLATES YOUR MARKET RISK PREMIUM. PLEASE**  
16 **RESPOND.**

17 A. I disagree with Mr. Hinton's statement. The implied expected market returns using  
18 Bloomberg data is only one out of six measures. The average implied market return for  
19 my Direct (12.73%) and Rebuttal (12.62%) Testimonies represent the approximately 48<sup>th</sup>  
20 percentile of actual returns observed from 1926 to 2020, as shown on Exhibit DWD-9R.  
21 As discussed previously, multiple measures gives greater insight into the investor-required

<sup>50</sup> Docket No. W-218, Sub 526, Hinton Direct Testimony, at 32-33.

<sup>51</sup> Hinton Direct Testimony, at 48.

1 return than a limited number of measures. The average implied market return for my Direct  
2 and Rebuttal Testimonies of 12.73% and 12.62%, respectively, are comparable to the  
3 average historical market return of approximately 12.20%.

4 **Q. DOES MR. HINTON RELY ON ANY EXTERNAL SOURCES TO SUPPORT HIS**  
5 **ASSERTION THAT YOUR BLOOMBERG EXPECTED MARKET RETURN IS**  
6 **UNSUSTAINABLE?**

7 Yes, he does. Mr. Hinton refers to a Morningstar survey of professional investment  
8 advisors that expect “lower future market returns on equity of 5% to 8%.”<sup>52</sup> My review of  
9 that survey revealed that many of the estimates are “more immediate term than they are  
10 long”.<sup>53</sup> As stated in my Direct Testimony, the holding period returns used in calculating  
11 equity risk premiums for estimating the ROE should be as long as possible to be  
12 commensurate with an investment in a company expected to operate in perpetuity.<sup>54</sup> As a  
13 result, I do not agree that the expected returns by investment houses referred to by Mr.  
14 Hinton are applicable in estimating the Company’s ROE.

15 **Q. WHAT IS THE RELATIONSHIP BETWEEN EXPECTED RETURNS BY**  
16 **INVESTMENT FUNDS AND REQUIRED/ALLOWED ROE?**

17 A. Expected returns from pension funds or investment houses are not the same as the ROE  
18 (otherwise known as required returns). Expected returns from pension funds or investment  
19 houses are expecting what the particular utility’s earned return will be. Because utilities  
20 generally do not earn their authorized returns, investor-expected returns are less than

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<sup>52</sup> *Ibid.*, at 48-49.

<sup>53</sup> Public Staff Hinton Exhibit 10, at 2.

<sup>54</sup> D’Ascendis Direct Testimony at 27.

1 investor-required returns. For example, a benefit plan asset manager will match the  
2 **expected returns** available from various asset classes to the expected liabilities that must  
3 be funded. An investor seeking to maximize their risk-adjusted return will only invest in  
4 a security if the expected return is equal to or greater than the **required return**. Because  
5 expected returns may or may not equal required returns, we should not assume pension  
6 funding assumptions (that is, expected returns) may be viewed as a measure of investors'  
7 required returns.

8 Benefit plan managers develop asset allocation and investment decisions based on  
9 expected risks and returns for various asset classes and are subject to the investment  
10 objective or expected timing and nature of the liabilities being funded by those investments.  
11 In the U.S., they must consider: (1) the diversification of the portfolio; (2) the liquidity and  
12 current return of the portfolio relative to the expected cash flow requirements under the  
13 plan; (3) the portfolio's projected return relative to the plan's funding objective; and (4)  
14 the return expected on alternative investments with similar risks.<sup>55</sup> Pension asset  
15 managers, therefore, are concerned with investing funds at an expected return to meet  
16 expected liabilities.

17 Widely used finance texts recommend the use of multiple models in estimating the  
18 cost of equity, in particular the DCF, CAPM, and RPM. To determine whether the use of  
19 broad market expected returns for the purposes of pension asset management also is an  
20 approach recommended by finance texts, I reviewed articles published in financial journals,  
21 as well as additional texts that speak to the methods used by analysts to estimate the cost

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<sup>55</sup> 29 CFR 2509.908-1, Interpretive Bulletin Relating to Investing in Economically Targeted Investments, October 17, 2008.

1 of equity. An article published in Financial Analysts Journal surveyed financial analysts  
2 to determine the analytical techniques that are used in practice.<sup>56</sup> Regarding stock price  
3 valuation and cost of capital estimation, the author asked respondents to comment only on  
4 the DCF, CAPM, and Economic Value-Added models. Nowhere in that article did the  
5 author consider asking whether surveys of expected returns or pension fund assumptions  
6 are relevant to the determination of the ROE, the subject of this proceeding.

7 Additionally, I note that the 8% to 10% expected long-term market returns  
8 referenced on page 2 of Mr. Hinton's Exhibit 10 can be assumed to be geometric mean  
9 returns, as geometric means are generally used by investment houses to discuss past  
10 performances. As shown on page 6-17 of Duff & Phelps 2021 SBBI® Yearbook Stocks,  
11 Bonds, Bills and Inflation ("SBBI-2021"), the long-term geometric mean return of  
12 approximately 10.00% converts to an approximate 12.00% long-term arithmetic mean  
13 return.

14 **V. RESPONSE TO CUCA WITNESS O'DONNELL**

15 **Q. PLEASE PROVIDE A SUMMARY OF MR. O'DONNELL'S TESTIMONY AND**  
16 **RECOMMENDATION.**

17 A. Mr. O'Donnell recommends an ROE of 9.00%,<sup>57</sup> which is based on the upper end of his  
18 DCF model results, which range from 7.50% to 9.50%.<sup>58</sup> Mr. O'Donnell also calculates a  
19 CEM and CAPM as checks on his DCF model results, which produced ROE estimates

<sup>56</sup> Stanley B. Block, *A Study of Financial Analysts: Practice and Theory*, Financial Analysts Journal, July/August, 1999.

<sup>57</sup> O'Donnell Direct Testimony, at 4.

<sup>58</sup> *Ibid.*, at 69.

1 ranging from 9.00% to 10.00% for his CEM and 6.00% to 8.00% for his CAPM.<sup>59</sup> Mr.  
2 O'Donnell exclusively relies on his DCF model results based on his opinion that the DCF  
3 model is superior to all other ROE models.<sup>60</sup>

4 **Q. PLEASE SUMMARIZE THE REMAINING AREAS IN WHICH YOU DISAGREE**  
5 **WITH MR. O'DONNELL'S ROE ANALYSES, METHODS, AND**  
6 **CONCLUSIONS?**

7 A. My remaining areas of disagreement with Mr. O'Donnell's analysis are as follows: (1) the  
8 interpretation of capital market conditions; (2) his proxy group selection; (3) his  
9 consideration of growth rates other than the expected EPS growth rate for his DCF model  
10 analysis; (4) his use and miscalculation of the sustainable growth rate; (5) the applicability  
11 of the CEM; (6) his application of the CAPM; and (7) his failure to reflect flotation costs.

12 **A. Capital Market Conditions**

13 **Q. DO YOU AGREE WITH MR. O'DONNELL THAT UTILITIES ARE "A SAFE**  
14 **HARBOR" DURING PERIODS OF MARKET UNCERTAINTY?<sup>61</sup>**

15 A. No, I do not. I have studied the relative performance and annualized volatilities of groups  
16 of utilities and market indices to gauge whether utilities weathered the COVID-19  
17 pandemic better than the overall market. As shown on Schedule DWD-10R and Table 5,  
18 below, from February 1, 2020 to July 30, 2021, contrary to Mr. O'Donnell's opinion, the  
19 combined proxy group (including all companies considered by the witnesses in this  
20 proceeding) and other groups of utilities were more volatile (i.e. riskier) than the market

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<sup>59</sup> *Ibid.*

<sup>60</sup> *Ibid.*, at 41.

<sup>61</sup> *Ibid.*, at 9.



indices and underperformed both the Dow Jones Industrial Average and Standard & Poor's ("S&P") 500.

**Table 5: Annualized Volatility and Returns of Utility Groups and Market Indices**  
**February 2020 – July 2021<sup>62</sup>**

	Proxy Group	Dow Jones Utility Average (DJU)	Utilities Select SPDR (XLU)	Dow Jones Industrial Average	S&P 500
Price Change	-6.44%	-3.54%	-4.67%	23.01%	35.28%
Annualized Volatility	44.80%	33.12%	33.13%	30.95%	29.28%

Table 5, above, shows that while markets in general have recovered from the market downturn, utilities have not.

**Q. MR. O'DONNELL REFERS TO SEVERAL RECENT REPORTS BY S&P CONCLUDING THAT THE CURRENT OUTLOOK FOR REGULATED UTILITIES IS STABLE.<sup>63</sup> DO YOU AGREE?**

A. No, I do not. Although Mr. O'Donnell's review of recent articles from S&P seems to suggest that the outlook for regulated utilities is stable, a closer look reveals that not to be the case. For example, in January of this year S&P noted:

Many rate case filings were delayed, rate case orders often took longer than expected, and many orders were below expectations.

\*\*\*

During the year, the utility industry performed poorly from a credit quality perspective. The negative outlooks or CreditWatch negative listings doubled and downgrades outpaced upgrades for the first time in a decade

<sup>62</sup> Source: S&P Global Market Intelligence.

<sup>63</sup> O'Donnell Direct Testimony, at 11-12.

1 by about 7 to 1.<sup>64</sup>

2 Clearly, the outlook for regulated utilities is less stable than Mr. O'Donnell assumes.

3 **Q. WHAT IS YOUR RESPONSE TO MR. O'DONNELL'S REVIEW OF**  
4 **UNEMPLOYMENT RATES?**

5 A. Regarding the unemployment rate, Mr. O'Donnell's cited unemployment rate of 6.77% in  
6 Q4 2020 dropping to 5.93% in Q2 2021 is accurate, but he is comparing that unemployment  
7 rate with the pre-pandemic unemployment rate of 3.67%, which was the lowest  
8 unemployment rate for 50 years.<sup>65</sup> The average American unemployment rate is 5.80%  
9 over the period 1948-present,<sup>66</sup> which is comparable to the unemployment rate of 5.93%  
10 in Q2 2021.

11 **Q. MR. O'DONNELL DISCUSSES INFLATION STATING THAT IT "IS TOO**  
12 **EARLY TO PREDICT WHETHER THE UNITED STATES ECONOMY WILL**  
13 **SERIOUSLY SUFFER PERMANENTLY IN THE LONG TERM DUE TO RISING**  
14 **PRICES."**<sup>67</sup> **PLEASE RESPOND.**

15 A. On August 27, 2020, Federal Chairman Powell released a statement noting that the Federal  
16 Open Market Committee will adopt an approach towards inflation that "could be viewed  
17 as a flexible form of average inflation targeting"; meaning that following periods in which

<sup>64</sup> S&P Global Ratings, RatingsDirect, *North American Regulated Utilities' Negative Outlook Could See Modest Improvement*, January 20, 2021, at 1.

<sup>65</sup> Source: Bureau of Labor Statistics.

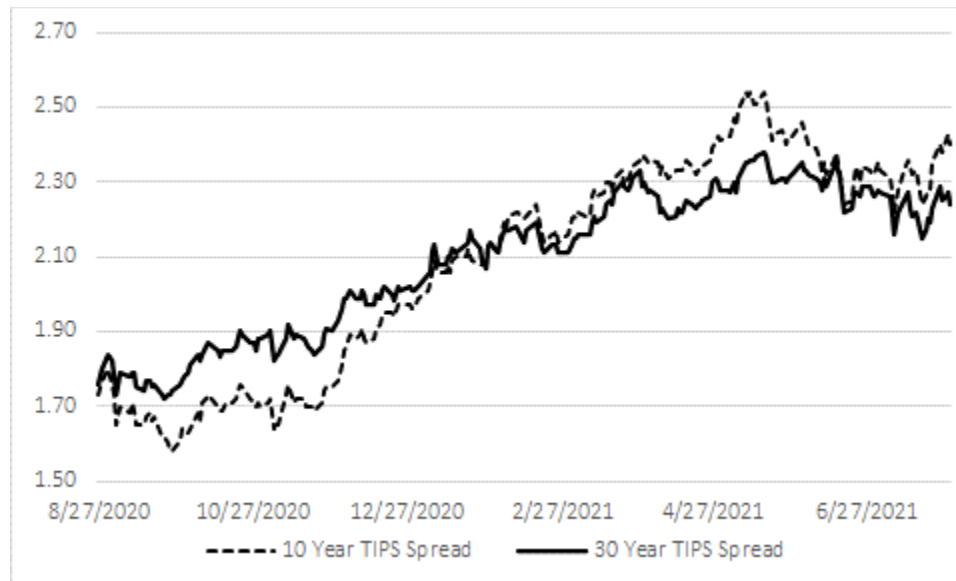
<sup>66</sup> Source: Bureau of Labor Statistics dating back to January 1948.

<sup>67</sup> O'Donnell Direct Testimony, at 18-19.

1 inflation has run below 2.00%, “appropriate monetary policy will likely aim to achieve  
2 inflation moderately above 2 percent for some time.”<sup>68</sup>

3 Since Mr. Powell’s remarks, the breakeven inflation rate, represented as the ten-  
4 year and 30-year Treasury Inflation-Protected Securities spread, has increased from 1.73%  
5 and 1.76%, respectively, to 2.33% and 2.19% respectively, as of July 30, 2021. Further,  
6 as shown in Chart 3 below, breakeven inflation has trended upward since the Federal  
7 Reserve’s policy change at a relatively consistent pace.

8 **Chart 3: Breakeven Inflation Since August 27, 2020<sup>69</sup>**



9  
10 Further, the Consumer Price Index (“CPI”) June 2021 monthly increase (0.9%) was  
11 the largest monthly increase since June 2008 (1.0%), and the year-over-year increase  
12 (5.4%) was the highest it has been since August 2008 (also 5.4%).<sup>70</sup> There is little proof

<sup>68</sup> *New Economic Challenges and the Fed’s Monetary Policy Review*, Remarks by Jerome H. Powell, Chair Board of Governors of the Federal Reserve System, August 27, 2020.

<sup>69</sup> Source: Federal Reserve (<https://www.federalreserve.gov/datadownload/>)

<sup>70</sup> U.S. Bureau of Labor Statistics, Economic News Release, Consumer Price Index Summary – June 2021.

1 that the current inflationary environment is indeed transitory (one could only judge the  
2 period as transitory after it is concluded) so it should be considered at face value.

3 **Q. IS INFLATION STRONGLY RELATED TO INTEREST RATES?**

4 A. Yes, it is. Generally, when inflation is increasing, central banks will attempt to raise  
5 interest rates by reducing bond buying programs or increasing their interbank offered rates  
6 in an attempt to keep inflation at target levels (a long-term average of 2.00%, as noted  
7 above). Over the period 1947-2020, the relationship between inflation, as measured by the  
8 year-over-year change in the CPI and interest rates had a 0.63 correlation coefficient,  
9 showing a strong positive relationship, which is statistically significant.

10 **Q. IS THERE A LINK BETWEEN INFLATION AND AUTHORIZED ROES?**

11 A. Yes, there is. Looking at the yearly growth in the CPI and the corresponding authorized  
12 ROEs for natural gas utilities, I calculated a correlation of 0.73. In addition, I found the  
13 relationship between the two variables to be statistically significant.

14 **B. Proxy Group Selection**

15 **Q. PLEASE DESCRIBE THE SCREENING CRITERIA BY WHICH MR.**  
16 **O'DONNELL DEVELOPED HIS PROXY GROUP.**

17 A. Mr. O'Donnell does not screen for comparability of the *Value Line* gas utility group and  
18 includes all ten gas distribution utilities covered by *Value Line* in his proxy group.<sup>71</sup>

19 **Q. DO YOU AGREE WITH MR. O'DONNELL'S PROXY GROUP?**

20 A. No. Chesapeake Utilities and UGI Corporation have significant operations in activities  
21 other than natural gas distribution services. This is illustrated in Table 6, below:

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<sup>71</sup> O'Donnell Direct Testimony, at 23.

**Table 6: Percent of 2019 Net Operating Income and Assets Attributable to Gas Distribution Operations of the Combined Proxy Group<sup>72</sup>**

	Net Oper. Income	Total Assets
Atmos Energy Corporation	63.02%	79.32%
<b>Chesapeake Utilities Corporation</b>	<b>38.57%</b>	<b>39.82%</b>
New Jersey Resources Corporation	87.58%	70.07%
NiSource Inc.	75.83%	62.77%
Northwest Natural Holding Company	94.73%	95.91%
ONE Gas, Inc.	100.00%	100.00%
South Jersey Industries	98.14%	87.03%
Southwest Gas Holdings, Inc.	79.90%	83.22%
Spire, Inc.	97.06%	67.72%
<b>UGI Corporation</b>	<b>34.57%</b>	<b>25.98%</b>

This table shows that Chesapeake Utilities and UGI Corp. are not valid comparators to Piedmont at this time and should be eliminated.

**Q. HAS MR. O'DONNELL CONSIDERED THE ANALYTICAL RESULTS OF ANY OTHER COMPANIES TO SET HIS RECOMMENDED ROE?**

A. Yes. In addition to his proxy group comprised of natural gas utilities, Mr. O'Donnell also estimates his analytical models based on market data for Duke Energy, Piedmont's ultimate parent.

**Q. IS IT REASONABLE TO ESTIMATE THE ROE FOR PIEDMONT BASED ON THE ANALYTICAL RESULTS OF DUKE ENERGY?**

A. No, it is not. Although Mr. O'Donnell states Duke Energy, "provides the most directly observable link between any company within the comparable proxy group and Piedmont,"

<sup>72</sup> SEC Form 10-K.

1 there are several issues with that conclusion. First, Piedmont represents only 5% of Duke  
2 Energy based on assets. Second, although Duke Energy has natural gas distribution  
3 operations, a majority of its operating income and assets are related to its electric  
4 operations. In 2020, approximately 87.5% of Duke Energy's operating income came from  
5 its electric operations, and approximately 85.1% of its assets were related to its electric  
6 operations. It is for that reason that *Value Line* includes Duke Energy in its Electric Utility  
7 group. As such, it is inappropriate to assume that Duke Energy faces comparable risk to  
8 Piedmont based solely on the fact that Piedmont is a subsidiary of Duke Energy. To that  
9 point, none of the witnesses in this proceeding have included electric utilities in their proxy  
10 groups. Because Duke Energy fails the comparable risk standard, the results of Mr.  
11 O'Donnell's analyses using Duke Energy-specific data should be given no weight.

12 **C. DCF Analysis**

13 **Q. PLEASE SUMMARIZE MR. O'DONNELL'S APPLICATION OF THE**  
14 **CONSTANT GROWTH DCF MODEL.**

15 A. Mr. O'Donnell calculates his dividend yield based on the one-week, four-week and 13-  
16 week expected dividend yield as provided by *Value Line Summary & Index* for the period  
17 April 16, 2021 through July 9, 2021.<sup>73</sup> For the growth component of his Constant Growth  
18 DCF model, Mr. O'Donnell reviews a number of growth rates, including historical and  
19 projected DPS, BVPS, and EPS growth rates as reported by *Value Line*; analysts'  
20 consensus EPS growth rate projections from the Center for Financial Research ("CFRA")  
21 and Charles Schwab & Co.<sup>74</sup>; and an estimate of the "plowback" growth rate also known

<sup>73</sup> O'Donnell Direct Testimony, at 45.

<sup>74</sup> *Ibid.*, at 49.

1 as the “Sustainable Growth” or “Retention Growth” derived from data provided by *Value*  
2 *Line*.<sup>75</sup> Mr. O’Donnell concludes that his DCF model produces an ROE in the range of  
3 7.5% to 9.5%.<sup>76</sup>

4 **Q. DO YOU AGREE WITH MR. O’DONNELL THAT HISTORICAL GROWTH**  
5 **RATES, OR DIVIDEND AND BOOK VALUE GROWTH RATES, ARE**  
6 **APPROPRIATE MEASURES OF EXPECTED GROWTH FOR THE CONSTANT**  
7 **GROWTH DCF MODEL?**<sup>77</sup>

8 A. No, I do not. As discussed in my response to Mr. Hinton, there is a significant body of  
9 empirical evidence supporting the superiority of analysts’ EPS growth rates in a DCF  
10 analysis, indicating that analysts’ forecasts of EPS remain the best predictor of growth to  
11 use in the DCF model.

12 **Q. DO YOU AGREE WITH MR. O’DONNELL’S CONSIDERATION OF**  
13 **SUSTAINABLE GROWTH RATES IN HIS CONSTANT GROWTH DCF**  
14 **ANALYSIS?**

15 A. No. As Morin explains, there are inherent weaknesses in using sustainable growth rates in  
16 the DCF model.<sup>78</sup> Specifically, Mr. O’Donnell’s methodology is inherently circular  
17 because: (1) it relies on an expected ROE on book common equity; (2) that expected ROE  
18 on book common equity is then used in a DCF analysis to establish an ROE cost rate related  
19 to the market value of the common stock; and (3) that market-related ROE, if authorized

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<sup>75</sup> *Ibid.*

<sup>76</sup> *Ibid.*, at 55.

<sup>77</sup> *Ibid.*, at 52-53.

<sup>78</sup> *Ibid.*, at 306-307.

1 as the allowed ROE in this proceeding, becomes the expected ROE on book common  
2 equity.

3 Put simply, the estimated ROEs Mr. O'Donnell used to derive his sustainable  
4 growth rate become the regulatory outcome of this proceeding, even as those ROEs are  
5 themselves based on regulatory outcomes.

6 **Q. HAVE YOU REVIEWED INDEPENDENT SOURCES FOR DISCUSSION OF THE**  
7 **USE OF SUSTAINABLE GROWTH FOR ROE ESTIMATION?**

8 A. Yes. Morin discusses the sustainable growth model and shows that it relies on knowledge  
9 of several factors, including:

- 10 • “b”: the fraction of earnings per share retained;
- 11 • “r”: the rate of return on equity (ROE);
- 12 • “s”: the growth rate in common equity due to the sale of stock; and
- 13 • “v”: the fraction of a stock sale that increases existing book value.

14 Specifically, Morin states the following:

15 There are three problems in the practical application of the sustainable  
16 growth method. The first is that it may be even more difficult to estimate  
17 what b, r, s and v investors have in mind than it is to estimate what g they  
18 envisage. It would appear far more economical and expeditious to use  
19 available growth forecasts and obtain g directly instead of relying on four  
20 individual forecasts of the determinants of such growth. *It seems only*  
21 *logical that the measurement and forecasting errors inherent in using four*  
22 *different variables to predict growth far exceed the forecasting error*  
23 *inherent in the direct forecast of growth itself.*

24 Second, there is a potential element of circularity in estimating g by a  
25 forecast of b and ROE for the utility being regulated, since ROE is  
26 determined in large part by regulation. To estimate what ROE resides in  
27 the minds of investors is equivalent to estimating the market's assessment  
28 of the outcome of regulatory hearings. Expected ROE is exactly what  
29 regulatory commissions set in determining an allowed rate of return. In  
30 other words, the method requires an estimate of return on equity before it



1 can even be implemented. Common sense would dictate the inconsistency  
2 of a return on equity recommendation that is different than the expected  
3 ROE that the method assumes the utility will earn forever. For example,  
4 using an expected return on equity of 11% to determine the growth rate and  
5 using the growth rate to recommend a return on equity of 9% is inconsistent.  
6 It is not reasonable to assume that this regulatory utility company is  
7 expected to earn 11% forever, but recommend a 9% return on equity. The  
8 only way this utility can earn 11% is that rates be set by the regulator so that  
9 the utility will, in fact, earn 11%....

10 Third, the empirical finance literature discussed earlier demonstrates that  
11 the sustainable growth method of determining growth is not as significantly  
12 correlated to measures of value, such as stock price and price/earnings  
13 ratios, as other historical measures or analysts' growth forecasts. *Other*  
14 *proxies for growth such as historical growth rates and analysts' growth*  
15 *forecasts outperform retention growth estimates.* (emphasis added)<sup>79</sup>

16 **Q. DO YOU HAVE ANY OTHER CONCERNS WITH THE USE OF THE**  
17 **SUSTAINABLE GROWTH RATE AS A MEASURE OF LONG-TERM GROWTH?**

18 A. Yes. The sustainable growth rate assumes increasing retention ratios necessarily are  
19 associated with increasing future growth. The underlying premise is that future earnings  
20 will increase as the retention ratio increases. That is, if future growth is modeled as “b x  
21 r” (where “b” is the retention ratio and “r” is the earned return on book equity), growth will  
22 increase as “b” increases. There are several reasons, however, why that may not be the  
23 case. Consequently, it is appropriate to determine whether the data supports the assumption  
24 that higher earnings retention ratios necessarily are associated with higher future earnings  
25 growth rates.

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<sup>79</sup> Morin, at 306-307.

1 **Q. DOES INDEPENDENT RESEARCH SUPPORT THE FINDING THAT FUTURE**  
2 **EARNINGS AND THE RETENTION RATIO ARE NOT POSITIVELY**  
3 **RELATED?**

4 A. Yes. In 2006, for example, two articles in Financial Analysts Journal addressed the theory  
5 that high dividend payouts (*i.e.*, low retention ratios) are associated with low future  
6 earnings growth.<sup>80</sup> Both articles cite a 2003 study by Arnott and Asness,<sup>81</sup> who found that  
7 over the course of 130 years of data, future earnings growth is associated with high, rather  
8 than low, payout ratios.<sup>82</sup> In essence, the findings of all three studies found that there is a  
9 negative, not a positive, relationship between the two.

10 **Q. DO YOU AGREE WITH MR. O'DONNELL'S SPECIFICATION OF THE**  
11 **SUSTAINABLE GROWTH RATE?**

12 A. No, I do not. Not only do I disagree with Mr. O'Donnell's use of the Sustainable Growth  
13 Rate, I also do not agree with his form of the model. The full form of the model assumes  
14 growth is a function of its expected earnings, and the extent to which it retains earnings to  
15 invest in the enterprise. The form of the model on which Mr. O'Donnell relies is its  
16 simplest form, which defines growth solely as a function of internally generated funds.

17 If Mr. O'Donnell is going to consider a form of Sustainable Growth, he should use  
18 the "br + sv" form of the model, which reflects growth both from internally generated funds

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<sup>80</sup> See, Ping Zhou, William Ruland, *Dividend Payout and Future Earnings Growth*, Financial Analysts Journal, Vol. 62, No. 3, 2006. See also, Owain ap Gwilym, James Seaton, Karina Suddason, Stephen Thomas, *International Evidence on the Payout Ratio, Earnings, Dividends and Returns*, Financial Analysts Journal, Vol. 62, No. 7, 2006.

<sup>81</sup> See, Robert Arnott, Clifford Asness, *Surprise: Higher Dividends = Higher Earnings Growth*, Financial Analysts Journal, Vol. 59, No. 1, January/February 2003.

<sup>82</sup> Because the payout ratio is the inverse of the retention ratio, the authors found that future earnings growth is negatively related to the retention ratio.

1 (i.e., the “br” term) and from issuances of equity (i.e., the “sv” term). As noted above, the  
2 first term is the product of the retention ratio (i.e., “b”, or the portion of net income not  
3 paid in dividends) and the expected ROE (i.e., “r”), which represents the portion of net  
4 income that is “plowed back” into the company as a means of funding growth. The “sv”  
5 term is represented as:

$$\left(\frac{m}{b} - 1\right) \times \text{Common shares growth rate}$$

7 where  $\frac{m}{b}$  is the M/B ratio. In that form, the “sv” term reflects an element of growth  
8 as the product of: (1) the growth in shares outstanding, and (2) that portion of the M/B ratio  
9 that exceeds unity.

10 **Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE APPROPRIATE**  
11 **GROWTH RATES FOR THE CONSTANT GROWTH DCF MODEL?**

12 A. Based on the analyses and research noted above and in my response to Mr. Hinton, I  
13 conclude projected EPS growth rates are the appropriate measure of growth in the Constant  
14 Growth DCF model.

15 **Q. WHAT ARE MR. O'DONNELL'S GROWTH RATE RANGE AND INDICATED**  
16 **DCF MODEL RESULTS USING PROJECTED EPS GROWTH RATES?**

17 A. As shown in Schedule DWD-11R, I calculated the individual DCF results of each of Mr.  
18 O'Donnell's proxy companies using his three measures of the dividend yield and the  
19 average of his three EPS projected growth rates from *Value Line*, CFRA, and Charles  
20 Schwab. That analysis indicates average DCF results of 9.51% to 9.57%.

1        **D.     Comparable Earnings Model**

2        **Q.     PLEASE SUMMARIZE MR. O'DONNELL'S CEM.**

3        A.     Mr. O'Donnell performs two forms of the CEM. His first method reviews the historical  
4           and forecast earned returns on book value from *Value Line* for his proxy group for the  
5           years 2019 through 2021 and the three- to five-year forecast. The results of Mr.  
6           O'Donnell's first CEM range from 9.20% to 9.70%.<sup>83</sup> For Mr. O'Donnell's second CEM  
7           he calculates the annual average authorized returns for natural gas utilities since 2006.  
8           Based on those analyses he estimates a range of results from 9.00% to 10.00%.<sup>84</sup>

9        **Q.     WHAT IS YOUR RESPONSE TO MR. O'DONNELL'S FIRST METHOD?**

10       A.     While I appreciate that Mr. O'Donnell used projected data in calculating his CEM, as  
11           discussed in my response to Mr. Hinton, the CEM analysis should be based on a broad  
12           group of comparable companies, and not utilities as Mr. O'Donnell has done. As such, I  
13           do not agree with Mr. O'Donnell's application of the CEM.

14       **Q.     WHAT IS YOUR RESPONSE TO MR. O'DONNELL'S SECOND METHOD?**

15       A.     Although Mr. O'Donnell suggests that "regulated ROE's have trended down over the past  
16           15 years,"<sup>85</sup> he fails to note that, as shown on his Chart 5, since 2013 authorized returns for  
17           natural gas utilities have been relatively stable. In fact, authorized returns through July 30,  
18           2021 averaged 9.60%, which is similar to the average authorized returns in 2013 through  
19           2019, and 14 basis points above the 2020 average.

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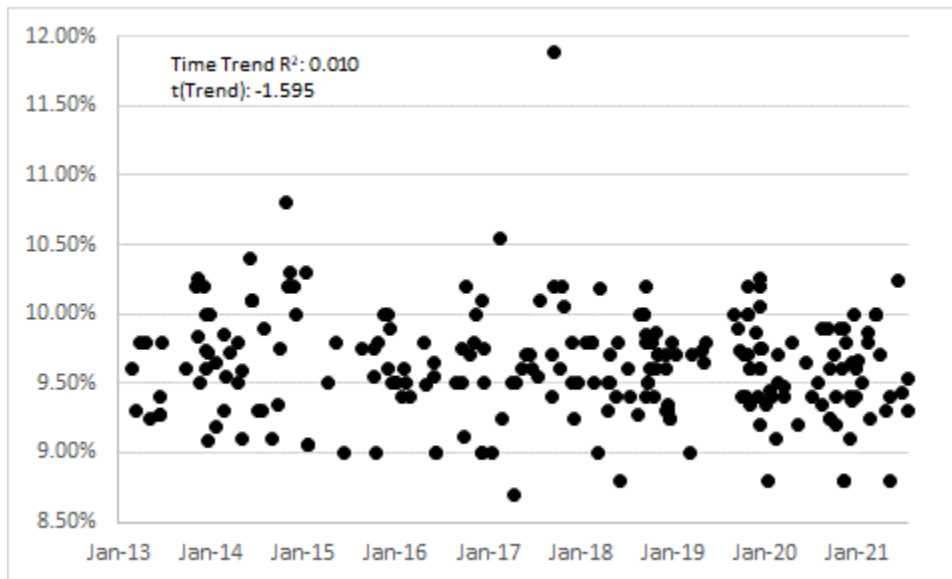
<sup>83</sup> O'Donnell Direct Testimony, at 56.

<sup>84</sup> *Ibid.*, at 58.

<sup>85</sup> *Ibid.*, at 57.

More importantly though, average annual data obscures variations in returns and does not address the number of cases nor the jurisdictions issuing orders within a given year. For example, one year may have fewer cases decided, and a relatively large portion of those cases decided by a single jurisdiction. As shown in Chart 4, below, if all individual authorized ROEs are charted, rather than annual averages, there is no meaningful trend since 2013. Rather, time explains approximately 1% of the change in ROEs, and the trend variable is statistically insignificant. Mr. O'Donnell's reference to the trend in annual averages inaccurately suggests authorized returns have trended downward recently, when they have not.

**Chart 4: Natural Gas Authorized Returns (2013-2021)<sup>86</sup>**



<sup>86</sup> Source: Regulatory Research Associates. Excludes limited issue rate riders. Based on data through July 30, 2021.

1 From a slightly different perspective, the recent fluctuations around the annual  
2 average authorized return data are well within the standard deviation of authorized ROEs,  
3 as shown in Table 7, below.

4 **Table 7: Mean, Median, and Standard Deviation of Authorized Returns**  
5 **(2013-2021)<sup>87</sup>**

Year	Average	Median	Standard Deviation
2013	9.68%	9.72%	0.33%
2014	9.78%	9.78%	0.44%
2015	9.60%	9.68%	0.39%
2016	9.53%	9.50%	0.32%
2017	9.73%	9.60%	0.61%
2018	9.59%	9.60%	0.30%
2019	9.72%	9.72%	0.29%
2020	9.46%	9.42%	0.31%
2021	9.60%	9.57%	0.34%

6 From that perspective as well, there is no reason to conclude authorized returns  
7 have fallen since 2013.

8 **Q. ARE THERE OTHER DISTINCTIONS THAT ARE IMPORTANT TO CONSIDER**  
9 **WHEN REVIEWING AUTHORIZED RETURNS?**

10 A. Yes, there are. The regulatory environment is one of the most important factors debt and  
11 equity investors factor in their assessment of risk. Further, utility credit ratings and  
12 outlooks depend substantially on the extent to which rating agencies view the regulatory  
13 environment credit supportive, or not. For example, Moody's finds the regulatory  
14 environment to be so important that 50.00% of the factors that weigh in its ratings

<sup>87</sup> Source: Regulatory Research Associates. Excludes limited issue rate riders. Based on data through July 30, 2021.

1 determination are determined by the nature of regulation.<sup>88</sup> Given Piedmont's need to  
2 access external capital, and the weight rating agencies place on the nature of the regulatory  
3 environment, it is important to consider the extent to which the jurisdictions that recently  
4 have authorized ROEs for natural gas utilities are viewed as having constructive regulatory  
5 environments.

6 As shown in Table 8 (below; *see also* Schedule DWD-12R), I analyzed the  
7 authorized ROE for natural gas utilities based on the jurisdiction's ranking by RRA, which  
8 provides an assessment of the extent to which regulatory jurisdictions are constructive from  
9 investors' perspectives, or not. As RRA explains, less constructive environments are  
10 associated with higher levels of risk:

11 RRA maintains three principal rating categories, Above Average, Average  
12 and Below Average, with Above Average indicating a relatively more  
13 constructive, lower-risk regulatory environment from an investor viewpoint  
14 and Below Average indicating a less constructive, higher-risk regulatory  
15 climate. Within each principal rating categories, the numbers 1, 2 and 3  
16 indicate relative position. The designation 1 indicates a stronger or more  
17 constructive rating from an investor viewpoint; 2, a midrange rating; and 3,  
18 a less constructive rating. Hence, if you were to assign numeric values to  
19 each of the nine resulting categories, with a "1" being the most constructive  
20 from an investor viewpoint and a "9" being the least constructive from an  
21 investor viewpoint, then Above Average/1 would be a "1" and Below  
22 Average/3 would be a "9."<sup>89</sup>

23 The Commission currently is ranked "Average/1", which falls in the top-third of  
24 the 53 jurisdictions ranked by RRA.

25 Across the 232 vertically integrated rate cases for which RRA reports an authorized  
26 ROE since 2013, there was a 36-basis point difference between the median return for

<sup>88</sup> See, Moody's Investors Service Rating Methodology: *Regulated Electric and Gas Utilities*, June 23, 2017, at 4.

<sup>89</sup> Regulatory Research Associates, *RRA Regulatory Focus: State Regulatory Evaluations*, May 25, 2021, at 7.

jurisdictions ranked in the top third of all jurisdictions, and jurisdictions ranked in the middle third of all jurisdictions (the higher-ranked jurisdictions providing the higher authorized returns; *see* Table 8, below). As Table 8 indicates, authorized ROEs for natural gas utilities in jurisdictions rated in the top third of all jurisdictions, including North Carolina, range from 9.20% to 10.55%, with an average of 9.83%, and a median of 9.85%.

**Table 8: Natural Gas Authorized ROE by RRA Ranking<sup>90</sup>**

Authorized ROE (%) Natural Gas Utilities			
RRA Ranking	Top Third	Middle Third	Bottom Third
Mean	9.83%	9.45%	9.62%
Median	9.85%	9.49%	9.60%
Maximum	10.55%	10.20%	11.88%
Minimum	9.20%	8.70%	9.10%

In view of the above, my recommended ROE, 10.25%, is consistent with the returns authorized in more constructive jurisdictions, such as North Carolina.

**E. CAPM Analysis**

**Q. PLEASE SUMMARIZE MR. O'DONNELL'S CAPM ANALYSIS.**

A. Mr. O'Donnell uses the range of 30-year Treasury yields between April 1, 2019 and July 2, 2021 for the risk-free rate component. He uses *Value Line* Beta coefficients and Market Risk Premiums ("MRP") of 4.25% and 6.25%, based on historical and investment professionals' forecasts, to derive CAPM estimates of 4.60% to 8.60% for his proxy group

<sup>90</sup> Source: Regulatory Research Associates. "Top Third" includes Above Average/1,2,3 and Average/1; "Middle Third" includes Average/2; "Bottom Third" includes Average/3 and Below Average/1,2,3. Of the 53 total jurisdictions, the "Top Third" group includes 17 jurisdictions, the "Middle Third" group includes 16 jurisdictions, and the "Bottom Third" group includes 20 jurisdictions. . *See also*, Schedule DWD-12R. Excludes limited issue riders.



1 and Duke Energy, which he believes indicates a “proper” CAPM result of 6.00% to  
2 8.00%.<sup>91</sup> Mr. O’Donnell’s CAPM results are used as a check on his DCF results.<sup>92</sup>

3 **Q. WHAT ISSUES DO YOU TAKE WITH MR. O’DONNELL’S CAPM ANALYSIS?**

4 A. I take several issues with Mr. O’Donnell’s CAPM analysis, including: (1) his failure to  
5 include projected Treasury yields in his analysis; (2) his use of a subset of historical data  
6 instead of the long-term historical average MRP in his analysis; (3) his use of geometric  
7 returns in the calculation of the historical MRP; (4) his use of the total return on Long-  
8 Term Government bonds as a proxy for the risk-free rate in the historical MRP; (5) his  
9 consideration of professional investor forecasts and market surveys for his MRP analysis;  
10 and (6) his analysis did not include an Empirical CAPM (“ECAPM”). I have discussed the  
11 use of projected interest rates in my response to Mr. Hinton. The remaining issues are  
12 discussed in turn below.

13 **Q. DO YOU AGREE WITH MR. O’DONNELL’S USE OF A 1972-2019 HISTORICAL**  
14 **TIME PERIOD FOR HIS HISTORICAL MRP CALCULATION?**

15 A. No, I don’t. SBBI – 2021 makes it clear that the arbitrary selection of short historical  
16 periods is highly suspect and unlikely to be representative of long-term trends in market  
17 data. For example, SBBI - 2021 states:

18 The estimate of the equity risk premium depends on the length of the data  
19 series studied. A proper estimate of the equity risk premium requires a data  
20 series long enough to give a reliable average without being unduly  
21 influenced by very good and very poor short-term returns. When calculated  
22 using a long data series, the historical equity risk premium is relatively  
23 stable. Furthermore, because an average of the realized equity risk  
24 premium, is quite volatile when calculated using a short history, using a long

<sup>91</sup> O’Donnell Direct Testimony, at 67-68.

<sup>92</sup> *Ibid.*, at 40.

1 series makes it less likely that the analyst can justify any number he or she  
2 wants.<sup>93</sup>

3 The academic literature demonstrates and confirms that a subset of data could be  
4 subject to data manipulation. Because of this, Mr. O'Donnell's historical MRPs should be  
5 viewed with considerable caution.

6 **Q. DO YOU AGREE WITH MR. O'DONNELL'S ESTIMATE OF THE HISTORICAL**  
7 **MARKET RISK PREMIUM?**

8 A. No. Mr. O'Donnell presents the geometric and arithmetic mean market return estimates  
9 based on the Ibbotson historical average from 1972-2019.<sup>94</sup> In addition to using an  
10 inappropriate time period, his use of the geometric mean for cost of capital purposes is also  
11 inappropriate. Only arithmetic mean return rates, equity risk premiums, and yields are  
12 appropriate for cost of capital purposes because *ex-post* (historical) total returns and equity  
13 risk premiums differ in size and direction over time, indicating volatility, *i.e.*, variance or  
14 risk. The arithmetic mean captures the prospect for variance in returns and equity risk  
15 premiums, providing the valuable insight needed by investors in estimating risk in the  
16 *future* when making a *current* investment. Absent such valuable insight into the potential  
17 variance of returns, investors cannot meaningfully evaluate prospective risk. The  
18 geometric mean of ex-post equity risk premiums provides no insight into the potential  
19 variance of future returns because the geometric mean relates the change over many time  
20 periods to a constant rate of change, rather than the year-to-year fluctuations, or variance,  
21 *critical to risk analysis*. Therefore, the geometric mean is of little to no value to investors

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<sup>93</sup> Duff & Phelps 2021 SBBI® Yearbook Stocks, Bonds, Bills and Inflation at 10-23 ("SBBI-2021").  
<sup>94</sup> O'Donnell Direct Testimony, at 64.

1 seeking to measure risk. Moreover, from a statistical perspective, since stock returns and  
2 equity risk premiums are randomly generated, the arithmetic mean is expectational and  
3 consistent with the prospective nature of the cost of capital and ratemaking noted above.

4 The financial literature is quite clear that risk is measured by the variability of  
5 expected returns, *i.e.*, the probability distribution of returns.<sup>95</sup> SBBI-2021<sup>96</sup> explains in  
6 detail why the arithmetic mean is the correct mean to use when estimating the cost of  
7 capital.

8 In addition, Weston and Brigham provide the standard financial textbook definition  
9 of the riskiness of an asset when they state:

10 The riskiness of an asset is defined in terms of the likely variability of future  
11 returns from the asset. (emphasis added)<sup>97</sup>

12 Furthermore, Morin states:

13 The geometric mean answers the question of what constant return you  
14 would have had to achieve in each year to have your investment growth  
15 match the return achieved by the stock market. The arithmetic mean  
16 answers the question of what growth rate is the best estimate of the future  
17 amount of money that will be produced by continually reinvesting in the  
18 stock market. It is the rate of return which, compounded over multiple  
19 periods, gives the mean of the probability distribution of ending wealth.  
20 (emphasis added)<sup>98</sup>

21 In addition, Brealey and Myers note:

22 The proper uses of arithmetic and compound rates of return from past  
23 investments are often misunderstood... Thus the arithmetic average of the  
24 returns correctly measures the opportunity cost of capital for investments...  
25 *Moral:* If the cost of capital is estimated from historical returns or risk

<sup>95</sup> Eugene F. Brigham, Fundamentals of Financial Management, (The Dryden Press, 1989), at 639.

<sup>96</sup> SBBI-2021, at p. 10-22.

<sup>97</sup> J. Fred Weston and Eugene F. Brigham, Essentials of Managerial Finance, 3rd Edition (The Dryden Press, 1974), at 272.

<sup>98</sup> Morin, at 133.

1 premiums, use arithmetic averages, not compound annual rates of return.  
2 (italics in original)<sup>99</sup>

3 As previously discussed, investors gain insight into relative riskiness by analyzing  
4 expected *future* variability. This is accomplished using the arithmetic mean of a random  
5 distribution of returns/premiums. Only the arithmetic mean considers all the  
6 returns/premiums over a period of time, hence, providing meaningful insight into the  
7 variance and standard deviation of those returns/premiums.

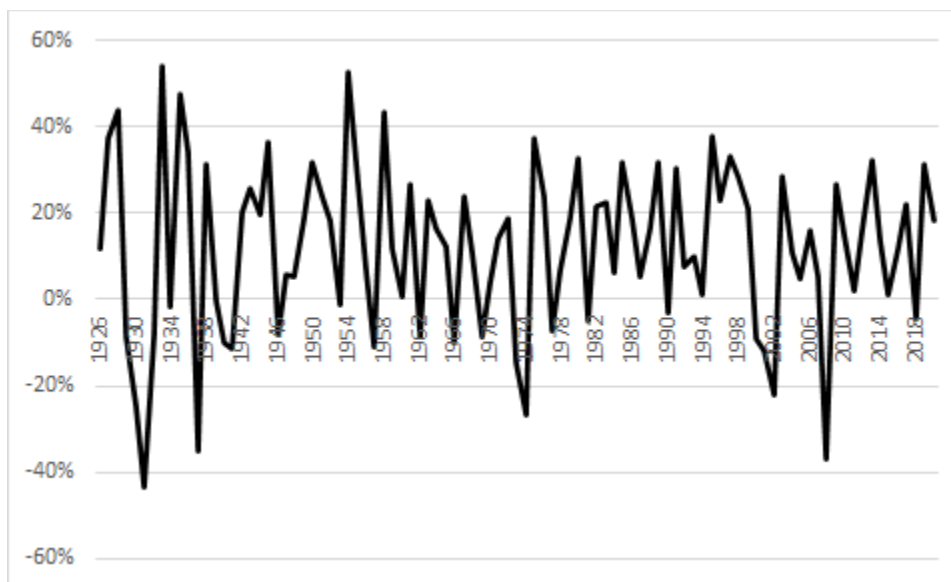
8 **Q. CAN IT BE DEMONSTRATED THAT THE ARITHMETIC MEAN TAKES INTO**  
9 **ACCOUNT ALL OF THE RETURNS AND, THEREFORE, IS THE ONLY**  
10 **APPROPRIATE MEAN TO USE WHEN ESTIMATING THE COST OF**  
11 **CAPITAL?**

12 A. Yes. Schedules DWD-9R and DWD-13R graphically demonstrate this. Schedule DWD-  
13 13R charts the SBBI-2021 returns on large company stocks for each and every year from  
14 1926 through 2020. It is clear from looking at the year-to-year variation of these returns  
15 that stock market returns and, hence, MRPs vary (see Chart 5, below).

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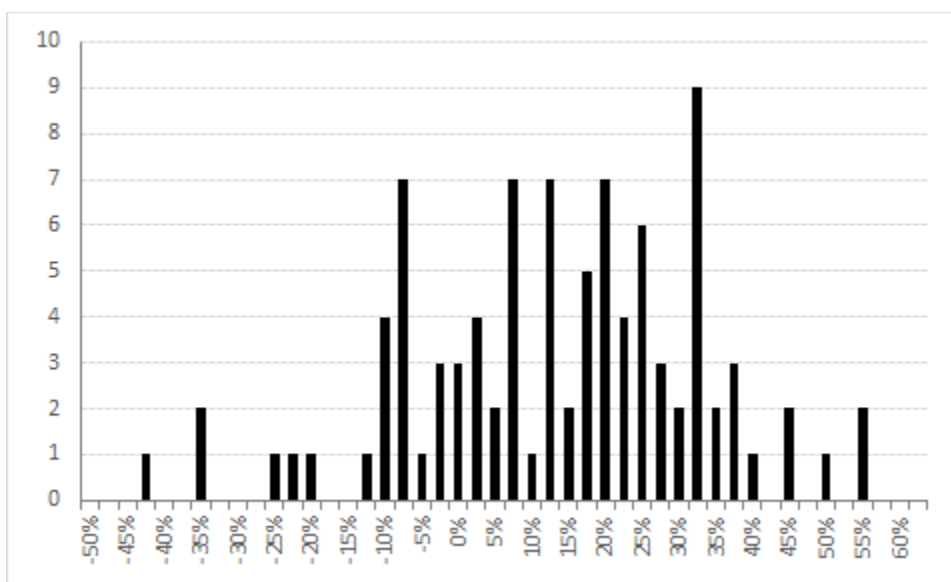
<sup>99</sup> Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance, Fifth Edition (The McGraw-Hill Companies, Inc., 1996), at 146 – 147.

**Chart 5: U.S. Large Company Stock Returns 1926-2020<sup>100</sup>**



The distribution of each of those returns for the period from 1926 through 2020 is shown on Schedule DWD-9R and Chart 6, below.

**Chart 6: Frequency Distribution of Observed Market Returns, 1926 - 2020<sup>101</sup>**



<sup>100</sup> SBBI-2021 at Appendix A-1.  
<sup>101</sup> Schedule DWD-9R.

1           There is a clear bell-shaped pattern to the probability distribution of returns, an  
2           indication that they are randomly generated and not serially correlated. The arithmetic  
3           mean of this distribution of returns considers each and every return in the distribution. In  
4           doing so, the arithmetic mean takes into account the standard deviation or likely variance  
5           which may be experienced in the future when estimating the rate of return based on such  
6           historical returns.

7           In contrast, the geometric mean considers only two of the returns, the initial and  
8           terminal years, which, in this case, are 1926 and 2020. Based on only those two years, a  
9           constant rate of return is calculated by the geometric average. That constant return is  
10          graphically represented by a flat line, showing no year-to-year variation for the entire 1926  
11          to 2020 time period. This is obviously unrealistic, based on the histogram shown in Chart  
12          6 above. In view of the foregoing, Mr. O'Donnell should have exclusively relied on the  
13          long-term arithmetic average return on the market in calculating his historical risk premium  
14          using SBBI-2021 data.

15   **Q.   PLEASE COMMENT ON MR. O'DONNELL'S USE OF TOTAL RETURNS ON**  
16   **LONG-TERM GOVERNMENT BONDS IN THE CALCULATION OF HIS MRP.**

17   A.   Although Mr. O'Donnell relies on Duff & Phelps' historical returns in his CAPM analysis,  
18          he has ignored their recommendation to rely on the income return and not the total return  
19          on U.S. Treasury securities in deriving an MRP. As indicated in SBBI-2021:

20               Another point to keep in mind when calculating the equity risk premium is  
21               that the income return on the appropriate-horizon Treasury security, rather  
22               than the total return, is used in the calculation.

23               The total return comprises three return components: the income return, the  
24               capital appreciation return, and the reinvestment return. The income return  
25               is defined as the portion of the total return that results from a periodic cash

1 flow or, in this case, the bond coupon payment. The capital appreciation  
2 return results from the price change of a bond over a specific period. Bond  
3 prices generally change in reaction to unexpected fluctuations in yields.  
4 Reinvestment return is the return on a given month's investment income  
5 when reinvested into the same asset class in the subsequent months of the  
6 year. The income return is thus used in the estimation of the equity risk  
7 premium because it represents the truly riskless portion of the return.<sup>102</sup>

8 Also, as shown in SBBI-2021 on page 6-17, the standard deviation for the income  
9 return on long-term government bonds is 2.6%, which is the lowest (i.e., least risky)  
10 measure of all bond returns followed by SBBI. Mr. O'Donnell's recommended measure  
11 of the risk-free rate, the total return on long-term government bonds, has a standard  
12 deviation of 9.8%, which is the highest (i.e., most risky) measure of all bond returns  
13 followed by SBBI. These measures alone warrant the use of the income return on long-  
14 term government bonds as the appropriate proxy of the risk-free rate for use in the  
15 calculation of the MRP in a CAPM analysis.

16 In view of the above, the correct derivation of the historical MRP is the difference  
17 between the arithmetic mean total return on large company common stocks of 12.20%, and  
18 the arithmetic mean 1926-2020 income return on long-term government bonds of 4.90%,  
19 which results in an MRP of 7.30%.<sup>103</sup>

20 **Q. WHAT IS YOUR RESPONSE TO MR. O'DONNELL'S REFERENCE TO**  
21 **PROFESSIONAL INVESTOR FORECASTS AND MARKET SURVEYS THAT**

---

<sup>102</sup> SBBI-2021, at 10-22.

<sup>103</sup> *Ibid.*, at 6-17.

**INDICATE EXPECTED MARKET RETURNS RANGE FROM NEGATIVE 5.80% (REAL) TO 5.70% (NOMINAL)?<sup>104</sup>**

A. I have several concerns with his reference. First, Mr. O'Donnell's 9.00% ROE recommendation is at odds with the data he presents. Mr. O'Donnell refers to the market forecasts summarized in Table 9, below.

**Table 9: Summary of Mr. O'Donnell's Market Return Forecast References<sup>105</sup>**

Institution	Market Return Forecast
BlackRock Investment Institute	5.00% nominal return for US large caps over the next decade
Grantham, Mayo, & van Otterloo (GMO)	-5.80% real returns for US large caps over the next 7 years
JP Morgan Asset Management	4.10% nominal return for US equities over a 10-15-year horizon
Morningstar Investment Management	-0.10% 10-year nominal returns for US stocks
Research Affiliates	2.00% nominal and -0.20% real (inflation adjusted) returns for US large caps during the next 10 years
Vanguard	Nominal equity market returns of 3.70% to 5.70% during the next decade

As Table 9 indicates, the expected market returns (on a nominal basis) range from negative 0.10% to 5.70% for U.S. equities. Mr. O'Donnell, however, estimates an ROE of 9.00% for a utility that is generally less risky than the overall market. If Mr. O'Donnell believes these expected returns are meaningful measures of investor-required returns, which is the subject of his testimony, his recommendation would be no higher than 5.70%.

In addition to the short-term nature of these forecasts and the difference between expected and required returns as discussed in response to Mr. Hinton's testimony, Mr. O'Donnell does not consider the limiting language often contained in documents providing

<sup>104</sup> O'Donnell Direct Testimony, at 65.

<sup>105</sup> *Ibid.*, at 65.



1 expected market returns. For example, JP Morgan Asset Management's *2021 Long-Term*  
2 *Capital Market Assumptions* (the source document for the 4.10% expected market return  
3 noted in Table 9, above) states:

4 Please note that all information shown is based on qualitative analysis.  
5 Exclusive reliance on the above is not advised. This information is not  
6 intended as a recommendation to invest in any particular asset class or  
7 strategy or as a promise of future performance. Note that these asset class  
8 and strategy assumptions are passive only – they do not consider the impact  
9 of active management. References to future returns are not promises or  
10 even estimates of actual returns a client portfolio may achieve.  
11 Assumptions, opinions and estimates are provided for illustrative purposes  
12 only.<sup>106</sup>

13 Regarding the Duke University CFO Survey (Duke CFO Survey),<sup>107</sup> Mr.  
14 O'Donnell's 9.00% recommendation is 221 basis points above the 6.79% expected market  
15 return suggested by the survey.<sup>108</sup> If the survey were a reasonable method of determining  
16 the expected market return, Mr. O'Donnell's ROE recommendation would be no higher  
17 than 6.79%. Further, over time the survey results have rather significantly underestimated  
18 actual market performance (*see*, Table 10).

<sup>106</sup> JP Morgan Asset Management, *2021 Long-Term Capital Market Assumptions*, at PDF 130.

<sup>107</sup> O'Donnell Direct Testimony, at 66.

<sup>108</sup> *Ibid.*, at 67.

**Table 10: S&P 500 Market Return: Accuracy of Duke CFO Survey Estimates**<sup>109</sup>

	Actual	Survey Estimate
2020	18.40%	5.23%
2019	31.49%	4.59%
2018	-4.38%	6.57%
2017	21.83%	5.00%
2016	11.96%	4.32%
2015	1.38%	6.07%
2014	13.69%	5.00%
2013	32.39%	3.40%
2012	16.00%	4.00%
2011	2.11%	5.30%
2010	15.06%	6.28%
Average	14.54%	5.07%

The Duke CFO Survey authors also have noted a distinction between the expected market return on one hand, and the “hurdle rate” on the other. In the Third Quarter 2017 survey, the authors reported an average hurdle rate, which is the return required for capital investments, of 13.50%. The authors further reported the average Weighted Average Cost of Capital, which includes the cost of debt, was 9.20% even though the expected market return was 6.50%.<sup>110</sup>

**Q. DO YOU HAVE ANY ADDITIONAL CONCERNS WITH MR. O'DONNELL'S CAPM ANALYSIS?**

A. Yes. Mr. O'Donnell reviews several data points, but he does not explain how he derives his range of MRPs of 4.25% to 6.25%. For example, it appears Mr. O'Donnell gives

<sup>109</sup> Source: SBBI-2021, Appendix A-1; <http://www.cfosurvey.org> (one-year return estimates as of fourth quarter of the previous year). Note, Graham and Harvey publish the Duke CFO survey.

<sup>110</sup> Duke/CFO Magazine Global Business Outlook Survey – U.S., Third Quarter 2017.

1 significant weight to the May 3, 2021, Charles Schwab report, *Why Market Returns May*  
2 *Be Lower and Global Diversification More Important in the Future*, because that report  
3 includes the only MRP estimates at or above the 6.25% upper end of his range.<sup>111</sup> None  
4 of the other eight sources presented by Mr. O'Donnell include MRP estimates above  
5 5.70%.<sup>112</sup> Given the subjective nature of Mr. O'Donnell's range of MRP estimates, it is  
6 impossible to recreate his analysis.

7 **Q. DOES MR. O'DONNELL PERFORM AN ECAPM?**

8 A. No, he does not. Mr. O'Donnell fails to consider the ECAPM, despite the fact that  
9 numerous tests of the CAPM have confirmed that the empirical Security Market Line  
10 ("SML") described by the traditional CAPM is not as steeply sloped as the predicted SML.  
11 Because of the empirical findings presented in my Direct Testimony, and below, Mr.  
12 O'Donnell should have considered the ECAPM in his CAPM analysis.

13 As discussed in my Direct Testimony, numerous tests of the CAPM have measured  
14 the extent to which security returns and betas are related as predicted by the CAPM. Fama  
15 and French found that "[t]he returns on the low beta portfolios are too high, and the returns  
16 on the high beta portfolios are too low."<sup>113</sup>

17 Similarly, Morin states:<sup>114</sup>

18 With few exceptions, the empirical studies agree that ... low-beta securities  
19 earn returns somewhat higher than the CAPM would predict, and high-beta  
20 securities earn less than predicted.

21 \* \* \*

22 For an alpha in the range of 1%-2% and for reasonable values of the market

<sup>111</sup> O'Donnell Direct Testimony, at 64-66.

<sup>112</sup> *Ibid.*

<sup>113</sup> Eugene F. Fama and Kenneth R. French, *The Capital Asset Pricing Model: Theory and Evidence*, Journal of Economic Perspectives, Vol. 18, No. 3, Summer 2004, at 33.

<sup>114</sup> Morin, at 175 and 190.

1 risk premium and the risk-free rate, Equation 6-5 reduces to the following  
2 more pragmatic form:

3 
$$K = R_F + 0.25 (R_M - R_F) + 0.75 \beta (R_M - R_F) \quad (6-6)$$

4 Over reasonable values of the risk-free rate and the market risk premium,  
5 Equation 6-6 produces results that are indistinguishable from the ECAPM  
6 of Equation 6-5.<sup>12</sup>

7 <sup>12</sup>. . . Therefore, the empirical evidence suggests that the expected return  
8 on a security is related to its risk by the following approximation:

9 
$$K = R_F + x \beta (R_M - R_F) + (1-x) \beta (R_M - R_F)$$

10 where x is a fraction to be determined empirically. The value of x that best  
11 explains the observed relationship  $\text{Return} = 0.0829 + 0.0520 \beta$  is between  
12 0.25 and 0.30. If  $x = 0.25$ , the equation becomes:

13 
$$K = R_F + 0.25(R_M - R_F) + 0.75 \beta (R_M - R_F)$$

14 In addition to the above academic evidence, the New York Public Service  
15 Commission has been using this form of the CAPM, with factors of 0.25 and 0.75, since  
16 the mid-1990s. As such, the ECAPM is a well-established model that has been relied on  
17 in both academic and regulatory settings. I continue to believe it is an appropriate model  
18 to estimate Piedmont's ROE.

19 **F. Response to Mr. O'Donnell's Criticisms**

20 **Q. DOES MR. O'DONNELL HAVE ANY CRITIQUES OF YOUR ANALYSIS?**

21 A. Yes, he does. Critiques of my analysis include: (1) my exclusive reliance on projected EPS  
22 growth rates in the DCF model; (2) that my estimate of the MRP is too high; (3) my use of  
23 the ECAPM; (4) that my RPM is "overly complex" compared to the DCF model; and (5)  
24 a flotation cost adjustment is not appropriate.

25 I have addressed critiques 1, 2, and 3 previously in this testimony and will not  
26 address them again here. I respond to the remaining critiques in turn below.

1   **Q.    WHAT IS YOUR RESPONSE TO MR. O'DONNELL'S CONCERN THAT YOUR**  
2   **RPM IS "OVERLY COMPLEX"? <sup>115</sup>**

3   **A.**    Although Mr. O'Donnell suggests that finance is simple, and his analysis is simple, my  
4    testimony demonstrates that the question of equity financing of a regulated utility is  
5    anything but simple. If finance and determining the ROE were simple, investors would  
6    rely on the DCF model and not consider the results of any other analysis. In fact, other  
7    models would not be necessary. As discussed previously in my Rebuttal Testimony, that  
8    is not the case. No model is appropriate under all market conditions. Because of that, the  
9    use of multiple models is supported in both the financial literature and regulatory  
10   precedent. If determining the appropriate ROE for utilities was as simple as performing a  
11   DCF analysis, none of the expert witnesses in this proceeding, or any other, would be  
12   necessary. As Mr. O'Donnell notes, that is not the case:

13           There is no direct, observable way to determine the rate of return required  
14           by equity investors in any company or group of companies. Investors must  
15           make do with indications from market data and analyst predictions to  
16           estimate the appropriate price of a share.<sup>116</sup>

17           Furthermore, the simplicity of the DCF model does not imply that other models,  
18           such as the RPM are invalid. The DCF model, CAPM, and RPM are based on varying  
19           assumptions and inputs, but are all valid approaches to estimating the ROE and are  
20           supported in both the financial literature and regulatory precedent, as discussed previously.

21           Lastly, my RPM analysis is based on multiple estimates of the Risk Premium, both  
22           historical and forward-looking. Mr. O'Donnell similarly relies on several estimates of the

---

<sup>115</sup>       O'Donnell Direct Testimony, at 40.

<sup>116</sup>       *Ibid.*

1 MRP in his CAPM analysis. Although Mr. O'Donnell finds my RPM to be "overly  
2 complex", I have relied on multiple estimates of the Risk Premium to ensure that my  
3 estimate is not biased by any single approach or data source.

4 Because Mr. O'Donnell finds the RPM complicated does not mean that the model  
5 produces an unreasonable estimate of the ROE for Piedmont. As such, I strongly disagree  
6 with Mr. O'Donnell's implication that my RPM is "convoluted" because he finds it to be  
7 "overly complex."

8 **Q. WHAT IS YOUR RESPONSE TO MR. O'DONNELL'S CONCERN WITH YOUR**  
9 **FLOTATION COST ADJUSTMENT?**

10 A. Flotation costs are reflected on the balance sheet under "paid in capital" and incurred over  
11 time. As a result, flotation costs remain part of a company's cost structure during the test  
12 year and beyond even if the costs were incurred prior to the test year.<sup>117</sup>

13 As noted by Morin:

14 Unlike the case of bonds, common stock has no finite life so that flotation  
15 costs cannot be amortized and therefore must be recovered by way of an  
16 upward adjustment to the allowed return on equity.<sup>118</sup>

17 Morin further notes that the equity capital raised in a given offering remains on the  
18 balance sheet, and as such, it "would be unfair to burden the current generation of  
19 ratepayers with the full costs of raising capital when the benefits of that capital extend  
20 indefinitely."<sup>119</sup>

<sup>117</sup> D'Ascendis Direct Testimony, at 83-84.

<sup>118</sup> Morin, at 327.

<sup>119</sup> *Ibid.* In this quote, Morin is speaking to the issue of recovering flotation costs through rates as they are incurred.

1 Whether paid directly or indirectly through an underwriting discount, the cost  
2 results in net proceeds that are less than the gross proceeds. Under federal law, the  
3 underwriters' compensation must be disclosed in the offering prospectus. In fact, those  
4 prospectuses are the source of the issuance costs included in Schedule DWD-8 to my Direct  
5 Testimony. Because those costs were incurred, the net proceeds to the issuing company  
6 were less than the gross proceeds. Whether the issuer wrote a check or received the  
7 proceeds at a discount does not matter. What does matter is that issuance costs are a  
8 permanent reduction to common equity, and absent a recovery of those costs, the issuing  
9 company will not be able to earn its required return.

10 As further discussed in my Direct Testimony, wholly owned subsidiaries such as  
11 Piedmont receive capital from their parents, and provide returns on the capital that roll up  
12 to the parent, which is designated to attract and raise capital based on the returns of those  
13 subsidiaries.<sup>120</sup> As such, denying recovery of issuance costs would penalize the investors  
14 that fund the utility operations. As shown in Schedule DWD-14R, because of flotation  
15 costs, an authorized return of 10.85% would be required to realize an ROE of 10.75% (i.e.,  
16 a 10-basis point flotation cost adjustment). If flotation costs are not recovered, the growth  
17 rate falls and the ROE decreases to 10.65% (i.e., below the required return).<sup>121</sup>

<sup>120</sup> D'Ascendis Direct Testimony, at 7-8.

<sup>121</sup> Schedule DWD-14R is provided for illustrative purposes only. Please note that I have not relied on the results of the analysis in determining my recommended ROE or range.

**VI. RESPONSE TO CIGFUR WITNESS PHILLIPS**

**Q. PLEASE SUMMARIZE MR. PHILLIPS' DIRECT TESTIMONY AS IT RELATES TO THE COMPANY'S RETURN ON EQUITY.**

A. Mr. Phillips states that the Company's requested ROE is inconsistent with recently authorized returns, which he notes are 9.56% over the 12-month period ending March 31, 2021. He also suggests that the Commission consider Piedmont's cost recovery mechanisms in setting the authorized ROE.

**Q. WHAT IS YOUR RESPONSE TO MR. PHILLIPS?**

A. As discussed in my response to Mr. O'Donnell, average authorized return data obscures the variations in returns and does not address the number of cases nor the jurisdictions issuing orders within a given year. Pointing solely to a 12-month average of authorized returns provides little value in providing context to the appropriate ROE for Piedmont. As further discussed in my response to Mr. O'Donnell, the regulatory environment is one of the most important factors debt and equity investors factor in their assessment of risk. As shown in Table 8, more constructive jurisdictions from an investor standpoint tend to have higher authorized returns.

In addition, as discussed in my response to Mr. Hinton, the cost of capital is a comparative exercise, so if a cost recovery mechanism is common throughout the proxy companies, the comparative risk is zero because any impact of the perceived reduced risk of the mechanism(s) by investors would be reflected in the market data of the proxy group. To that point, as shown on Schedule DWD-8R, ten of the eleven companies in Mr. Hinton's



1 proxy group have a capital investment rider and ten of his eleven proxy group companies  
2 have a decoupling mechanism in at least one of their jurisdictions.

3 **VII. CONCLUSION**

4 **Q. PLEASE SUMMARIZE YOUR REBUTTAL TESTIMONY.**

5 A. In this Rebuttal Testimony I updated my ROE models with market data as of July 30, 2021.  
6 The results of the ROE models produced indicated ranges of ROEs from 9.59% to 12.72%  
7 (unadjusted) and from 9.70% to 12.83% (adjusted).<sup>122</sup> Given these ranges, I maintain my  
8 initial recommendation of 10.25%, which, in light of the current capital markets, is  
9 reasonable, if not conservative.

10 Regarding the Opposing Witnesses' direct testimonies, I discussed my  
11 disagreements with their analyses, which I supported with citations to the academic  
12 literature and empirical analyses. I also responded to any critiques to my Direct Testimony,  
13 again, supporting my responses with citations to the academic literature and empirical  
14 analyses.

15 **Q. SHOULD ANY OR ALL OF THE ARGUMENTS MADE BY THE OPPOSING**  
16 **WITNESSES PERSUADE THE COMMISSION TO LOWER THE RETURN ON**  
17 **COMMON EQUITY IT APPROVES FOR PIEDMONT BELOW YOUR**  
18 **RECOMMENDATION?**

19 A. No, they should not. My recommended cost of common equity of 10.25% is both  
20 reasonable and conservative. It will provide the Company with sufficient earnings to

---

<sup>122</sup> D'Ascendis Rebuttal Testimony, Exhibit DWD-1R, at 2.

1 enable it to attract necessary new capital efficiently and at a reasonable cost, to the benefit  
2 of both customers and investors.

3 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

4 **A.** Yes, it does.

Piedmont Natural Gas Company  
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Piedmont Natural Gas Company  
Brief Summary of Common Equity Cost Rate

Line No.	Principal Methods	Proxy Group of Seven Natural Gas Distribution Companies	Results using Current Interest Rates
1.	Discounted Cash Flow Model (DCF) (1)	9.59%	9.59%
2.	Risk Premium Model (RPM) (2)	10.71%	10.25%
3.	Capital Asset Pricing Model (CAPM) (3)	12.02%	11.79%
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	12.72%	12.38%
5.	Indicated Range of Common Equity Cost Rates before Adjustment for Size Risk	9.59% - 12.72%	9.59% - 12.38%
6.	Size Risk Adjustment (5)	0.00%	0.00%
7.	Flotation Cost Adjustment (6)	0.11%	0.11%
8.	Recommended Range of Common Equity Cost Rates after Adjustment for Size Risk	9.70% - 12.83%	9.70% - 12.49%
9.	Recommended Cost of Common Equity Cost Rates after Adjustment for Size Risk	10.25%	

- Notes: (1) From page 2 of this Schedule.  
(2) From page 10 of this Schedule.  
(3) From page 23 of this Schedule.  
(4) From page 28 of this Schedule.  
(5) As discussed in Mr. D'Ascendis' Direct Testimony, a size adjustment is not applicable in this proceeding.  
(6) From page 37 of this Schedule.

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Piedmont Natural Gas Company  
Indicated Common Equity Cost Rate Using the Discounted Cash Flow Model for the  
Proxy Group of Seven Natural Gas Distribution Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Seven Natural Gas Distribution Companies	Average Dividend Yield (1)	Value Line Projected Five Year Growth in EPS (2)	Zack's Five Year Projected Growth Rate in EPS	Bloomberg's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth in EPS (3)	Adjusted Dividend Yield (4)	Indicated Common Equity Cost Rate (5)
Atmos Energy Corporation	2.51	7.00	7.34	7.43	7.17	7.24	2.60	9.84
New Jersey Resources Corporation	3.21	2.00	7.10	7.55	6.00	5.66	3.30	8.96
Northwest Natural Holding Company	3.60	5.50	4.93	4.73	3.80	4.74	3.69	8.43
ONE Gas, Inc.	3.09	6.50	5.00	5.00	5.00	5.38	3.17	8.55
South Jersey Industries, Inc.	4.61	11.50	5.43	4.76	4.80	6.62	4.76	11.38
Southwest Gas Holdings, Inc.	3.51	9.00	5.50	5.17	4.00	5.92	3.61	9.53
Spire Inc.	3.56	10.00	5.49	6.00	7.31	7.20	3.69	10.89
							Average	9.65
							Median	9.53
							Average of Mean and Median	9.59

NA= Not Available  
NMF= Not Meaningful Figure

Notes:

- (1) Indicated dividend at 07/30/2021 divided by the average closing price of the last 60 trading days ending 07/30/2021 for each company.
- (2) From pages 3 through 9 of this Schedule.
- (3) Average of columns 2 through 5 excluding negative growth rates.
- (4) This reflects a growth rate component equal to one-half the conclusion of growth rate (from column 6) x column 1 to reflect the periodic payment of dividends (Gordon Model) as opposed to the continuous payment. Thus, for Atmos Energy Corporation,  $2.51\% \times (1 + (1/2 \times 7.24\%)) = 2.60\%$ .
- (5) Column 6 + column 7.

Source of Information:

Value Line Investment Survey  
www.zacks.com Downloaded on 07/30/2021  
www.yahoo.com Downloaded on 07/30/2021  
Bloomberg Professional Services

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NEW JERSEY RES. NYSE-NJR										RECENT PRICE	42.59	P/E RATIO	19.4	(Trailing: 15.5 Median: 17.0)	RELATIVE P/E RATIO	0.89	DIV'D YLD	3.1%	VALUE LINE	
TIMELINESS	3	Raised 5/21/21	High: 22.0	25.2	25.1	23.8	32.1	34.1	38.9	45.4	51.8	51.2	44.7	43.9					Target Price Range	
SAFETY	2	Lowered 4/17/20	Low: 16.7	19.8	19.3	19.5	21.9	26.8	30.5	33.7	35.6	40.3	21.1	33.3					2024 2025 2026	
TECHNICAL	3	Raised 4/16/21	LEGENDS																	
BETA	1.00	(1.00 = Market)	0.40 x Dividends p sh divided by Interest Rate																	
			..... Relative Price Strength																	
			3-for-2 split 3/08																	
			2-for-1 split 3/15																	
			Options: Yes																	
			Shaded area indicates recession																	
18-Month Target Price Range																				
Low-High																				
Midpoint (% to Mid)																				
\$16-\$52																				
\$34 (-20%)																				
2024-26 PROJECTIONS																				

<p><b>(A)</b> Diluted earnings per share. Excludes non-recurring items: '06, (\$0.06); '08, (\$0.03); '09, \$0.06; May not sum due to rounding. Next earnings report due in early Aug.</p>	<p><b>(B)</b> Dividends historically paid in mid-February, May, August, and November.  <b>■</b> Dividend reinvestment plan available.  <b>(C)</b> In millions.</p>	<p><b>(D)</b> Includes intangibles. In 2020: \$69.2 million, \$2.26/share.</p>	<p><b>Company's Financial Strength</b> A  <b>Stock's Price Stability</b> 85  <b>Price Growth Persistence</b> 30  <b>Earnings Predictability</b> 5</p>
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<p><b>(A)</b> Based on economic eggs. from 2007. GAAP EPS: '10, \$1.11; '11, \$1.49; '12, \$1.49; '13, \$1.28; '14, \$1.46; '15, \$1.52; '16, \$1.56; '17, \$0.04; '18, \$0.21; '19, \$0.84; '20, \$1.62. Excl.</p>	<p>nonrecur. gain (loss): '10, (\$0.24); '11, \$0.04; '12, (\$0.03); '13, (\$0.24); '14, (\$0.11); '15, \$0.08; '16, \$0.22; '17, \$1.27; '18, (\$1.17); '19, (\$0.28); '20, (\$0.06). Next eggs. rpt. due early</p>	<p>August. <b>(B)</b> Div'ds paid early April, July, Oct., and late Dec. ■ Div. reinvest. plan avail. <b>(C)</b> Incl. reg. assets. In 2020: \$674.0 mill., \$6.70 per shr. <b>(D)</b> In mill., adj. for split.</p>	<p><b>Company's Financial Strength</b> B++  <b>Stock's Price Stability</b> 60  <b>Price Growth Persistence</b> 15  <b>Earnings Predictability</b> 65</p>
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<p><b>(A)</b> Diluted earnings. Excl. nonrec. gains (losses): '05, (11c); '06, 7c. Next egs. report due early August. <b>(B)</b> Dividends historically paid early March, June, September, and December. <b>(C)</b> In millions. <b>(D)</b> Totals may not sum due to rounding.</p>	<p>Company's Financial Strength Stock's Price Stability Price Growth Persistence Earnings Predictability</p>	<p>A 80 60 100</p>
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<p><b>(A)</b> Fiscal year ends Sept. 30th. <b>(B)</b> Based on diluted shares outstanding. Excludes nonrecurring loss: '06, 7c. Excludes gain from discontinued operations: '08, 94c. Next earnings report</p>	<p>due late July. <b>(C)</b> Dividends paid in early January, April, July, and October. ■ Dividend reinvestment plan available. <b>(D)</b> Incl. deferred charges. In '20: \$1,171.6 mill., \$22.71/sh.</p>	<p><b>(E)</b> In millions. <b>(F)</b> Qtlly. egs. may not sum due to rounding or change in shares outstanding.</p>	<p><b>Company's Financial Strength</b> B++  <b>Stock's Price Stability</b> 90  <b>Price Growth Persistence</b> 55  <b>Earnings Predictability</b> 50</p>
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Piedmont Natural Gas Company  
Summary of Risk Premium Models for the  
Proxy Group of Seven Natural Gas Distribution Companies

	<u>Proxy Group of Seven Natural Gas Distribution Companies</u>	<u>Results using Current Interest Rates</u>
Predictive Risk Premium Model (PRPM) (1)	10.86 %	10.26 %
Risk Premium Using an Adjusted Total Market Approach (2)	<u>10.56 %</u>	<u>10.24 %</u>
Average	<u><u>10.71 %</u></u>	<u><u>10.25 %</u></u>

Notes:

(1) From page 11 of this Schedule.

(2) From page 12 of this Schedule.

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Piedmont Natural Gas Company  
Indicated ROE  
Derived by the Predictive Risk Premium Model (1)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Seven Natural Gas Distribution Companies	LT Average Predicted Variance	Spot Predicted Variance	Recommended Variance (2)	GARCH Coefficient	Predicted Risk Premium (3)	Risk-Free Rate (4)	Indicated ROE (6)
Atmos Energy Corporation	0.33%	0.41%	0.33%	2.2493	9.37%	2.74%	12.11%
New Jersey Resources Corporation	0.38%	0.38%	0.38%	2.0290	9.71%	2.74%	12.45%
Northwest Natural Holding Company	0.32%	0.29%	0.32%	1.5450	6.16%	2.74%	8.90%
ONE Gas, Inc.	0.29%	0.35%	0.29%	3.8153	14.28%	2.74%	17.02% (7)
South Jersey Industries, Inc.	0.39%	0.55%	0.39%	1.6294	7.80%	2.74%	10.54%
Southwest Gas Holdings, Inc.	0.43%	0.34%	0.43%	1.3833	7.43%	2.74%	10.17%
Spire Inc.	0.71%	0.45%	0.71%	0.9478	8.38%	2.74%	11.12%
						Average	10.88%
						Median	10.83%
						Average of Mean and Median	10.86%

Using Current Interest Rates

Proxy Group of Seven Natural Gas Distribution Companies	LT Average Predicted Variance	Spot Predicted Variance	Recommended Variance (2)	GARCH Coefficient	Predicted Risk Premium (3)	Risk-Free Rate (5)	Indicated ROE (6)
Atmos Energy Corporation	0.33%	0.41%	0.33%	2.2493	9.37%	2.14%	11.51%
New Jersey Resources Corporation	0.38%	0.38%	0.38%	2.0290	9.71%	2.14%	11.85%
Northwest Natural Holding Company	0.32%	0.29%	0.32%	1.5450	6.16%	2.14%	8.30%
ONE Gas, Inc.	0.29%	0.35%	0.29%	3.8153	14.28%	2.14%	16.42% (7)
South Jersey Industries, Inc.	0.39%	0.55%	0.39%	1.6294	7.80%	2.14%	9.94%
Southwest Gas Holdings, Inc.	0.43%	0.34%	0.43%	1.3833	7.43%	2.14%	9.57%
Spire Inc.	0.71%	0.45%	0.71%	0.9478	8.38%	2.14%	10.52%
						Average	10.28%
						Median	10.23%
						Average of Mean and Median	10.26%

Notes:

- (1) The Predictive Risk Premium Model uses historical data to generate a predicted variance and a GARCH coefficient. The historical data used are the equity risk premiums for the first available trading month as reported by Bloomberg Professional Service.
- (2) Given current market conditions, I recommend using the long-term average predicted variance.
- (3)  $(1 + (\text{Column [3]} * \text{Column [4]})^{12}) - 1$ .
- (4) From note 2 on page 24 of this Schedule.
- (5) From note 3 on page 24 of this Schedule.
- (6) Column [5] + Column [6].
- (7) Results were excluded from the final average and median as they were more than 2 standard deviations from the proxy group's mean.

Piedmont Natural Gas Company  
Indicated Common Equity Cost Rate  
Through Use of a Risk Premium Model  
Using an Adjusted Total Market Approach

<u>Line No.</u>		<u>Proxy Group of Seven Natural Gas Distribution Companies</u>	<u>Results using Current Interest Rates</u>
1.	Prospective Yield on Aaa Rated Corporate Bonds (1)	3.48 %	
2.	Adjustment to Reflect Yield Spread Between Aaa Rated Corporate Bonds and A2 Rated Public Utility Bonds	<u>0.38 (2)</u>	
3.	Adjusted Prospective Yield on A2 Rated Public Utility Bonds	3.86 %	
4.	Current Yield on A2 Rated Public Utility Bonds (3)		3.15 %
5.	Adjustment to Reflect Bond Rating Difference of Proxy Group(4)	<u>0.08</u>	<u>0.08</u>
6.	Adjusted Bond Yield	3.94 %	3.23 %
7.	Equity Risk Premium (5)	<u>6.62</u>	<u>7.01</u>
8.	Risk Premium Derived Common Equity Cost Rate	<u><u>10.56</u> %</u>	<u><u>10.24</u> %</u>

- Notes:
- (1) Consensus forecast of Moody's Aaa Rated Corporate bonds from Blue Chip Financial Forecasts (see pages 19 and 20 of this Schedule).
  - (2) The average yield spread of A2 rated public utility bonds over Aaa rated corporate bonds of 0.38% from page 13 of this Schedule.
  - (3) Source of Information: Bloomberg Professional Services.
  - (4) Adjustment to reflect the A2/A3 Moody's LT issuer rating of the Utility Proxy Group as shown on page 14 of this Schedule. The 0.08% upward adjustment is derived by taking 1/3 of the spread between A2 and Baa2 Public Utility Bonds ( $1/3 * 0.25\% = 0.08\%$ ) as derived from page 13 of this Schedule.
  - (5) From page 16 of this Schedule.

Piedmont Natural Gas Company  
Interest Rates and Bond Spreads for  
Moody's Corporate and Public Utility Bonds

Selected Bond Yields - Moody's

	[1]	[2]	[3]
	<u>Aaa Rated Corporate Bond</u>	<u>A2 Rated Public Utility Bond</u>	<u>Baa2 Rated Public Utility Bond</u>
Jul-2021	2.57 %	2.95 %	3.20 %
Jun-2021	2.79	3.16	3.41
May-2021	<u>2.96</u>	<u>3.33</u>	<u>3.58</u>
Average	<u>2.77 %</u>	<u>3.15 %</u>	<u>3.40 %</u>

Selected Bond Spreads

A2 Rated Public Utility Bonds Over Aaa Rated Corporate Bonds:

0.38 % (1)

Baa2 Rated Public Utility Bonds Over A2 Rated Public Utility Bonds:

0.25 % (2)

Notes:

(1) Column [2] - Column [1].

(2) Column [3] - Column [2].

Source of Information:

Bloomberg Professional Service



Piedmont Natural Gas Company  
Comparison of Long-Term Issuer Ratings for  
Proxy Group of Seven Natural Gas Distribution Companies

	Moody's		Standard & Poor's	
	Long-Term Issuer Rating		Long-Term Issuer Rating	
	July 2021		July 2021	
<u>Proxy Group of Seven Natural Gas Distribution Companies</u>	<u>Long-Term Issuer Rating (1)</u>	<u>Numerical Weighting (2)</u>	<u>Long-Term Issuer Rating (1)</u>	<u>Numerical Weighting (2)</u>
Atmos Energy Corporation	A1	5.0	A-	7.0
New Jersey Resources Corporation	A1	5.0	NR	- -
Northwest Natural Holding Company	Baa1	8.0	A+	5.0
ONE Gas, Inc.	A3	7.0	BBB+	8.0
South Jersey Industries, Inc.	A3	7.0	BBB	9.0
Southwest Gas Holdings, Inc.	Baa1	8.0	A-	7.0
Spire Inc.	A1/A2	5.5	A-	7.0
Average	<u>A2/A3</u>	<u>6.5</u>	<u>A-</u>	<u>7.2</u>

Notes:

- (1) Ratings are that of the average of each company's utility operating subsidiaries.  
(2) From page 15 of this Schedule.

Source Information:     Moody's Investors Service  
                                 Standard & Poor's Global Utilities Rating Service

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Numerical Assignment for  
Moody's and Standard & Poor's Bond Ratings

Moody's Bond Rating	Numerical Bond Weighting	Standard & Poor's Bond Rating
Aaa	1	AAA
Aa1	2	AA+
Aa2	3	AA
Aa3	4	AA-
A1	5	A+
A2	6	A
A3	7	A-
Baa1	8	BBB+
Baa2	9	BBB
Baa3	10	BBB-
Ba1	11	BB+
Ba2	12	BB
Ba3	13	BB-
B1	14	B+
B2	15	B
B3	16	B-

Piedmont Natural Gas Company  
Judgment of Equity Risk Premium for  
Proxy Group of Seven Natural Gas Distribution Companies

Line No.		Proxy Group of Seven Natural Gas Distribution Companies	Results using Current Interest Rates
1.	Calculated equity risk premium based on the total market using the beta approach (1)	8.37 %	8.79 %
2.	Mean equity risk premium based on a study using the holding period returns of public utilities with A rated bonds (2)	5.80	6.20
3.	Predicted Equity Risk Premium Based on Regression Analysis of 803 Fully-Litigated Natural Gas Utility Rate Cases (3)	<u>5.69</u>	<u>6.04</u>
4.	Average equity risk premium	<u><u>6.62</u> %</u>	<u><u>7.01</u> %</u>

Notes: (1) From page 17 of this Schedule.  
(2) From page 21 of this Schedule.  
(3) From page 22 of this Schedule.

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Piedmont Natural Gas Company  
Derivation of Equity Risk Premium Based on the Total Market Approach  
Using the Beta for the  
Proxy Group of Seven Natural Gas Distribution Companies

<u>Line No.</u>	<u>Equity Risk Premium Measure</u>	<u>Proxy Group of Seven Natural Gas Distribution Companies</u>	<u>Results using Current Interest Rates</u>
<u>Ibbotson-Based Equity Risk Premiums:</u>			
1.	Ibbotson Equity Risk Premium (1)	5.92 %	5.92 %
2.	Regression on Ibbotson Risk Premium Data	8.79 (2)	9.55 (3)
3.	Ibbotson Equity Risk Premium based on PRPM (4)	9.96	9.96
4.	Equity Risk Premium Based on Value Line Summary and Index	5.03 (5)	5.68 (6)
5.	Equity Risk Premium Based on Value Line S&P 500 Companies	11.20 (7)	11.84 (8)
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies	<u>13.08 (9)</u>	<u>13.73 (10)</u>
7.	Conclusion of Equity Risk Premium	9.00 %	9.45 %
8.	Adjusted Beta (11)	<u>0.93</u>	<u>0.93</u>
9.	Forecasted Equity Risk Premium	<u>8.37 %</u>	<u>8.79 %</u>

Notes provided on page 18 of this Schedule.

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Piedmont Natural Gas Company  
Derivation of Equity Risk Premium Based on the Total Market Approach  
Using the Beta for the  
Proxy Group of Seven Natural Gas Distribution Companies

Notes:

- (1) Based on the arithmetic mean historical monthly returns on large company common stocks from Ibbotson® SBBI® 2021 Market Report minus the arithmetic mean monthly yield of Moody's average Aaa and Aa corporate bonds from 1928-2020.
- (2) This equity risk premium is based on a regression of the monthly equity risk premiums of large company common stocks relative to Moody's average Aaa and Aa2 rated corporate bond yields from 1928-2019 referenced in Note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the average consensus forecast of Aaa corporate bonds of 3.48% (from page 12 of this Schedule).
- (3) This equity risk premium is based on a regression of the monthly equity risk premiums of large company common stocks relative to Moody's average Aaa and Aa2 rated corporate bond yields from 1928-2019 referenced in Note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the three-month average Aaa and Aa2 rated corporate bond of 2.84%.
- (4) The Predictive Risk Premium Model (PRPM) is discussed in the accompanying direct testimony. The Ibbotson equity risk premium based on the PRPM is derived by applying the PRPM to the monthly risk premiums between Ibbotson large company common stock monthly returns and average Aaa and Aa corporate monthly bond yields, from January 1928 through July 2021.
- (5) The equity risk premium based on the Value Line Summary and Index is derived by subtracting the average consensus forecast of Aaa corporate bonds of 3.48% (from page 12 of this Schedule) from the projected 3-5 year total annual market return of 8.51% (described fully in note 1 on page 24 of this Schedule).
- (6) The equity risk premium based on the Value Line Summary and Index is derived by subtracting the current 3 month average of Aaa and Aa2 corporate bonds of 2.84% (from page 12 of this Schedule) from the projected 3-5 year total annual market return of 8.51% (described fully in note 1 on page 24 of this Schedule).
- (7) Using data from Value Line for the S&P 500, an expected total return of 14.68% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the average consensus forecast of Aaa corporate bonds of 3.48% results in an expected equity risk premium of 11.20%.
- (8) Using data from Value Line for the S&P 500, an expected total return of 14.68% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the current 3 month average of Aaa and Aa2 corporate bonds of 2.84% results in an expected equity risk premium of 11.84%.
- (9) Using data from the Bloomberg Professional Service for the S&P 500, an expected total return of 16.56% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the average consensus forecast of Aaa corporate bonds of 3.48% results in an expected equity risk premium of 13.08%.
- (10) Using data from the Bloomberg Professional Service for the S&P 500, an expected total return of 16.56% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the 3 month average of Aaa and Aa2 corporate bonds of 2.84% results in an expected equity risk premium of 13.73%.
- (11) Average of mean and median beta from page 23 of this Schedule.

Sources of Information:

Stocks, Bonds, Bills, and Inflation - 2021 SBBI Yearbook, John Wiley & Sons, Inc.  
Industrial Manual and Mergent Bond Record Monthly Update.  
Value Line Summary and Index  
Blue Chip Financial Forecasts, August 3, 2021 and June 1, 2021  
Bloomberg Professional Service

## Consensus Forecasts of U.S. Interest Rates and Key Assumptions

Interest Rates	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month				3Q 2021	4Q 2021	1Q 2022	2Q 2022	3Q 2022	4Q 2022
	Jul 23	Jul 16	Jul 9	Jul 2	Jun	May	Apr	2Q 2021	2021	2021	2022	2022	2022	2022
Federal Funds Rate	0.10	0.10	0.10	0.10	0.08	0.06	0.07	0.07	0.1	0.1	0.1	0.1	0.1	0.1
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.3	3.3	3.3
LIBOR, 3-mo.	0.13	0.13	0.13	0.14	0.13	0.15	0.18	0.16	0.2	0.2	0.2	0.3	0.3	0.3
Commercial Paper, 1-mo.	0.05	0.06	0.06	0.05	0.04	0.10	0.04	0.06	0.1	0.1	0.1	0.1	0.2	0.2
Treasury bill, 3-mo.	0.05	0.05	0.06	0.05	0.04	0.02	0.02	0.03	0.1	0.1	0.1	0.1	0.2	0.2
Treasury bill, 6-mo.	0.05	0.05	0.06	0.06	0.05	0.04	0.04	0.04	0.1	0.1	0.1	0.2	0.2	0.2
Treasury bill, 1 yr.	0.07	0.08	0.08	0.08	0.07	0.05	0.06	0.06	0.1	0.1	0.2	0.2	0.3	0.3
Treasury note, 2 yr.	0.21	0.24	0.22	0.25	0.20	0.16	0.16	0.17	0.2	0.3	0.4	0.5	0.5	0.6
Treasury note, 5 yr.	0.71	0.81	0.78	0.88	0.84	0.82	0.86	0.84	0.9	1.0	1.1	1.2	1.3	1.3
Treasury note, 10 yr.	1.26	1.36	1.34	1.47	1.52	1.62	1.64	1.59	1.5	1.6	1.8	1.9	1.9	2.0
Treasury note, 30 yr.	1.89	1.97	1.96	2.08	2.16	2.32	2.30	2.26	2.1	2.3	2.4	2.5	2.6	2.6
Corporate Aaa bond	2.69	2.74	2.74	2.81	2.91	3.06	3.04	3.00	2.8	3.0	3.1	3.2	3.3	3.3
Corporate Baa bond	3.13	3.19	3.19	3.26	3.35	3.52	3.51	3.46	3.5	3.7	3.9	4.0	4.1	4.2
State & Local bonds	2.59	2.60	2.63	2.66	2.64	2.64	2.66	2.65	2.4	2.5	2.6	2.6	2.7	2.7
Home mortgage rate	2.78	2.88	2.90	2.98	2.98	2.96	3.06	3.00	3.0	3.2	3.3	3.4	3.5	3.5

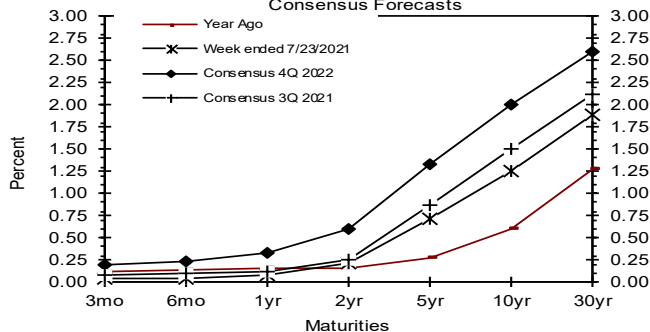
  

Key Assumptions	History								Consensus Forecasts-Quarterly					
	3Q 2019	4Q 2019	1Q 2020	2Q 2020	3Q 2020	4Q 2020	1Q 2021	2Q 2021	3Q 2021	4Q 2021	1Q 2022	2Q 2022	3Q 2022	4Q 2022
	2019	2019	2020	2020	2020	2020	2021	2021	2021	2021	2022	2022	2022	2022
Fed's AFE \$ Index	110.6	110.5	111.4	112.4	107.3	105.2	103.4	102.9	104.5	104.4	104.0	103.9	103.9	104.0
Real GDP	2.8	1.9	-5.1	-31.2	33.8	4.5	6.3	6.5	7.2	5.5	4.0	3.3	2.7	2.3
GDP Price Index	1.4	1.5	1.6	-1.5	3.6	2.2	4.3	6.0	3.7	2.5	2.4	2.3	2.3	2.3
Consumer Price Index	1.3	2.6	1.0	-3.1	4.7	2.4	3.7	8.4	4.7	2.4	2.2	2.4	2.4	2.2
PCE Price Index	1.1	1.7	1.3	-1.6	3.7	1.5	3.8	6.4	3.7	2.2	2.1	2.3	2.2	2.2

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index, PCE Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP, GDP Price Index and PCE Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index history is from the Department of Labor's Bureau of Labor Statistics (BLS).

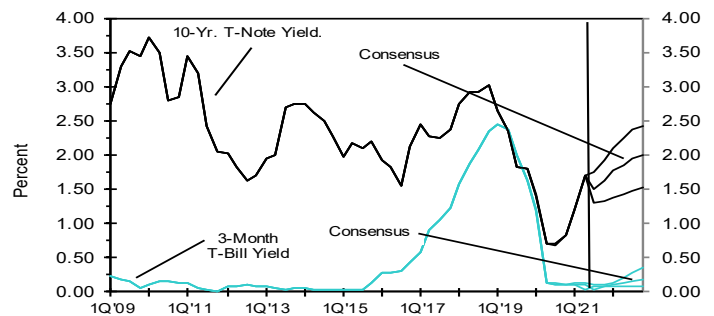
## U.S. Treasury Yield Curve

Week ended July 23, 2021 & Year Ago v.s.  
3Q 2021 & 4Q 2022  
Consensus Forecasts



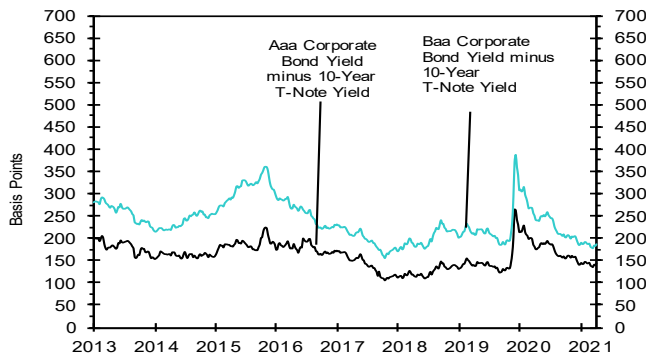
## U.S. 3-Mo. T-Bills &amp; 10-Yr. T-Note Yield

(Quarterly Average) Forecast



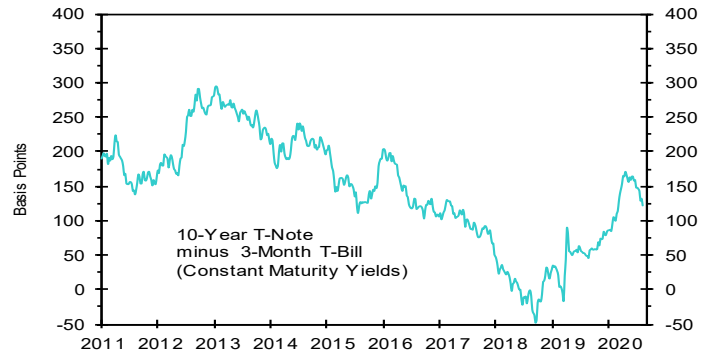
## Corporate Bond Spreads

As of week ended July 23, 2021



## U.S. Treasury Yield Curve

As of week ended July 23, 2021



## Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2022 through 2027 and averages for the five-year periods 2023-2027 and 2028-2032. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year						Five-Year Averages	
		2022	2023	2024	2025	2026	2027	2023-2027	2028-2032
1. Federal Funds Rate	CONSENSUS	0.1	0.4	1.0	1.6	1.9	2.1	1.4	2.2
	Top 10 Average	0.2	0.7	1.6	2.4	2.6	2.7	2.0	2.7
	Bottom 10 Average	0.1	0.1	0.5	0.9	1.3	1.5	0.9	1.6
2. Prime Rate	CONSENSUS	3.3	3.5	4.2	4.7	5.0	5.2	4.5	5.2
	Top 10 Average	3.4	3.8	4.7	5.4	5.7	5.8	5.1	5.8
	Bottom 10 Average	3.2	3.3	3.7	4.0	4.4	4.6	4.0	4.7
3. LIBOR, 3-Mo.	CONSENSUS	0.4	0.6	1.3	1.8	2.1	2.3	1.6	2.4
	Top 10 Average	0.5	1.0	1.8	2.4	2.7	2.9	2.2	3.0
	Bottom 10 Average	0.2	0.4	0.8	1.2	1.6	1.7	1.1	1.8
4. Commercial Paper, 1-Mo	CONSENSUS	0.2	0.6	1.3	1.8	2.1	2.3	1.6	2.4
	Top 10 Average	0.4	0.9	1.6	2.3	2.6	2.8	2.0	2.8
	Bottom 10 Average	0.1	0.3	0.9	1.3	1.8	1.9	1.2	2.0
5. Treasury Bill Yield, 3-Mo	CONSENSUS	0.2	0.5	1.0	1.6	1.9	2.1	1.4	2.2
	Top 10 Average	0.3	0.8	1.6	2.2	2.5	2.7	1.9	2.7
	Bottom 10 Average	0.1	0.2	0.6	0.9	1.3	1.5	0.9	1.6
6. Treasury Bill Yield, 6-Mo	CONSENSUS	0.2	0.5	1.1	1.6	2.0	2.2	1.5	2.3
	Top 10 Average	0.3	0.8	1.7	2.3	2.6	2.7	2.0	2.8
	Bottom 10 Average	0.1	0.3	0.6	1.0	1.4	1.6	1.0	1.7
7. Treasury Bill Yield, 1-Yr	CONSENSUS	0.3	0.7	1.2	1.8	2.1	2.3	1.6	2.4
	Top 10 Average	0.5	1.0	1.8	2.4	2.8	2.9	2.2	3.0
	Bottom 10 Average	0.2	0.3	0.7	1.1	1.5	1.7	1.1	1.8
8. Treasury Note Yield, 2-Yr	CONSENSUS	0.5	0.9	1.5	2.0	2.3	2.5	1.8	2.6
	Top 10 Average	0.7	1.3	2.1	2.7	3.0	3.1	2.5	3.3
	Bottom 10 Average	0.3	0.5	0.9	1.3	1.6	1.8	1.2	1.9
9. Treasury Note Yield, 5-Yr	CONSENSUS	1.2	1.6	2.1	2.5	2.8	2.8	2.4	3.0
	Top 10 Average	1.5	2.0	2.8	3.3	3.5	3.5	3.0	3.6
	Bottom 10 Average	0.9	1.2	1.5	1.8	2.0	2.2	1.7	2.3
10. Treasury Note Yield, 10-Yr	CONSENSUS	2.0	2.4	2.7	3.0	3.2	3.3	2.9	3.3
	Top 10 Average	2.3	2.8	3.4	3.8	4.0	3.9	3.6	4.0
	Bottom 10 Average	1.7	1.9	2.1	2.3	2.5	2.6	2.3	2.7
11. Treasury Bond Yield, 30-Yr	CONSENSUS	2.6	2.9	3.3	3.6	3.8	3.8	3.5	3.9
	Top 10 Average	3.0	3.5	4.0	4.5	4.6	4.5	4.2	4.6
	Bottom 10 Average	2.3	2.4	2.5	2.7	2.9	3.1	2.7	3.2
12. Corporate Aaa Bond Yield	CONSENSUS	3.3	3.7	4.1	4.5	4.7	4.7	4.3	4.8
	Top 10 Average	3.6	4.2	4.7	5.2	5.4	5.4	5.0	5.4
	Bottom 10 Average	3.1	3.2	3.4	3.7	3.9	4.1	3.7	4.2
13. Corporate Baa Bond Yield	CONSENSUS	4.3	4.7	5.1	5.4	5.6	5.7	5.3	5.8
	Top 10 Average	4.6	5.1	5.6	6.1	6.3	6.2	5.9	6.4
	Bottom 10 Average	4.0	4.3	4.5	4.7	4.9	5.2	4.7	5.2
14. State & Local Bonds Yield	CONSENSUS	2.9	3.2	3.6	3.9	4.1	4.2	3.8	4.2
	Top 10 Average	3.2	3.5	4.1	4.5	4.7	4.7	4.3	4.8
	Bottom 10 Average	2.6	2.9	3.1	3.4	3.7	3.7	3.3	3.8
15. Home Mortgage Rate	CONSENSUS	3.6	4.0	4.4	4.7	4.9	5.0	4.6	5.0
	Top 10 Average	4.0	4.5	5.0	5.5	5.6	5.6	5.2	5.7
	Bottom 10 Average	3.2	3.6	3.8	4.0	4.2	4.3	4.0	4.4
A. Fed's AFE Nominal \$ Index	CONSENSUS	103.7	103.7	104.0	103.7	103.6	103.3	103.7	103.1
	Top 10 Average	105.3	106.0	106.8	107.0	107.3	107.5	106.9	107.9
	Bottom 10 Average	102.0	101.5	101.4	100.8	100.4	100.0	100.8	99.4
		Year-Over-Year, % Change						Five-Year Averages	
		2022	2023	2024	2025	2026	2027	2023-2027	2028-2032
B. Real GDP	CONSENSUS	4.2	2.6	2.3	2.2	2.1	2.1	2.2	2.1
	Top 10 Average	5.3	3.3	2.7	2.5	2.4	2.4	2.7	2.5
	Bottom 10 Average	2.9	2.0	1.9	1.8	1.8	1.7	1.8	1.7
C. GDP Chained Price Index	CONSENSUS	2.3	2.3	2.2	2.1	2.2	2.1	2.2	2.1
	Top 10 Average	2.6	2.6	2.4	2.4	2.4	2.4	2.4	2.3
	Bottom 10 Average	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	CONSENSUS	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2
	Top 10 Average	2.8	2.7	2.5	2.5	2.5	2.4	2.5	2.4
	Bottom 10 Average	2.1	2.1	1.9	1.9	2.0	1.9	2.0	1.9
E. PCE Price Index	CONSENSUS	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1
	Top 10 Average	2.7	2.5	2.4	2.4	2.4	2.4	2.4	2.3
	Bottom 10 Average	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9

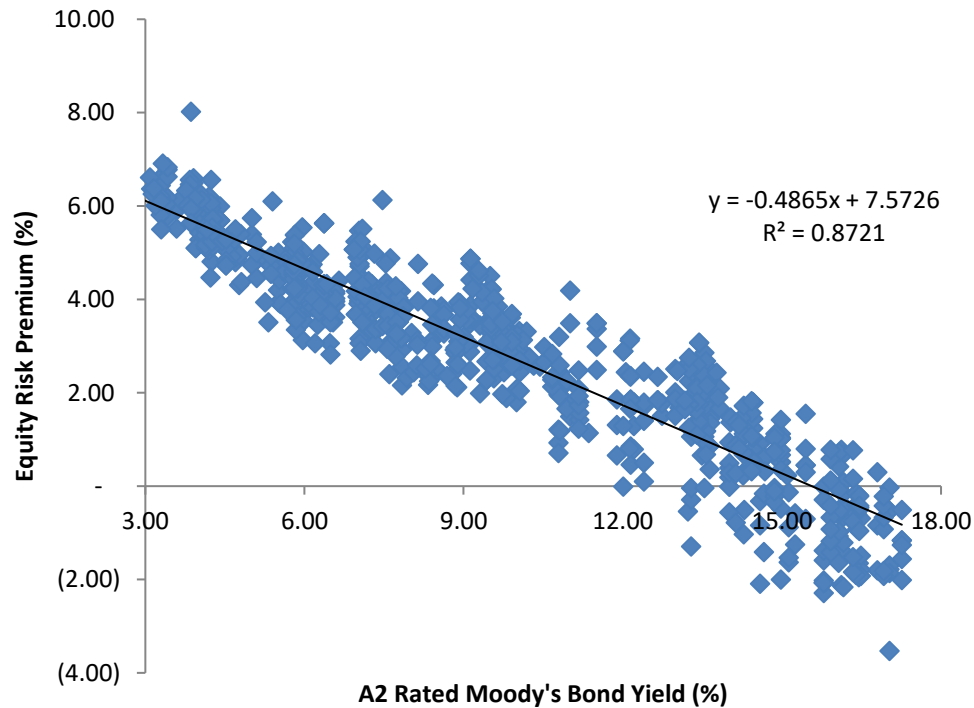
Piedmont Natural Gas Company  
Derivation of Mean Equity Risk Premium Based Studies  
Using Holding Period Returns and  
Projected Market Appreciation of the S&P Utility Index

<u>Line No.</u>		<u>Implied Equity Risk Premium</u>	<u>Results using Current Interest Rates</u>
	<u>Equity Risk Premium based on S&amp;P Utility Index Holding Period Returns (1):</u>		
1.	Historical Equity Risk Premium	4.16 %	4.16 %
2.	Regression of Historical Equity Risk Premium	6.45 (2)	7.03 (3)
3.	Forecasted Equity Risk Premium Based on PRPM (4)	5.62	5.62
4.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Value Line Data)	7.37 (5)	8.08 (6)
5.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Bloomberg Data)	<u>5.38 (7)</u>	<u>6.09 (8)</u>
6.	Average Equity Risk Premium (9)	<u>5.80 %</u>	<u>6.20 %</u>

- Notes: (1) Based on S&P Public Utility Index monthly total returns and Moody's Public Utility Bond average monthly yields from 1928-2020. Holding period returns are calculated based upon income received (dividends and interest) plus the relative change in the market value of a security over a one-year holding period.
- (2) This equity risk premium is based on a regression of the monthly equity risk premiums of the S&P Utility Index relative to Moody's A2 rated public utility bond yields from 1928 - 2020 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the prospective A2 rated public utility bond yield of 3.86% (from line 3, page 12 of this Schedule).
- (3) This equity risk premium is based on a regression of the monthly equity risk premiums of the S&P Utility Index relative to Moody's A2 rated public utility bond yields from 1928 - 2020 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the current A2 rated public utility bond yield of 3.15% (from line 4, page 12 of this Schedule).
- (4) The Predictive Risk Premium Model (PRPM) is applied to the risk premium of the monthly total returns of the S&P Utility Index and the monthly yields on Moody's A2 rated public utility bonds from January 1928 - July 2021.
- (5) Using data from Value Line for the S&P Utilities Index, an expected return of 11.23% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the expected A2 rated public utility bond yield of 3.86%, calculated on line 3 of page 12 of this Schedule results in an equity risk premium of 7.37%. (11.23% - 3.86% = 7.37%)
- (6) Using data from Value Line for the S&P Utilities Index, an expected return of 11.23% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the current A2 rated public utility bond yield of 3.15%, calculated on line 4 of page 12 of this Schedule results in an equity risk premium of 8.08%. (11.23% - 3.15% = 8.08%)
- (7) Using data from Bloomberg Professional Service for the S&P Utilities Index, an expected return of 9.24% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the expected A2 rated public utility bond yield of 3.86%, calculated on line 3 of page 12 of this Schedule results in an equity risk premium of 5.38%. (9.24% - 3.86% = 5.38%)
- (8) Using data from Bloomberg Professional Service for the S&P Utilities Index, an expected return of 9.24% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the current A2 rated public utility bond yield of 3.15%, calculated on line 3 of page 12 of this Schedule results in an equity risk premium of 6.09%. (9.24% - 3.15% = 6.09%)
- (9) Average of lines 1 through 5.



Piedmont Natural Gas Company  
Prediction of Equity Risk Premiums Relative to  
Moody's A2 Rated Utility Bond Yields



		Prospective A2 Rated Utility Bond (1)	Prospective Equity Risk Premium
<u>Constant</u>	<u>Slope</u>		
7.5726 %	-0.4865	3.86 %	5.69 %
		Current A2 Rated Utility Bond (1)	Prospective Equity Risk Premium
<u>Constant</u>	<u>Slope</u>		
7.5726 %	-0.4865	3.15	6.04 %

Notes:

- (1) From line 3 of page 12 of this Schedule.  
(2) From line 4 of page 12 of this Schedule.

Source of Information: Regulatory Research Associates

Piedmont Natural Gas Company  
Indicated Common Equity Cost Rate Through Use  
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM).

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Seven Natural Gas Distribution Companies	Line Adjusted Beta	Bloomberg Adjusted Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Common Equity Cost Rate (4)
Atmos Energy Corporation	0.80	0.92	0.86	9.88 %	2.74 %	11.24 %	11.58 %	11.41 %
New Jersey Resources Corporation	1.00	0.98	0.99	9.88	2.74	12.52	12.55	12.53
Northwest Natural Holding Company	0.85	0.86	0.86	9.88	2.74	11.24	11.58	11.41
ONE Gas, Inc.	0.80	1.00	0.90	9.88	2.74	11.63	11.88	11.76
South Jersey Industries, Inc.	1.05	1.00	1.03	9.88	2.74	12.92	12.84	12.88
Southwest Gas Holdings, Inc.	0.95	1.10	1.02	9.88	2.74	12.82	12.77	12.79
Spire Inc.	0.85	0.99	0.92	9.88	2.74	11.83	12.03	11.93
Mean			<u>0.94</u>			<u>12.03 %</u>	<u>12.18 %</u>	<u>12.10 %</u>
Median			<u>0.92</u>			<u>11.83 %</u>	<u>12.03 %</u>	<u>11.93 %</u>
Average of Mean and Median			<u>0.93</u>			<u>11.93 %</u>	<u>12.11 %</u>	<u>12.02 %</u>

Using Current Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Seven Natural Gas Distribution Companies	Line Adjusted Beta	Bloomberg Adjusted Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (3)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Common Equity Cost Rate (4)
Atmos Energy Corporation	0.80	0.92	0.86	10.28 %	2.14 %	10.98 %	11.34 %	11.16 %
New Jersey Resources Corporation	1.00	0.98	0.99	10.28	2.14	12.32	12.34	12.33
Northwest Natural Holding Company	0.85	0.86	0.86	10.28	2.14	10.98	11.34	11.16
ONE Gas, Inc.	0.80	1.00	0.90	10.28	2.14	11.39	11.65	11.52
South Jersey Industries, Inc.	1.05	1.00	1.03	10.28	2.14	12.73	12.65	12.69
Southwest Gas Holdings, Inc.	0.95	1.10	1.02	10.28	2.14	12.63	12.57	12.60
Spire Inc.	0.85	0.99	0.92	10.28	2.14	11.60	11.80	11.70
Mean			<u>0.94</u>			<u>11.80 %</u>	<u>11.96 %</u>	<u>11.88 %</u>
Median			<u>0.92</u>			<u>11.60 %</u>	<u>11.80 %</u>	<u>11.70 %</u>
Average of Mean and Median			<u>0.93</u>			<u>11.70 %</u>	<u>11.88 %</u>	<u>11.79 %</u>

Notes on page 24 of this Schedule.

Piedmont Natural Gas Company  
Notes to Accompany the Application of the CAPM and ECAPM

## Notes:

- (1) The market risk premium (MRP) is derived by using six different measures from three sources: Ibbotson, Value Line, and Bloomberg as illustrated below:

	Prospective Interest Rates	Using Current Interest Rates
<u>Historical Data MRP Estimates:</u>		
Measure 1: Ibbotson Arithmetic Mean MRP (1926-2020)		
Arithmetic Mean Monthly Returns for Large Stocks 1926-2020:	12.20 %	12.20 %
Arithmetic Mean Income Returns on Long-Term Government Bonds:	5.05	5.05
MRP based on Ibbotson Historical Data:	<u>7.15 %</u>	<u>7.15 %</u>
Measure 2: Application of a Regression Analysis to Ibbotson Historical Data (1926-2020)		
	<u>9.53 %</u>	<u>10.13 %</u>
Measure 3: Application of the PRPM to Ibbotson Historical Data: (January 1926 - July 2021)		
	<u>11.07 %</u>	<u>11.07 %</u>
<u>Value Line MRP Estimates:</u>		
Measure 4: Value Line Projected MRP (Thirteen weeks ending July 30, 2021)		
Total projected return on the market 3-5 years hence*:	8.51 %	8.51 %
Projected Risk-Free Rate (see note 2):	2.74	2.14
MRP based on Value Line Summary & Index:	<u>5.77 %</u>	<u>6.37 %</u>
*Forecasted 3-5 year capital appreciation plus expected dividend yield		
Measure 5: Value Line Projected Return on the Market based on the S&P 500		
Total return on the Market based on the S&P 500:	14.68 %	14.68 %
Projected Risk-Free Rate (see note 2):	2.74	2.14
MRP based on Value Line data	<u>11.94 %</u>	<u>12.54 %</u>
Measure 6: Bloomberg Projected MRP		
Total return on the Market based on the S&P 500:	16.56 %	16.56 %
Projected Risk-Free Rate (see note 2):	2.74	2.14
MRP based on Bloomberg data	<u>13.82 %</u>	<u>14.42 %</u>
Average of Value Line, Ibbotson, and Bloomberg MRP:	<u>9.88 %</u>	<u>10.28 %</u>

- (2) For reasons explained in the direct testimony, the appropriate risk-free rate for cost of capital purposes is the average forecast of 30 year Treasury Bonds per the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts. (See pages 19 and 20 of this Schedule.) The projection of the risk-free rate is illustrated below:

Third Quarter 2021	2.10 %
Fourth Quarter 2021	2.30
First Quarter 2022	2.40
Second Quarter 2022	2.50
Third Quarter 2022	2.60
Fourth Quarter 2022	2.60
2023-2027	3.50
2028-2032	3.90
	<u>2.74 %</u>

- (3) Three-month average on 30-year Treasury bond yield ended July, 2021 as shown below:

May-21	2.32 %
Jun-21	2.16
Jul-21	1.94
	<u>2.14 %</u>

- (4) Average of Column 6 and Column 7.

## Sources of Information:

Value Line Summary and Index  
Blue Chip Financial Forecasts, August 3, 2021 and June 1, 2021  
Stocks, Bonds, Bills, and Inflation - 2021 SBBI Yearbook, John Wiley & Sons, Inc.  
Bloomberg Professional Services

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Piedmont Natural Gas Company  
Basis of Selection of the Group of Non-Price Regulated Companies  
Comparable in Total Risk to the Utility Proxy Group

The criteria for selection of the proxy group of forty-three non-price regulated companies was that the non-price regulated companies be domestic and reported in Value Line Investment Survey (Standard Edition).

The Non-Price Regulated Proxy Group were then selected based on the unadjusted beta range of 0.65 – 0.95 and residual standard error of the regression range of 2.8123 – 3.3543 of the Utility Proxy Group.

These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression. Plus or minus two standard deviations captures 95.50% of the distribution of unadjusted betas and residual standard errors of the regression.

The standard deviation of the Utility Proxy Group's residual standard error of the regression is 0.1355. The standard deviation of the standard error of the regression is calculated as follows:

$$\text{Standard Deviation of the Std. Err. of the Regr.} = \frac{\text{Standard Error of the Regression}}{\sqrt{2N}}$$

where: N = number of observations. Since Value Line betas are derived from weekly price change observations over a period of five years, N = 259

$$\text{Thus, } 0.1355 = \frac{2.8123}{\sqrt{518}} = \frac{3.3543}{22.7596}$$

Source of Information: Value Line, Inc., June 2021  
Value Line Investment Survey (Standard Edition)

Piedmont Natural Gas Company  
Basis of Selection of Comparable Risk  
Domestic Non-Price Regulated Companies

	[1]	[2]	[3]	[4]
Proxy Group of Seven Natural Gas Distribution Companies	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
Atmos Energy Corporation	0.80	0.67	2.7774	0.0693
New Jersey Resources Corporation	1.00	0.93	3.0337	0.0757
Northwest Natural Holding Company	0.85	0.70	3.2144	0.0802
ONE Gas, Inc.	0.80	0.68	2.7447	0.0685
South Jersey Industries, Inc.	1.05	1.01	3.7945	0.0947
Southwest Gas Holdings, Inc.	0.95	0.86	3.1572	0.0788
Spire Inc.	0.85	0.73	2.8613	0.0714
Average	0.90	0.80	3.0833	0.0769
Beta Range (+/- 2 std. Devs. of Beta) 2 std. Devs. of Beta	0.65 0.15	0.95		
Residual Std. Err. Range (+/- 2 std. Devs. of the Residual Std. Err.)	2.8123	3.3543		
Std. dev. of the Res. Std. Err.	0.1355			
2 std. devs. of the Res. Std. Err.	0.2710			

Source of Information: Valueline Proprietary Database, June 2021

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Piedmont Natural Gas Company  
Proxy Group of Non-Price Regulated Companies  
Comparable in Total Risk to the  
Proxy Group of Seven Natural Gas Distribution Companies

	[1]	[2]	[3]	[4]
Proxy Group of Forty-Three Non-Price Regulated Companies	VL Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
Apple Inc.	0.90	0.83	3.2843	0.0819
Assurant Inc.	0.90	0.84	2.8245	0.0705
ANSYS, Inc.	0.85	0.77	3.1971	0.0798
Booz Allen Hamilton	0.90	0.84	3.1767	0.0793
Bristol-Myers Squibb	0.85	0.75	3.3304	0.0831
Brady Corp.	1.00	0.94	2.9465	0.0735
CACI Int'l	0.95	0.89	2.9930	0.0747
Casey's Gen'l Stores	0.90	0.81	3.2028	0.0799
Quest Diagnostics	0.80	0.69	2.9288	0.0731
Lauder (Estee)	0.95	0.91	2.8562	0.0713
Exponent, Inc.	0.90	0.81	2.9605	0.0739
Fastenal Co.	0.95	0.88	3.2005	0.0799
FirstCash, Inc.	0.90	0.79	3.2437	0.0809
Franklin Electric	0.95	0.89	3.2374	0.0808
GATX Corp.	1.00	0.92	3.1223	0.0779
Gorman-Rupp Co.	1.00	0.93	3.2972	0.0823
Int'l Flavors & Frag	0.95	0.85	3.3168	0.0828
Ingredion Inc.	0.90	0.84	2.8771	0.0718
Iron Mountain	0.90	0.78	3.1699	0.0791
Hunt (J.B.)	0.95	0.87	2.8702	0.0716
J&J Snack Foods	0.95	0.86	2.9559	0.0738
Henry (Jack) & Assoc	0.85	0.71	2.8328	0.0707
ManTech Int'l 'A'	0.85	0.77	3.1011	0.0774
Monster Beverage	0.85	0.76	3.0195	0.0753
Altria Group	0.95	0.86	2.9525	0.0737
MSA Safety	1.00	0.94	3.0342	0.0757
MSCI Inc.	0.95	0.87	2.9742	0.0742
Vail Resorts	0.95	0.88	3.2995	0.0823
Maxim Integrated	0.95	0.87	3.0073	0.0750
Northrop Grumman	0.85	0.72	2.8865	0.0720
Old Dominion Freight	0.95	0.86	2.9913	0.0746
Packaging Corp.	1.00	0.92	2.8690	0.0716
PerkinElmer Inc.	0.90	0.82	3.0422	0.0759
Philip Morris Int'l	0.95	0.91	3.2461	0.0810
Pool Corp.	0.85	0.74	3.2969	0.0823
Post Holdings	0.95	0.87	2.9481	0.0736
RLI Corp.	0.80	0.67	3.0423	0.0759
Rollins, Inc.	0.85	0.73	2.9580	0.0738
Selective Ins. Group	0.90	0.80	2.9918	0.0746
Sirius XM Holdings	0.95	0.88	2.8551	0.0712
Synopsys, Inc.	0.95	0.91	2.8936	0.0722
Tetra Tech	0.95	0.88	3.2523	0.0811
West Pharmac. Svcs.	0.80	0.69	3.2862	0.0820
Average	0.92	0.83	3.0600	0.0800
Proxy Group of Seven Natural Gas Distribution Companies	0.90	0.80	3.0833	0.0769

Source of Information:

Valueline Proprietary Database, June 2021

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Piedmont Natural Gas Company  
Summary of Cost of Equity Models Applied to  
Proxy Group of Forty-Three Non-Price Regulated Companies  
Comparable in Total Risk to the  
Proxy Group of Seven Natural Gas Distribution Companies

<u>Principal Methods</u>	<u>Proxy Group of Forty-Three Non- Price Regulated Companies</u>	<u>Results using Current Interest Rates</u>
Discounted Cash Flow Model (DCF) (1)	13.12 %	13.12 %
Risk Premium Model (RPM) (2)	12.77	12.32
Capital Asset Pricing Model (CAPM) (3)	12.10	11.88
	Mean <u>12.66 %</u>	<u>12.44 %</u>
	Median <u>12.77 %</u>	<u>12.32 %</u>
	Average of Mean and Median <u>12.72 %</u>	<u>12.38 %</u>

Notes:

- (1) From page 29 of this Schedule.
- (2) From page 30 of this Schedule.
- (3) From pages 33 and 34 of this Schedule.

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Piedmont Natural Gas Company  
DCF Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the  
Proxy Group of Seven Natural Gas Distribution Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Forty- Three Non-Price Regulated Companies	Average Dividend Yield	Value Line Projected Five Year Growth in EPS	Zack's Five Year Projected Growth Rate in EPS	Bloomberg's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth Rate in EPS	Adjusted Dividend Yield	Indicated Common Equity Cost Rate (1)
Apple Inc.	0.66 %	14.50 %	12.70 %	12.80 %	17.93 %	14.48 %	0.71 %	15.19 %
Assurant Inc.	1.67	11.50	17.80	17.78	17.80	16.22	1.81	18.03
ANSYS, Inc.	-	8.00	12.30	12.12	11.52	10.99	-	NA
Booz Allen Hamilton	1.71	10.50	11.00	13.00	9.83	11.08	1.80	12.88
Bristol-Myers Squibb	2.95	12.50	7.00	5.53	7.95	8.25	3.07	11.32
Brady Corp.	1.57	7.50	7.00	9.00	7.00	7.63	1.63	9.26
CACI Int'l	-	13.50	13.10	12.06	13.68	13.08	-	NA
Casey's Gen'l Stores	0.66	10.50	NA	13.75	7.50	10.58	0.69	11.27
Quest Diagnostics	1.86	7.00	26.50	(4.96)	(8.66)	16.75	2.02	18.77
Lauder (Estee)	0.68	11.00	10.70	18.25	26.73	16.67	0.74	17.41
Exponent, Inc.	0.88	12.50	NA	NA	15.00	13.75	0.94	14.69
Fastenal Co.	2.12	9.00	9.00	7.85	7.17	8.26	2.21	10.47
FirstCash, Inc.	1.53	9.50	NA	NA	23.00	16.25	1.65	17.90
Franklin Electric	0.86	10.00	NA	15.00	13.40	12.80	0.92	13.72
GATX Corp.	2.14	6.00	NA	3.00	12.00	7.00	2.21	9.21
Gorman-Rupp Co.	1.76	8.50	NA	13.00	15.00	12.17	1.87	14.04
Int'l Flavors & Frag	2.12	7.50	9.80	15.99	7.72	10.25	2.23	12.48
Ingredion Inc.	2.77	7.50	NA	11.00	1.90	6.80	2.86	9.66
Iron Mountain	5.66	11.50	1.70	0.66	1.70	3.89	5.77	9.66
Hunt (J.B.)	0.72	8.00	15.00	14.65	21.53	14.80	0.77	15.57
J&J Snack Foods	1.47	10.00	NA	NA	6.00	8.00	1.53	9.53
Henry (Jack) & Assoc	1.13	9.00	14.00	12.47	10.64	11.53	1.20	12.73
ManTech Int'l 'A'	1.75	9.00	5.10	5.53	3.87	5.88	1.80	7.68
Monster Beverage	-	11.50	13.30	11.48	14.86	12.78	-	NA
Altria Group	7.10	6.00	4.00	4.25	4.54	4.70	7.27	11.97
MSA Safety	1.07	6.50	NA	9.00	18.00	11.17	1.13	12.30
MSCI Inc.	0.81	16.00	NA	14.95	15.31	15.42	0.87	16.29
Vail Resorts	-	7.50	NA	65.25	56.46	43.07	-	NA
Maxim Integrated	-	11.00	10.00	9.25	21.91	13.04	-	NA
Northrop Grumman	1.71	7.00	8.70	5.53	5.77	6.75	1.77	8.52
Old Dominion Freight	0.31	9.00	22.70	20.51	19.83	18.01	0.34	18.35
Packaging Corp.	2.82	5.00	5.00	3.00	13.06	6.52	2.91	9.43
PerkinElmer Inc.	0.19	11.00	37.90	(5.71)	37.90	28.93	0.22	29.15 (2)
Philip Morris Int'l	4.88	7.00	8.80	10.85	13.30	9.99	5.12	15.11
Pool Corp.	0.71	15.00	NA	17.00	17.00	16.33	0.77	17.10
Post Holdings	-	9.50	NA	20.30	31.20	20.33	-	NA
RLI Corp.	0.95	12.00	NA	NA	9.80	10.90	1.00	11.90
Rollins, Inc.	0.91	11.50	NA	NA	8.20	9.85	0.95	10.80
Selective Ins. Group	1.29	9.50	9.50	10.17	5.10	8.57	1.35	9.92
Sirius XM Holdings	0.92	31.50	12.20	28.98	10.10	20.69	1.02	21.71
Synopsys, Inc.	-	12.50	14.60	15.18	14.70	14.25	-	NA
Tetra Tech	0.65	13.50	15.00	16.00	15.00	14.88	0.70	15.58
West Pharmac. Svcs.	0.19	17.00	25.80	19.46	25.80	22.01	0.21	22.22
							Mean	13.50 %
							Median	12.73 %
							Average of Mean and Median	13.12 %

NA= Not Available

NMF= Not Meaningful Figure

- (1) The application of the DCF model to the domestic, non-price regulated comparable risk companies is identical to the application of the DCF to the Utility Proxy Group. The dividend yield is derived by using the 60 day average price and the spot indicated dividend as of July 30, 2021. The dividend yield is then adjusted by 1/2 the average projected growth rate in EPS, which is calculated by averaging the 5 year projected growth in EPS provided by Value Line, www.zacks.com, Bloomberg Professional Services, and www.yahoo.com (excluding any negative growth rates) and then adding that growth rate to the adjusted dividend yield.
- (2) PKG's DCF results were excluded from the final average and median as they were more than 2 standard deviations above the proxy group's mean.

Source of Information: Value Line Investment Survey  
www.zacks.com Downloaded on 07/30/2021  
www.yahoo.com Downloaded on 07/30/2021  
Bloomberg Professional Services

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Piedmont Natural Gas Company  
Indicated Common Equity Cost Rate  
Through Use of a Risk Premium Model  
Using an Adjusted Total Market Approach

<u>Line No.</u>		<u>Proxy Group of Forty- Three Non-Price Regulated Companies</u>	<u>Results using Current Interest Rates</u>
1.	Prospective Yield on Baa2 Rated Corporate Bonds (1)	4.31 %	
2.	Current Yield on Baa2 Rated Corporate Bonds (2)		3.44 %
3.	Equity Risk Premium (3)	<u>8.46</u>	<u>8.88</u>
4.	Risk Premium Derived Common Equity Cost Rate	<u><u>12.77</u> %</u>	<u><u>12.32</u> %</u>

Notes: (1) Average forecast of Baa2 corporate bonds based upon the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts dated August 3, 2021 and June 1, 2021 (see pages 19 and 20 of this Schedule). The estimates are detailed below.

Third Quarter 2021	3.50 %
Fourth Quarter 2021	3.70
First Quarter 2022	3.90
Second Quarter 2022	4.00
Third Quarter 2022	4.10
Fourth Quarter 2022	4.20
2023-2027	5.30
2028-2032	<u>5.80</u>
Average	<u><u>4.31</u> %</u>

(2) Three-month average Baa2 corporate bond yield ended July, 2021 as reported by Bloomberg Professional Services shown below:

May-21	3.62
Jun-21	3.45
Jul-21	<u>3.24</u>
Average	<u><u>3.44</u> %</u>

(3) From page 32 of this Schedule.

Piedmont Natural Gas Company  
Comparison of Long-Term Issuer Ratings for the  
Proxy Group of Forty-Three Non-Price Regulated Companies of Comparable risk to the  
Proxy Group of Seven Natural Gas Distribution Companies

Proxy Group of Forty-Three Non-Price Regulated Companies	Moody's Long-Term Issuer Rating July 2021		Standard & Poor's Long-Term Issuer Rating July 2021	
	Long-Term Issuer Rating	Numerical Weighting (1)	Long-Term Issuer Rating	Numerical Weighting (1)
Apple Inc.	Aa1	2.0	AA+	2.0
Assurant Inc.	Baa3	10.0	BBB	9.0
ANSYS, Inc.	NA	--	NA	--
Booz Allen Hamilton	NA	--	NA	--
Bristol-Myers Squibb	A2	6.0	A+	5.0
Brady Corp.	NA	--	NA	--
CACI Int'l	NA	--	BB+	11.0
Casey's Gen'l Stores	NA	--	NA	--
Quest Diagnostics	Baa2	9.0	BBB+	8.0
Lauder (Estee)	A1	5.0	A+	5.0
Exponent, Inc.	NA	--	NA	--
Fastenal Co.	NA	--	NA	--
FirstCash, Inc.	Ba1	11.0	BB	12.0
Franklin Electric	NA	--	NA	--
GATX Corp.	Baa2	9.0	BBB	9.0
Gorman-Rupp Co.	NA	--	NA	--
Int'l Flavors & Frag	Baa3	10.0	BBB	9.0
Ingredion Inc.	Baa1	8.0	BBB	9.0
Iron Mountain	Ba3	13.0	BB-	13.0
Hunt (J.B.)	Baa1	8.0	BBB+	8.0
J&J Snack Foods	NA	--	NA	--
Henry (Jack) & Assoc	NA	--	NA	--
ManTech Int'l 'A'	WR	--	BB+	11.0
Monster Beverage	NA	--	NA	--
Altria Group	A3	7.0	BBB	9.0
MSA Safety	NA	--	NA	--
MSCI Inc.	Ba1	11.0	BB+	11.0
Vail Resorts	B2	15.0	BB	12.0
Maxim Integrated	Baa1	8.0	BBB+	8.0
Northrop Grumman	Baa2	9.0	BBB+	8.0
Old Dominion Freight	NA	--	NA	--
Packaging Corp.	Baa2	9.0	BBB	9.0
PerkinElmer Inc.	Baa3	10.0	BBB	9.0
Philip Morris Int'l	A2	6.0	A	6.0
Pool Corp.	NA	--	NA	--
Post Holdings	B2	15.0	B+	14.0
RLI Corp.	Baa2	9.0	BBB	9.0
Rollins, Inc.	NA	--	NA	--
Selective Ins. Group	Baa2	9.0	BBB	9.0
Sirius XM Holdings	NA	--	BB	12.0
Synopsys, Inc.	NA	--	NA	--
Tetra Tech	NA	--	NA	--
West Pharmac. Svcs.	NA	--	NA	--
Average	Baa2	9.0	BBB	9.1

Notes:

(1) From page 15 of this Schedule.

Source of Information:

Bloomberg Professional Services

Piedmont Natural Gas Company  
Derivation of Equity Risk Premium Based on the Total Market Approach  
Using the Beta for  
Proxy Group of Forty-Three Non-Price Regulated Companies of Comparable risk to the  
Proxy Group of Seven Natural Gas Distribution Companies

<u>Line No.</u>	<u>Equity Risk Premium Measure</u>	<u>Proxy Group of Forty-Three Non- Price Regulated Companies</u>	<u>Results using Current Interest Rates</u>
1.	Ibbotson Equity Risk Premium (1)	5.92 %	5.92 %
2.	Regression on Ibbotson Risk Premium Data	8.79 (2)	9.55 (3)
3.	Ibbotson Equity Risk Premium based on PRPM (4)	9.96	9.96
4.	Equity Risk Premium Based on <u>Value Line</u> Summary and Index	5.03 (5)	5.68 (6)
5	Equity Risk Premium Based on <u>Value Line</u> S&P 500 Companies	11.20 (7)	11.84 (8)
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies	<u>13.08 (9)</u>	<u>13.73 (10)</u>
7.	Conclusion of Equity Risk Premium	9.00 %	9.45 %
8.	Adjusted Beta (11)	<u>0.94</u>	<u>0.94</u>
9.	Forecasted Equity Risk Premium	<u>8.46 %</u>	<u>8.88 %</u>

Notes:

- (1) From note 1 of page 17 of this Schedule.
- (2) From note 2 of page 17 of this Schedule.
- (3) From note 3 of page 17 of this Schedule.
- (4) From note 4 of page 17 of this Schedule.
- (5) From note 5 of page 17 of this Schedule.
- (6) From note 6 of page 17 of this Schedule.
- (7) From note 7 of page 17 of this Schedule.
- (8) From note 8 of page 17 of this Schedule.
- (9) From note 9 of page 17 of this Schedule.
- (10) From note 10 of page 17 of this Schedule.
- (11) Average of mean and median beta from page 33 of this Schedule.

Sources of Information:

Stocks, Bonds, Bills, and Inflation - 2021 SBBI Yearbook, John Wiley & Sons, Inc.  
Value Line Summary and Index  
Blue Chip Financial Forecasts, August 3, 2021 and June 1, 2021  
Bloomberg Professional Services

Piedmont Natural Gas Company

Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the  
Proxy Group of Seven Natural Gas Distribution Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Forty-Three Non-Price Regulated Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (4)
Apple Inc.	0.90	1.00	0.95	9.88 %	2.74 %	12.13 %	12.25 %	12.19 %
Assurant Inc.	0.90	1.00	0.95	9.88	2.74	12.13	12.25	12.19
ANSYS, Inc.	0.85	0.95	0.90	9.88	2.74	11.63	11.88	11.76
Booz Allen Hamilton	0.90	0.91	0.91	9.88	2.74	11.73	11.95	11.84
Bristol-Myers Squibb	0.85	0.80	0.82	9.88	2.74	10.84	11.29	11.06
Brady Corp.	1.00	1.08	1.04	9.88	2.74	13.01	12.92	12.97
CACI Int'l	0.95	1.01	0.98	9.88	2.74	12.42	12.47	12.45
Casey's Gen'l Stores	0.90	0.92	0.91	9.88	2.74	11.73	11.95	11.84
Quest Diagnostics	0.80	0.96	0.88	9.88	2.74	11.43	11.73	11.58
Lauder (Estee)	0.95	1.00	0.97	9.88	2.74	12.32	12.40	12.36
Exponent, Inc.	0.90	0.96	0.93	9.88	2.74	11.93	12.10	12.01
Fastenal Co.	0.95	0.94	0.94	9.88	2.74	12.03	12.18	12.10
FirstCash, Inc.	0.85	0.94	0.90	9.88	2.74	11.63	11.88	11.76
Franklin Electric	0.95	0.99	0.97	9.88	2.74	12.32	12.40	12.36
GATX Corp.	1.00	1.00	1.00	9.88	2.74	12.62	12.62	12.62
Gorman-Rupp Co.	1.00	1.06	1.03	9.88	2.74	12.92	12.84	12.88
Int'l Flavors & Frag	0.95	1.08	1.01	9.88	2.74	12.72	12.69	12.71
Ingredion Inc.	0.90	0.93	0.91	9.88	2.74	11.73	11.95	11.84
Iron Mountain	0.90	1.04	0.97	9.88	2.74	12.32	12.40	12.36
Hunt (J.B.)	0.95	0.94	0.95	9.88	2.74	12.13	12.25	12.19
J&J Snack Foods	0.95	0.81	0.88	9.88	2.74	11.43	11.73	11.58
Henry (Jack) & Assoc	0.85	0.89	0.87	9.88	2.74	11.34	11.66	11.50
ManTech Int'l 'A'	0.85	1.12	0.99	9.88	2.74	12.52	12.55	12.53
Monster Beverage	0.85	0.97	0.91	9.88	2.74	11.73	11.95	11.84
Altria Group	0.95	0.89	0.92	9.88	2.74	11.83	12.03	11.93
MSA Safety	1.00	1.01	1.01	9.88	2.74	12.72	12.69	12.71
MSCI Inc.	0.95	0.91	0.93	9.88	2.74	11.93	12.10	12.01
Vail Resorts	0.95	1.13	1.04	9.88	2.74	13.01	12.92	12.97
Maxim Integrated	0.95	0.96	0.95	9.88	2.74	12.13	12.25	12.19
Northrop Grumman	0.85	0.78	0.82	9.88	2.74	10.84	11.29	11.06
Old Dominion Freight	0.95	0.99	0.97	9.88	2.74	12.32	12.40	12.36
Packaging Corp.	1.00	0.79	0.90	9.88	2.74	11.63	11.88	11.76
PerkinElmer Inc.	0.90	0.80	0.85	9.88	2.74	11.14	11.51	11.32
Philip Morris Int'l	0.95	0.92	0.94	9.88	2.74	12.03	12.18	12.10
Pool Corp.	0.85	0.95	0.90	9.88	2.74	11.63	11.88	11.76
Post Holdings	0.95	0.90	0.93	9.88	2.74	11.93	12.10	12.01
RLI Corp.	0.80	0.91	0.85	9.88	2.74	11.14	11.51	11.32
Rollins, Inc.	0.85	0.70	0.77	9.88	2.74	10.35	10.92	10.63 (5)
Selective Ins. Group	0.90	0.99	0.94	9.88	2.74	12.03	12.18	12.10
Sirius XM Holdings	0.95	1.13	1.04	9.88	2.74	13.01	12.92	12.97
Synopsys, Inc.	0.95	1.02	0.98	9.88	2.74	12.42	12.47	12.45
Tetra Tech	0.95	1.06	1.00	9.88	2.74	12.62	12.62	12.62
West Pharmac. Svcs.	0.80	0.74	0.77	9.88	2.74	10.35	10.92	10.63 (5)
		Mean	0.94			12.03 %	12.18 %	12.10 %
		Median	0.94			12.03 %	12.18 %	12.10 %
		Average of Mean and Median	0.94			12.03 %	12.18 %	12.10 %

Using Current Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Seven Natural Gas Distribution Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (3)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (4)
Apple Inc.	0.90	1.00	0.95	10.28 %	2.14 %	11.91 %	12.03 %	11.97
Assurant Inc.	0.90	1.00	0.95	10.28	2.14	11.91	12.03	11.97
ANSYS, Inc.	0.85	0.95	0.90	10.28	2.14	11.39	11.65	11.52
Booz Allen Hamilton	0.90	0.91	0.91	10.28	2.14	11.49	11.73	11.61
Bristol-Myers Squibb	0.85	0.80	0.82	10.28	2.14	10.57	11.03	10.80
Brady Corp.	1.00	1.08	1.04	10.28	2.14	12.83	12.73	12.78
CACI Int'l	0.95	1.01	0.98	10.28	2.14	12.21	12.27	12.24
Casey's Gen'l Stores	0.90	0.92	0.91	10.28	2.14	11.49	11.73	11.61
Quest Diagnostics	0.80	0.96	0.88	10.28	2.14	11.19	11.49	11.34
Lauder (Estee)	0.95	1.00	0.97	10.28	2.14	12.11	12.19	12.15
Exponent, Inc.	0.90	0.96	0.93	10.28	2.14	11.70	11.88	11.79
Fastenal Co.	0.95	0.94	0.94	10.28	2.14	11.80	11.96	11.88
FirstCash, Inc.	0.85	0.94	0.90	10.28	2.14	11.39	11.65	11.52
Franklin Electric	0.95	0.99	0.97	10.28	2.14	12.11	12.19	12.15
GATX Corp.	1.00	1.00	1.00	10.28	2.14	12.42	12.42	12.42
Gorman-Rupp Co.	1.00	1.06	1.03	10.28	2.14	12.73	12.65	12.69
Int'l Flavors & Frag	0.95	1.08	1.01	10.28	2.14	12.52	12.50	12.51
Ingredion Inc.	0.90	0.93	0.91	10.28	2.14	11.49	11.73	11.61
Iron Mountain	0.90	1.04	0.97	10.28	2.14	12.11	12.19	12.15
Hunt (J.B.)	0.95	0.94	0.95	10.28	2.14	11.91	12.03	11.97
J&J Snack Foods	0.95	0.81	0.88	10.28	2.14	11.19	11.49	11.34
Henry (Jack) & Assoc	0.85	0.89	0.87	10.28	2.14	11.08	11.42	11.25
ManTech Int'l 'A'	0.85	1.12	0.99	10.28	2.14	12.32	12.34	12.33
Monster Beverage	0.85	0.97	0.91	10.28	2.14	11.49	11.73	11.61
Altria Group	0.95	0.89	0.92	10.28	2.14	11.60	11.80	11.70
MSA Safety	1.00	1.01	1.01	10.28	2.14	12.52	12.50	12.51
MSCI Inc.	0.95	0.91	0.93	10.28	2.14	11.70	11.88	11.79
Vail Resorts	0.95	1.13	1.04	10.28	2.14	12.83	12.73	12.78
Maxim Integrated	0.95	0.96	0.95	10.28	2.14	11.91	12.03	11.97
Northrop Grumman	0.85	0.78	0.82	10.28	2.14	10.57	11.03	10.80
Old Dominion Freight	0.95	0.99	0.97	10.28	2.14	12.11	12.19	12.15
Packaging Corp.	1.00	0.79	0.90	10.28	2.14	11.39	11.65	11.52
PerkinElmer Inc.	0.90	0.80	0.85	10.28	2.14	10.88	11.26	11.07
Philip Morris Int'l	0.95	0.92	0.94	10.28	2.14	11.80	11.96	11.88
Pool Corp.	0.85	0.95	0.90	10.28	2.14	11.39	11.65	11.52
Post Holdings	0.95	0.90	0.93	10.28	2.14	11.70	11.88	11.79
RLJ Corp.	0.80	0.91	0.85	10.28	2.14	10.88	11.26	11.07
Rollins, Inc.	0.85	0.70	0.77	10.28	2.14	10.06	10.65	10.35 (5)
Selective Ins. Group	0.90	0.99	0.94	10.28	2.14	11.80	11.96	11.88
Sirius XM Holdings	0.95	1.13	1.04	10.28	2.14	12.83	12.73	12.78
Synopsys, Inc.	0.95	1.02	0.98	10.28	2.14	12.21	12.27	12.24
Tetra Tech	0.95	1.06	1.00	10.28	2.14	12.42	12.42	12.42
West Pharmac. Svcs.	0.80	0.74	0.77	10.28	2.14	10.06	10.65	10.35 (5)
		Mean	0.94			11.80 %	11.96 %	11.88 %
		Median	0.94			11.80 %	11.96 %	11.88 %
		Average of Mean and Median	0.94			11.80 %	11.96 %	11.88 %

## Notes:

- (1) From page 23 of this Schedule, note 1.
- (2) From page 23 of this Schedule, note 2.
- (3) From page 23 of this Schedule, note 3.
- (4) Average of CAPM and ECAPM cost rates.
- (5) ROL and WST CAPM results were excluded from the final average and median as they were more than 2 standard deviations below the proxy group's mean.

Piedmont Natural Gas Company  
Derivation of Investment Risk Adjustment Based upon  
Ibbotson Associates' Size Premia for the Decile Portfolios of the NYSE/AMEX/NASDAQ

Line No.	[1]		[2]		[3]		[4]	
	Market Capitalization on July 30, 2021 (1) (millions)	(times larger)	Applicable Decile of the NYSE/AMEX/ NASDAQ (2)		Applicable Size Premium (3)		Spread from Applicable Size Premium (4)	
1.	Piedmont Natural Gas Company		4		0.75%			
2.	Proxy Group of Seven Natural Gas Distribution Companies	1.1 x	4		0.75%		0.00%	
		[A]	[B]		[C]		[D]	
	Decile	Market Capitalization of Smallest Company (millions)			Market Capitalization of Largest Company (millions)		Size Premium (Return in Excess of CAPM)*	
		1	2		3	4		
	Largest	\$ 29,025.803	\$ 13,178.743		\$ 1,966,078.882	28,808.073	-0.22%	
			6,743.361		13,177.828		0.49%	
			3,861.858		6,710.676		0.71%	
			2,445.693		3,836.536		0.75%	
			1,591.865		2,444.745		1.09%	
			911.586		1,591.765		1.37%	
			451.955		911.103		1.54%	
			190.019		451.800		1.46%	
	Smallest		2.194		189.831		2.29%	
					*From 2021 Duff & Phelps Cost of Capital Navigator			

## Notes:

- (1) From page 36 of this Schedule.
- (2) Gleaned from Columns [B] and [C] on the bottom of this page. The appropriate decile (Column [A]) corresponds to the market capitalization of the proxy group, which is found in Column [1].
- (3) Corresponding risk premium to the decile is provided in Column [D] on the bottom of this page.
- (4) Line No. 1 Column [3] - Line No. 2 Column [3]. For example, the 0.00% in Column [4], Line No. 2 is derived as follows 0.00% = 0.75% - 0.75%.

Piedmont Natural Gas Company  
Market Capitalization of Piedmont Natural Gas Company and the  
Proxy Group of Seven Natural Gas Distribution Companies

Company	Exchange	[1] Common Stock Shares Outstanding at Fiscal Year End 2020 (millions)	[2] Book Value per Share at Fiscal Year End 2020 (1)	[3] Total Common Equity at Fiscal Year End 2020 (millions)	[4] Closing Stock Market Price on July 30, 2021	[5] Market-to- Book Ratio on July 30, 2021 (2)	[6] Market Capitalization on July 30, 2021 (3) (millions)
Piedmont Natural Gas Company		NA	NA	2,507.783 (4)	NA		
Based upon Proxy Group of Seven Natural Gas Distribution Companies					171.5 (5)		\$ 4,300.847 (6)
Proxy Group of Seven Natural Gas Distribution Companies							
Atmos Energy Corporation	NYSE	125.882	\$ 53.949	\$ 6,791.203	\$ 98.590	182.7 %	\$ 12,410.753
New Jersey Resources Corporation	NYSE	95.949	19.226	1,844.692	38.520	200.4	3,695.963
Northwest Natural Holding Company	NYSE	30.589	29.054	888.733	52.290	180.0	1,599.499
ONE Gas, Inc.	NYSE	53.167	42.006	2,233.311	73.780	175.6	3,922.642
South Jersey Industries, Inc.	NYSE	100.592	16.571	1,666.876	25.170	151.9	2,531.899
Southwest Gas Holdings, Inc.	NYSE	57.193	46.771	2,674.953	69.930	149.5	3,999.501
Spire Inc.	NYSE	51.612	44.182	2,280.300	70.950	160.6	3,661.856
Average		73.569	\$ 35.966	\$ 2,625.724	\$ 61.319	171.5 %	\$ 4,546.016

NA= Not Available

Notes: (1) Column 3 / Column 1.  
(2) Column 4 / Column 2.  
(3) Column 1 \* Column 4.  
(4) Requested rate base multiplied by the requested common equity ratio.

(5) The market-to-book ratio of Piedmont Natural Gas Company on July 30, 2021 is assumed to be equal to the market-to-book ratio of Proxy Group of Seven Natural Gas Distribution Companies on July 30, 2021 as appropriate.  
(6) Column [3] multiplied by Column [5].

Source of Information: 2020 Annual Forms 10K  
yahoo.finance.com  
Bloomberg Professional

Aug 25 2021

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Piedmont Natural Gas Company  
Derivation of the Flotation Cost Adjustment to the Cost of Common Equity

Equity Issuances since 2010

	[Column 1]	[Column 2]	[Column 3]	[Column 4]	[Column 5]	[Column 6]	[Column 7]	[Column 8]	[Column 9]	[Column 10]
Date of Offering	Transaction (1)	Market Price per Share	Average Offering Price per Share	Market Pressure (2)	Total Offering Expense per Share	Net Proceeds per Share (3)	Gross Equity Issue before Costs (4)	Total Net Proceeds (5)	Total Flotation Costs (6)	Flotation Cost Percentage (7)
11/18/19	Equity Offering	\$ 88.65	\$ 85.99	\$ 2.66	\$ 0.021	\$ 85.9694	\$ 2,548,687,500	\$ 2,471,620,500	\$ 77,067,000	3.02%
03/06/18	Equity Offering	\$ 75.86	\$ 74.07	\$ 1.79	\$ 0.021	\$ 74.0508	\$ 1,613,921,500	\$ 1,575,431,800	\$ 38,489,700	2.38%
02/29/16	Equity Offering	\$ 73.35	\$ 69.84	\$ 3.51	\$ 0.038	\$ 69.8024	\$ 780,260,625	\$ 742,523,000	\$ 37,737,625	4.84%
							\$ 4,942,869,625	\$ 4,789,575,300	\$ 153,294,325	3.10%

Flotation Cost Adjustment

	Average Dividend Yield	Average Projected EPS Growth Rate	Adjusted Dividend Yield	Average DCF Cost Rate Unadjusted for Flotation (8)	DCF Cost Rate Adjusted for Flotation (9)	Flotation Cost Adjustment (10)
Proxy Group of Seven Natural Gas Distribution Companies	3.44 %	6.11 %	3.55 %	9.66 %	9.77 %	0.11 %

See page 38 of this Schedule for notes.

Source of Information: Company SEC filings



Piedmont Natural Gas Company  
Notes to Accompany the  
Derivation of the Flotation Cost Adjustment to the Cost of Common Equity

- (1) S&P Global Market Intelligence.
- (2) Column 2 – Column 3.
- (3) Column 2 – the sum of columns 4 and 5.
- (4) Column 1 \* Column 2.
- (5) Column 1 \* Column 6.
- (6) Column 1 \* (the sum of columns 4 and 5).
- (7) (Column 7 – Column 8) divided by Column 7.
- (8) Using the average growth rate from page 2 of this Schedule.
- (9) Adjustment for flotation costs based on adjusting the average DCF constant growth cost rate in accordance with the following:

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

where  $g$  is the growth factor and  $F$  is the percentage of flotation costs.

- (10) Flotation cost adjustment of 0.11% equals the difference between the flotation adjusted average DCF cost rate of 9.77% and the unadjusted average DCF cost rate of 9.66% of the Utility Proxy Group.

Source of Information:

S&P Global Market Intelligence

Piedmont Natural Gas Company  
Demonstration of the Inadequacy of  
a DCF Return Rate Related to Book Value  
When Market Value is Greater than Book Value

	[A]	[B]	[C]	[D]
	Based on Mr. Hinton's Proxy Group		Based on Mr. O'Donnell's Proxy Group	
Line No.	Market Value	Book Value	Market Value	Book Value
1. Per Share	\$ 62.90 (1)	\$ 31.70 (2)	\$ 62.87 (1)	\$ 32.41 (2)
2. DCF Cost Rate (3)	9.39%	9.39%	9.00%	9.00%
3. Return in Dollars (4)	\$ 5.906	\$ 2.977	\$ 5.658	\$ 2.917
4. Dividends (5)	\$ 2.013	\$ 2.013	\$ 2.012	\$ 2.012
5. Growth in Dollars (6)	\$ 3.893	\$ 0.964	\$ 3.646	\$ 0.905
6. Return on Market Value (7)	9.39%	4.73%	9.00%	4.64%
7. Rate of Growth on Market Value (8)	6.19%	1.53%	5.80%	1.44%

Notes:

- (1) Average price for the 13-week period ending July 23, 2021 from Value Line Summary and Index (Hinton) and the average price for the 13-week period ending July 9, 2021 from Value Line Summary and Index (O'Donnell)
- (2) Average book value from dividing total common equity at year-end 2020 by common shares outstanding at year-end 2020 for each proxy group company.
- (3) Mr. Hinton's average DCF cost rate and Mr. O'Donnell recommended DCF cost rate.
- (4) Line 1 x Line 2.
- (5) Dividends are based on the average 3.2% dividend yield for Mr. Hinton's proxy group from Public Staff Hinton Exhibit 6 and on the 13-week average 3.2% dividend yield for Mr. O'Donnell's proxy group from Exhibit KWO-2.
- (6) Line 3 - Line 4.
- (7) Line 3 / Line 1.
- (8) Line 5 / Line 1.

Piedmont Natural Gas Company  
Calculation of Indicated DCF Applied to Book Value Capital Structure  
of Mr. Hinton's Proxy Group

Un-lever Indicated Market Capital Structure DCF

$$\begin{aligned}
 K_u &= K_e - (((K_u - i) \cdot (1 - t) \cdot D / E) - (K_u - d) \cdot P / E) \\
 K_u &= 9.39\% - (((K_u - 4.08\%) \cdot (1 - 21\%) \cdot 41.91\% / 57.72\%) - (K_u - 5.90\%) \cdot 0.37\% / 57.72\%) \\
 K_u &= 9.39\% - (((K_u - 4.08\%) \cdot 79.00\%) \cdot 72.60\%) - (K_u - 5.90\%) \cdot 0.65\% \\
 K_u &= 9.39\% - ((79.00\% \cdot K_u - 3.2232\%) \cdot 72.60\%) - (0.65\% \cdot K_u - 0.04\%) \\
 K_u &= 9.39\% - (57.35\% \cdot K_u - 2.34\%) \cdot -0.65\% \cdot K_u + 0.04\% \\
 K_u &= 9.39\% - 57.35\% \cdot K_u + 2.34\% \cdot -0.65\% \cdot K_u + 0.04\% \\
 K_u &= 11.77\% - 58.00\% \cdot K_u \\
 158.00\% \cdot K_u &= 11.77\% \\
 K_u &= \mathbf{7.45\%}
 \end{aligned}$$

Re-lever to Indicated Book Value Capital Structure DCF

$$\begin{aligned}
 K_e &= K_u + (((K_u - i) \cdot (1 - t) \cdot D / E) + (K_u - d) \cdot P / E) \\
 K_e &= 7.45\% + (((7.45\% - 4.08\%) \cdot (1 - 21\%) \cdot 50.39\% / 49.17\%) + (7.45\% - 5.90\%) \cdot 0.44\% / 49.17\%) \\
 K_e &= 7.45\% + (((3.37\%) \cdot 79\%) \cdot 102.47\%) + (1.55\%) \cdot 0.89\% \\
 K_e &= 7.45\% + ((2.66\%) \cdot 102.47\%) + (0.01\%) \\
 K_e &= 7.45\% + (2.73\%) + 0.01\% \\
 K_e &= \mathbf{10.19\%}
 \end{aligned}$$

Calculation of Indicated DCF Applied to Book Value Capital Structure  
of Mr. O'Donnell's Proxy Group

Un-lever Indicated Market Capital Structure DCF

$$\begin{aligned}
 K_u &= K_e - (((K_u - i) \cdot (1 - t) \cdot D / E) - (K_u - d) \cdot P / E) \\
 K_u &= 9.00\% - (((K_u - 4.09\%) \cdot (1 - 21\%) \cdot 43.89\% / 55.28\%) - (K_u - 6.01\%) \cdot 0.84\% / 55.28\%) \\
 K_u &= 9.00\% - (((K_u - 4.09\%) \cdot 79.00\%) \cdot 79.39\%) - (K_u - 6.01\%) \cdot 1.51\% \\
 K_u &= 9.00\% - ((79.00\% \cdot K_u - 3.2311\%) \cdot 79.39\%) - (1.51\% \cdot K_u - 0.09\%) \\
 K_u &= 9.00\% - (62.72\% \cdot K_u - 2.57\%) \cdot -1.51\% \cdot K_u + 0.09\% \\
 K_u &= 9.00\% - 62.72\% \cdot K_u + 2.57\% \cdot -1.51\% \cdot K_u + 0.09\% \\
 K_u &= 11.66\% - 64.23\% \cdot K_u \\
 164.23\% \cdot K_u &= 11.66\% \\
 K_u &= \mathbf{7.10\%}
 \end{aligned}$$

Re-lever to Indicated Book Value Capital Structure DCF

$$\begin{aligned}
 K_e &= K_u + (((K_u - i) \cdot (1 - t) \cdot D / E) + (K_u - d) \cdot P / E) \\
 K_e &= 7.10\% + (((7.10\% - 4.09\%) \cdot (1 - 21\%) \cdot 51.69\% / 47.23\%) + (7.10\% - 6.01\%) \cdot 1.07\% / 47.23\%) \\
 K_e &= 7.10\% + (((3.01\%) \cdot 79\%) \cdot 109.44\%) + (1.09\%) \cdot 2.27\% \\
 K_e &= 7.10\% + ((2.38\%) \cdot 109.44\%) + (0.02\%) \\
 K_e &= 7.10\% + (2.60\%) + 0.02\% \\
 K_e &= \mathbf{9.72\%}
 \end{aligned}$$

Where:

$K_u$  = Un-levered (i.e., 100% equity) cost of common equity  
 $K_e$  = Market determined cost of common equity  
 $i$  = Cost of debt  
 $t$  = Income tax rate  
 $D$  = Debt ratio  
 $E$  = Equity ratio  
 $d$  = Cost of preferred stock  
 $P$  = Preferred equity ratio

Piedmont Natural Gas Company  
Mr. Hinton's DCF Analysis using only Projected Growth in EPS

DCF ANALYSIS

Company Name	Yield <sup>1</sup>		Value Line <sup>2</sup>		Yahoo Forecast <sup>3</sup>		Average Growth <sup>2</sup>	
			EPS		EPS			
			5-Yr		5-Yr			
1 Atmos Energy	2.6	%	7.0	%	7.2	%	7.1	%
2 Chesapeake Utilities	1.6		8.5		4.7		6.6	
3 MDU Resources	2.6		10.5		7.2		8.9	
4 National Fuel Gas	3.4		19.0		8.5		8.5	
5 New Jersey Resources	3.2		2.0		6.0		4.0	
6 Northwest Natural Gas	3.6		5.5		3.8		4.7	
7 One Gas	3.1		6.5		5.0		5.8	
8 South Jersey Inds.	4.9		11.5		4.8		8.2	
9 Southwest Gas Corp	3.5		9.0		4.0		6.5	
10 Spire	3.6		10.0		7.3		8.7	
11 UGI Corp.	3.0		6.0		7.7		6.9	
Average			3.2	%	7.7	%	6.0	%
Average DCF Result					10.8	%	9.2	%
							10.1	%

Sources:

<sup>1</sup>. Value Line Investment Survey, Summary and Index from April 30, 2021 to July 23, 2021.

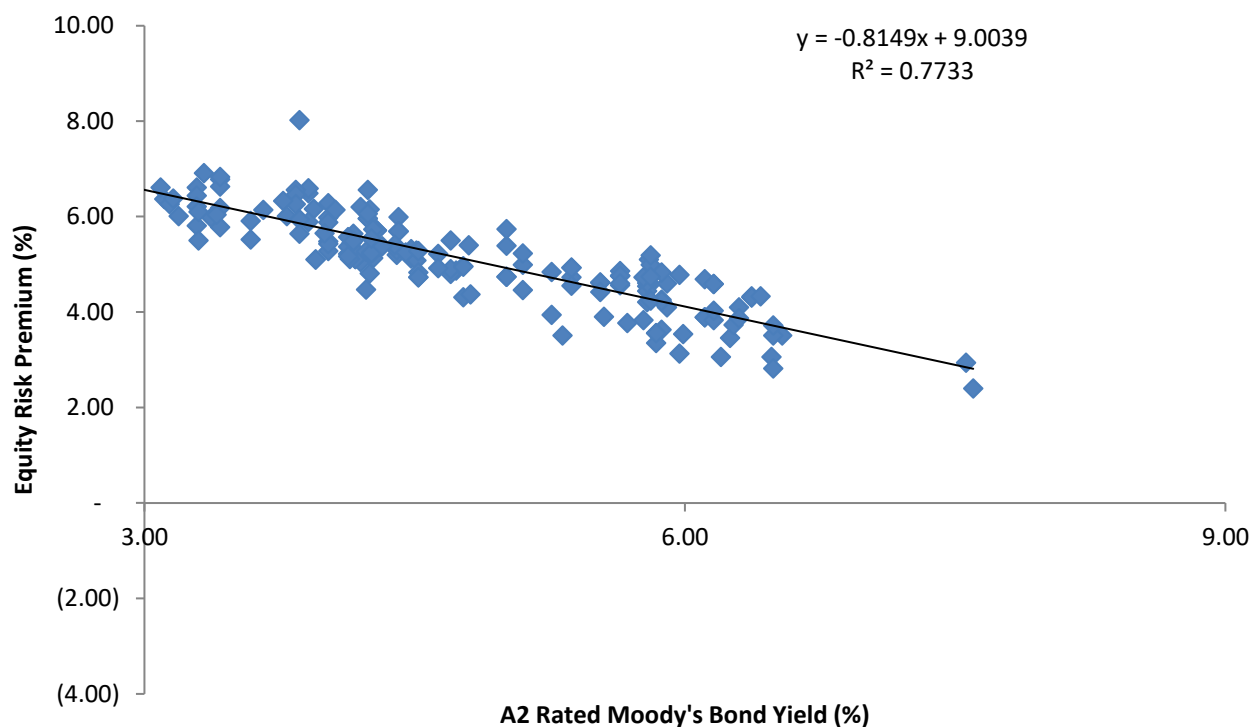
<sup>2</sup>. Value Line Investment Survey, Standard Edition, May 28, 2021. The 19% growth estimate for National Fuel Gas was excluded.

<sup>3</sup>. Yahoo Earnings Forecast as of June 30, 2021.

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Piedmont Natural Gas Company  
Prediction of Equity Risk Premiums Relative to  
Moody's A2 Rated Utility Bond Yields



Constant	Slope	Prospective A2 Rated Utility Bond (1)	Prospective Equity Risk Premium	Indicated ROE
9.0039 %	-0.8149	3.86 %	5.86 %	9.72 %
Constant	Slope	Current A2 Rated Utility Bond (1)	Prospective Equity Risk Premium	Indicated ROE
9.0039 %	-0.8149	3.21	6.39 %	9.60 %

Notes:

- (1) From line 3 of page 12 of Schedule 1.
- (2) Mr. Hinton's current A-rated bond yield as shown on Hinton Exhibit 7, page 2.

Source of Information: Regulatory Research Associates

Piedmont Natural Gas Company  
Mr. Hinton's CEM Analysis using Value Line Projected Returns

CEM ANALYSIS

Company Name	2021		2022		2024-2026	
1 Atmos Energy	8.0	%	7.5	%	7.5	%
2 Chesapeake Utilities	11.0		10.5		12.0	
3 MDU Resources	13.0		13.5		13.5	
4 National Fuel Gas	13.5		13.0		16.5	
5 New Jersey Resources	10.5		11.0		10.5	
6 Northwest Natural Gas	7.5		7.0		7.0	
7 One Gas	8.5		8.5		6.5	
8 South Jersey Inds.	10.0		10.5		11.5	
9 Southwest Gas Corp	9.0		9.0		10.0	
10 Spire	9.5		7.5		7.5	
11 UGI Corp.	14.0		14.0		12.5	
	<u>Average</u>		<u>Median</u>			
	10.35		10.50			

Sources:

<sup>1</sup> Value Line Investment Survey, May 28, 2021.

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Piedmont Natural Gas Company  
Calculation of Range of ROEs needed  
to Obtain a Single "A" Rating

	Capitalization Ratio (1) (a)	Embedded Cost (b)	Overall Cost Rate (2) (c)	Pre-Tax Cost of Capital (d)
<u>Company Proposed Rates</u>				
Long-term Debt	47.45%	4.08% (1)	1.94%	1.94%
Short-term Debt	0.55%	0.35% (1)	0.00%	0.00%
Equity	52.00%	10.25% (3)	5.33%	6.92% (4)
Total	<u>100.00%</u>		<u>7.27%</u>	<u>8.86%</u>
Pre-Tax Interest Coverage				5.01
<u>Public Staff Proposed Rates</u>				
Long-term Debt	48.80%	4.08% (1)	1.99%	1.99%
Short-term Debt	0.67%	0.20% (1)	0.00%	0.00%
Equity	50.53%	9.42% (5)	4.76%	6.18% (4)
Total	<u>100.00%</u>		<u>6.75%</u>	<u>8.17%</u>
Pre-Tax Interest Coverage				4.25
<u>Highest Rate Scenario</u>				
Long-term Debt	48.80%	4.08% (1)	1.99%	1.99%
Short-term Debt	0.67%	0.20% (1)	0.00%	0.00%
Equity	50.53%	14.55%	7.35%	9.54% (4)
Total	<u>100.00%</u>		<u>9.34%</u>	<u>11.54%</u>
Pre-Tax Interest Coverage				6.00
<u>Lowest Rate Scenario</u>				
Long-term Debt	48.80%	4.08% (1)	1.99%	1.99%
Short-term Debt	0.67%	0.20% (1)	0.00%	0.00%
Equity	50.53%	5.76%	2.91%	3.78% (4)
Total	<u>100.00%</u>		<u>4.90%</u>	<u>5.77%</u>
Pre-Tax Interest Coverage				3.00

Notes

- (1) Hinton Direct Testimony
- (2) Column (a) x Column (b)
- (3) Recommended ROE as shown on Schedule DWD-1R, page 1.
- (4) Overall Equity Cost Rate x Tax Conversion Factor
- (5) Hinton Direct Testimony

Piedmont Natural Gas Company  
Summary of Adjustment Clauses & Alternative Regulation/Incentive Plans

Company	Parent	State	Adjustment Clauses				Alternative Regulation / Incentive Plans	
			Gas Commodity	Decoupling (F/P) [1]	Capital Investment	Energy Efficiency [3]	Other [4]	Formula-Based Rates
Atmos Energy	ATO	Colorado	✓		✓	✓		
Atmos Energy	ATO	Kansas	✓	P	✓	✓	✓	✓
Atmos Energy	ATO	Kentucky	✓	P	✓	✓	✓	
Atmos Energy	ATO	Louisiana	✓	P	✓	✓		✓
Atmos Energy	ATO	Mississippi	✓	P	✓	✓		✓
Atmos Energy	ATO	Tennessee	✓	P	✓	✓		✓
Atmos Energy	ATO	Texas	✓	P	✓	✓		✓
Atmos Energy	ATO	Virginia	✓	P	✓	✓	✓	
Chesapeake Utilities Corp.	CPK	Delaware	✓	P	✓	✓	✓	
Chesapeake Utilities Corp.	CPK	Maryland	✓	F	✓	✓	✓	
Elkton Gas Company	CPK	Maryland	✓	F	✓	✓	✓	
Florida Public Utilities Co.	CPK	Florida	✓	F	✓	✓	✓	
MDU Resources Group Inc.	MDU	Montana	✓	P	✓	✓	✓	
MDU Resources Group Inc.	MDU	North Dakota	✓	P	✓	✓	✓	
Cascade Natural Gas Corp.	MDU	Oregon	✓	P	✓	✓	✓	✓
MDU Resources Group Inc.	MDU	South Dakota	✓	P	✓	✓	✓	
Cascade Natural Gas Corp.	MDU	Washington	✓	P	✓	✓	✓	
MDU Resources Group Inc.	MDU	Wyoming	✓	P	✓	✓	✓	
National Fuel Gas Distribution Corp.	NFG	New York	✓	F	✓	✓	✓	✓
National Fuel Gas Distribution Corp.	NFG	Pennsylvania	✓	F	✓	✓	✓	✓
New Jersey Natural Gas	NJR	New Jersey	✓	F	✓	✓	✓	✓
Northwest Natural Gas	NWN	Oregon	✓	P	✓	✓	✓	✓
Northwest Natural Gas	NWN	Washington	✓	P	✓	✓	✓	✓
Kansas Gas Service	OGS	Kansas	✓	P	✓	✓	✓	✓
Oklahoma Natural Gas	OGS	Oklahoma	✓	P	✓	✓	✓	✓
Texas Gas Service	OGS	Texas	✓	P	✓	✓	✓	✓
Elizabethtown Gas	SJI	New Jersey	✓	P	✓	✓	✓	✓
South Jersey Gas	SJI	New Jersey	✓	F	✓	✓	✓	✓
Southwest Gas Corporation	SWX	Arizona	✓	F	✓	✓	✓	✓
Southwest Gas Corporation	SWX	California	✓	F	✓	✓	✓	✓
Southwest Gas Corporation	SWX	Nevada	✓	F	✓	✓	✓	✓
Spire Alabama Inc.	SR	Alabama	✓	P	✓	✓	✓	✓
Spire Gulf Inc.	SR	Alabama	✓	P	✓	✓	✓	✓
Spire Mississippi Inc.	SR	Mississippi	✓	P	✓	✓	✓	✓
Spire Missouri East	SR	Missouri	✓	P	✓	✓	✓	✓
Spire Missouri West	SR	Missouri	✓	P	✓	✓	✓	✓
UGI Utilities	UGI	Pennsylvania	✓	P	✓	✓	✓	✓

## Notes:

Note: A mechanism may cover one or more cost categories; therefore, designations may not indicate separate mechanisms for each category.

[1] Full or partial decoupling (such as Fixed Variable rate design, weather normalization clauses, and recovery of lost revenues as a result of Energy Efficiency programs). All full or partial decoupling mechanisms include weather normalization adjustments.

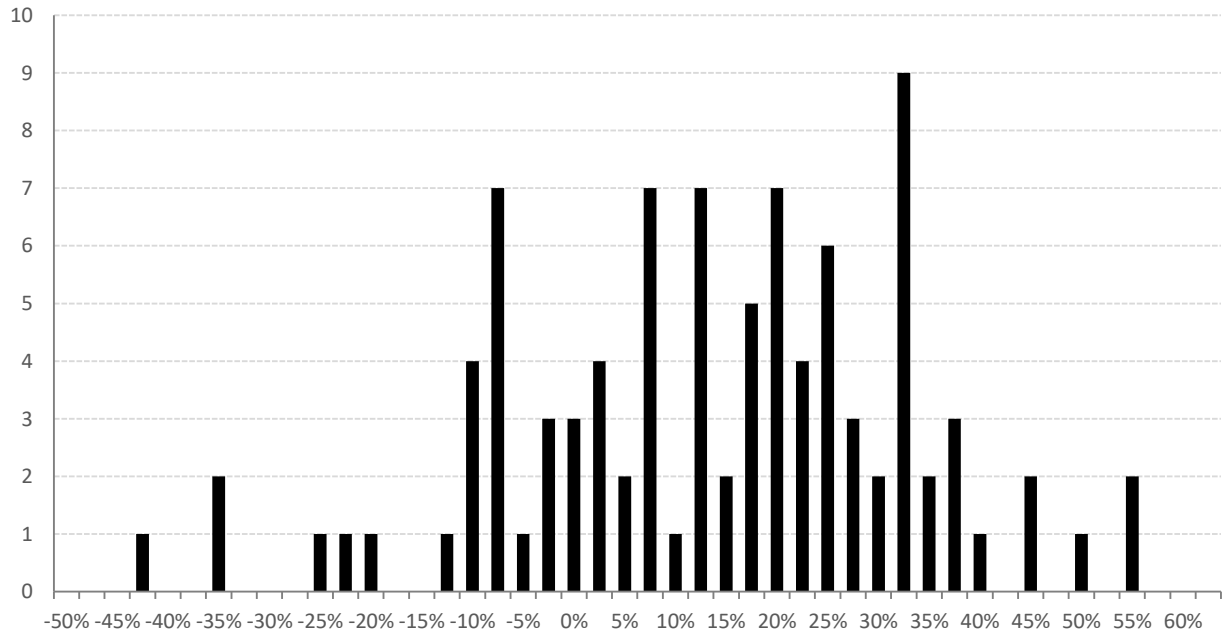
[2] Includes recovery of costs related to infrastructure replacement, system integrity/hardening, and other capital expenditures.

[3] Utility-sponsored conservation, energy efficiency, or other demand side management programs.

Sources: Company SEC Form 10-Ks; Operating company tariffs; Regulatory Research Associates.



Piedmont Natural Gas Company  
Frequency Distribution of Observed Market Returns, 1926 - 2020



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**Piedmont Natural Gas Company**  
**Frequency Distribution of Observed Market Returns, 1926 - 2020**

Large Company Stocks Total Returns		Long-Term Government Bond Income Returns	Market Returns		
Year	Jan-Dec*	Jan-Dec*	Bin	Frequency	Cumulative %
1926	0.1162	0.0373	-50.00%	0	0.0%
1927	0.3749	0.0341	-47.50%	0	0.0%
1928	0.4361	0.0322	-45.00%	0	0.0%
1929	-0.0842	0.0347	-42.50%	1	1.1%
1930	-0.2490	0.0332	-40.00%	0	1.1%
1931	-0.4334	0.0333	-37.50%	0	1.1%
1932	-0.0819	0.0369	-35.00%	2	3.2%
1933	0.5399	0.0312	-32.50%	0	3.2%
1934	-0.0144	0.0318	-30.00%	0	3.2%
1935	0.4767	0.0281	-27.50%	0	3.2%
1936	0.3392	0.0277	-25.00%	1	4.2%
1937	-0.3503	0.0266	-22.50%	1	5.3%
1938	0.3112	0.0264	-20.00%	1	6.3%
1939	-0.0041	0.0240	-17.50%	0	6.3%
1940	-0.0978	0.0223	-15.00%	0	6.3%
1941	-0.1159	0.0194	-12.50%	1	7.4%
1942	0.2034	0.0246	-10.00%	4	11.6%
1943	0.2590	0.0244	-7.50%	7	18.9%
1944	0.1975	0.0246	-5.00%	1	20.0%
1945	0.3644	0.0234	-2.50%	3	23.2%
1946	-0.0807	0.0204	0.00%	3	26.3%
1947	0.0571	0.0213	2.50%	4	30.5%
1948	0.0550	0.0240	5.00%	2	32.6%
1949	0.1879	0.0225	7.50%	7	40.0%
1950	0.3171	0.0212	10.00%	1	41.1%
1951	0.2402	0.0238	12.50%	7	48.4%
1952	0.1837	0.0266	15.00%	2	50.5%
1953	-0.0099	0.0284	17.50%	5	55.8%
1954	0.5262	0.0279	20.00%	7	63.2%
1955	0.3156	0.0275	22.50%	4	67.4%
1956	0.0656	0.0299	25.00%	6	73.7%
1957	-0.1078	0.0344	27.50%	3	76.8%
1958	0.4336	0.0327	30.00%	2	78.9%
1959	0.1196	0.0401	32.50%	9	88.4%
1960	0.0047	0.0426	35.00%	2	90.5%
1961	0.2689	0.0383	37.50%	3	93.7%
1962	-0.0873	0.0400	40.00%	1	94.7%
1963	0.2280	0.0389	42.50%	0	94.7%
1964	0.1648	0.0415	45.00%	2	96.8%
1965	0.1245	0.0419	47.50%	0	96.8%
1966	-0.1006	0.0449	50.00%	1	97.9%
1967	0.2398	0.0459	52.50%	0	97.9%
1968	0.1106	0.0550	55.00%	2	100.0%
1969	-0.0850	0.0595	57.50%	0	100.0%
1970	0.0386	0.0674	60.00%	0	100.0%
1971	0.1430	0.0632	62.50%	0	100.0%
1972	0.1899	0.0587			
1973	-0.1469	0.0651			
1974	-0.2647	0.0727			
1975	0.3723	0.0799			
1976	0.2393	0.0789			
1977	-0.0716	0.0714			
1978	0.0657	0.0790			
1979	0.1861	0.0886			
1980	0.3250	0.0997			

**Piedmont Natural Gas Company**  
**Frequency Distribution of Observed Market Returns, 1926 - 2020**

	Large Company Stocks Total Returns	Long-Term Government Bond Income Returns
<b>Year</b>	<b>Jan-Dec*</b>	<b>Jan-Dec*</b>
1981	-0.0492	0.1155
1982	0.2155	0.1350
1983	0.2256	0.1038
1984	0.0627	0.1174
1985	0.3173	0.1125
1986	0.1867	0.0898
1987	0.0525	0.0792
1988	0.1661	0.0897
1989	0.3169	0.0881
1990	-0.0310	0.0819
1991	0.3047	0.0822
1992	0.0762	0.0726
1993	0.1008	0.0717
1994	0.0132	0.0659
1995	0.3758	0.0760
1996	0.2296	0.0618
1997	0.3336	0.0664
1998	0.2858	0.0583
1999	0.2104	0.0557
2000	-0.0910	0.0650
2001	-0.1189	0.0553
2002	-0.2210	0.0559
2003	0.2868	0.0480
2004	0.1088	0.0502
2005	0.0491	0.0469
2006	0.1579	0.0468
2007	0.0549	0.0486
2008	-0.3700	0.0445
2009	0.2646	0.0347
2010	0.1506	0.0425
2011	0.0211	0.0382
2012	0.1600	0.0246
2013	0.3239	0.0288
2014	0.1369	0.0341
2015	0.0138	0.0247
2016	0.1196	0.0230
2017	0.2183	0.0267
2018	-0.0438	0.0282
2019	0.3149	0.0255
2020	0.1840	0.0142
Average	0.1216	0.0491
Std. Dev.	0.1967	0.0264
Average Return from Direct		% Rank
12.73%		48.10%
Average Return from Rebuttal		% Rank
12.62%		48.00%

Source: Duff & Phelps, 2021 SBBI Yearbook, Appendix A-1, A-7

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Piedmont Natural Gas Company  
Calculation of Price Appreciation and Annualized Volatility of the  
Combined Proxy Group, Other Utility Indices, and Market Indices since February 3, 2020

<u>Combined Natural Gas Proxy Group</u>	<u>Price Appreciation (1)</u>	<u>Annualized Volatility (2)</u>
Atmos Energy Corporation	-16.92%	36.23%
Chesapeake Utilities Corporation	27.30%	43.88%
Spire Inc	-17.00%	42.51%
New Jersey Resources Corporation	-9.15%	54.67%
NiSource Inc.	-16.85%	38.86%
Northwest Natural Gas Company	-30.36%	52.70%
ONE Gas, Inc.	-22.74%	43.95%
South Jersey Industries, Inc.	-19.99%	50.96%
Southwest Gas Corporation	-8.87%	44.10%
UGI Corporation	10.00%	44.25%
MDU Resources Group	6.19%	49.31%
National Fuel Gas	21.10%	36.17%
Average	<u>-6.44%</u>	<u>44.80%</u>
Dow Jones Utility Average	<u>-3.54%</u>	<u>33.12%</u>
Utilities Select SPDR Fund	<u>-4.67%</u>	<u>33.13%</u>
Dow Jones Industrial Average	<u>23.01%</u>	<u>30.95%</u>
S&P 500	<u>35.28%</u>	<u>29.28%</u>

Notes:

- (1) (7/30/2021 price minus 2/3/2020 price) divided by 2/3/2020 price.
- (2) Standard deviation of returns over the period multiplied by the square root of 252, or number of trading days in a year.

Source: S&P Market Intelligence, S&P Capital IQ

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Piedmont Natural Gas Company  
Mr. O'Donnell DCF Corrected

<u>Company</u>	<u>Dividend Yield</u>			<u>Forecast</u>				<u>DCF Result</u>		
	<u>13-Weeks</u>	<u>4-Weeks</u>	<u>1-Week</u>	<u>EPS</u>	<u>CFRA</u>	<u>Schwab</u>	<u>Avg Proj EPS</u>	<u>13-Weeks</u>	<u>4-Weeks</u>	<u>1-Week</u>
Atmos Energy	2.6%	2.7%	2.7%	7.0%	8.0%	7.2%	7.4%	10.00%	10.10%	10.10%
Chesapeake Utilities	1.6%	1.6%	1.6%	8.5%	3.6%	-	6.1%	7.65%	7.65%	7.65%
New Jersey Resources	3.1%	3.2%	3.3%	2.0%	8.0%	6.0%	5.3%	8.43%	8.53%	8.63%
NiSource Inc	3.5%	3.5%	3.5%	9.5%	5.0%	3.5%	6.0%	9.50%	9.50%	9.50%
Northwest Natural	3.5%	3.6%	3.6%	5.5%	4.0%	3.8%	4.4%	7.93%	8.03%	8.03%
ONE Gas Inc	3.1%	3.2%	3.2%	6.5%	5.0%	5.0%	5.5%	8.60%	8.70%	8.70%
South Jersey Inds	4.9%	4.7%	4.8%	11.5%	6.0%	4.8%	7.4%	12.33%	12.13%	12.23%
Southwest Gas	3.5%	3.7%	3.7%	9.0%	6.0%	4.0%	6.3%	9.83%	10.03%	10.03%
Spire Inc	3.5%	3.6%	3.6%	10.0%	4.0%	7.3%	7.1%	10.60%	10.70%	10.70%
UGI Corp	3.0%	2.9%	2.9%	6.0%	8.0%	7.7%	7.2%	10.23%	10.13%	10.13%
Average	3.2%	3.3%	3.3%	7.6%	5.8%	5.5%	6.3%	9.51%	9.55%	9.57%
Median								9.67%	9.77%	9.77%
Average - Excl. CPK, UGI								9.65%	9.72%	9.74%
Median - Excl. CPK, UGI								9.67%	9.77%	9.77%
Duke Energy	3.9%	3.9%	3.9%	7.0%	6.0%	5.0%	6.0%	9.90%	9.90%	9.90%

Source: Exhibit KWO-2

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Piedmont Natural Gas Company  
Recently Authorized ROEs by RRA Ranking

								Natural Gas Utilities				
								Top Third (Average/1 and higher)	Middle Third (Average/2)	Bottom Third (Average/3 and lower)	Year	RRA Rank
State	Company	Case Identification	Service	Case Type	Date	Return on Equity (%)	RRA Rank					
Maryland	Baltimore Gas and Electric Co.	C-9299 (gas)	Natural Gas	Distribution	2/22/2013	9.60	Average / 3			9.60	2013	4
New York	Niagara Mohawk Power Corp.	C-12-G-0202	Natural Gas	Distribution	3/14/2013	9.30	Average / 2		9.30		2013	5
Idaho	Avista Corp.	C-AVU-G-12-07	Natural Gas	Distribution	3/27/2013	9.80	Average / 2		9.80		2013	5
Montana	NorthWestern Corp.	D-D2012.9.94	Natural Gas	Distribution	4/23/2013	9.80	Below Average / 1			9.80	2013	3
District of Columbia	Washington Gas Light Co.	FC-1093	Natural Gas	Distribution	5/10/2013	9.25	Below Average / 3			9.25	2013	1
New York	Brooklyn Union Gas Co.	C-12-G-0544	Natural Gas	Distribution	6/13/2013	9.40	Average / 2				2013	5
Illinois	North Shore Gas Co.	D-12-0511	Natural Gas	Distribution	6/18/2013	9.28	Average / 2		9.28		2013	5
Texas	The Peoples Gas Light & Coke C	D-12-0512	Natural Gas	Distribution	6/18/2013	9.28	Average / 2		9.28		2013	5
Washington	Puget Sound Energy Inc.	D-UG-130138	Natural Gas	Distribution	6/25/2013	9.80	Average / 3			9.80	2013	4
Maryland	Columbia Gas of Maryland Inc	C-9316	Natural Gas	Distribution	9/23/2013	9.60	Average / 3			9.60	2013	4
Wisconsin	Wisconsin Public Service Corp.	D-6690-UR-122 (Gas)	Natural Gas	Distribution	11/6/2013	10.20	Above Average / 2	10.20			2013	8
Ohio	Duke Energy Ohio Inc.	C-12-1685-GA-AIR	Natural Gas	Distribution	11/13/2013	9.84	Average / 3			9.84	2013	4
Michigan	Michigan Gas Utilities Corp.	C-U-17273	Natural Gas	Distribution	11/14/2013	10.25	Above Average / 3	10.25			2013	7
Maryland	Washington Gas Light Co.	C-9322	Natural Gas	Distribution	11/22/2013	9.50	Average / 3			9.50	2013	4
Wisconsin	Northern States Power Co.	D-4220-UR-119 (Gas)	Natural Gas	Distribution	12/5/2013	10.20	Above Average / 2	10.20			2013	8
Maryland	Baltimore Gas and Electric Co.	C-9326 (gas)	Natural Gas	Distribution	12/13/2013	9.60	Average / 3			9.60	2013	4
Nevada	Sierra Pacific Power Co.	D-13-06003	Natural Gas	Distribution	12/16/2013	9.73	Average / 2		9.73		2013	4
North Carolina	Piedmont Natural Gas Co.	D-G-9, Sub 631	Natural Gas	Distribution	12/17/2013	10.00	Average / 1	10.00			2013	6
Illinois	Ameren Illinois	D-13-0192	Natural Gas	Distribution	12/18/2013	9.08	Average / 2		9.08		2013	5
Colorado	Public Service Co. of CO	D-12AL-1268G	Natural Gas	Distribution	12/23/2013	9.72	Average / 1		9.72		2013	6
North Dakota	MDU Resources Group	C-PU-13-803	Natural Gas	Distribution	12/30/2013	10.00	Average / 1	10.00			2013	6
Oregon	Avista Corp.	D-UG-246	Natural Gas	Distribution	1/21/2014	9.65	Average / 2		9.65		2014	5
Connecticut	CT Natural Gas Corp.	D-13-06-08	Natural Gas	Distribution	1/22/2014	9.18	Average / 3			9.18	2014	4
New York	Consolidated Edison Co. of NY	C-13-G-0031	Natural Gas	Distribution	2/20/2014	9.30	Average / 2		9.30		2014	5
Utah	Questar Gas Co.	D-13-057-05	Natural Gas	Distribution	2/21/2014	9.85	Average / 2		9.85		2014	5
Massachusetts	Eversource Gas Company of MA	DPU 13-75	Natural Gas	Distribution	2/28/2014	9.55	Average / 2		9.55		2014	5
Colorado	Atmos Energy Corp.	D-13AL-0496G	Natural Gas	Distribution	3/16/2014	9.72	Average / 1	9.72			2014	6
New Hampshire	Northern Utilities Inc.	D-DG-13-086	Natural Gas	Distribution	4/21/2014	9.50	Average / 3			9.50	2014	4
Kentucky	Atmos Energy Corp.	C-2013-00148	Natural Gas	Distribution	4/22/2014	9.80	Average / 1	9.80			2014	6
Minnesota	CenterPoint Energy Resources	D-G-008/GR-13-316	Natural Gas	Distribution	5/8/2014	9.59	Average / 2		9.59		2014	5
New York	Natl Fuel Gas Distribution Cor	C-13-G-0136	Natural Gas	Distribution	5/8/2014	9.10	Average / 2		9.10		2014	5
Wisconsin	Wisconsin Power and Light Co	D-6680-UR-119 (Gas)	Natural Gas	Distribution	6/6/2014	10.40	Above Average / 2	10.40			2014	8
California	Southwest Gas Corp.	A-12-12-024 (SoCal)	Natural Gas	Distribution	6/12/2014	10.10	Average / 2		10.10		2014	5
California	Southwest Gas Corp.	A-12-12-024 (NoCal)	Natural Gas	Distribution	6/12/2014	10.10	Average / 2		10.10		2014	5
California	Southwest Gas Corp.	A-12-12-024 (LkTah)	Natural Gas	Distribution	6/12/2014	10.10	Average / 2		10.10		2014	5
Arkansas	Black Hills Energy Arkansas	D-13-079-U	Natural Gas	Distribution	7/7/2014	9.30	Average / 1	9.30			2014	6
Arkansas	Arkansas Oklahoma Gas Corp.	D-13-078-U	Natural Gas	Distribution	7/25/2014	9.30	Average / 1	9.30			2014	6
Wyoming	Cheyenne Light Fuel Power Co.	D-30005-182-GR-13	Natural Gas	Distribution	7/31/2014	9.90	Average / 2		9.90		2014	5
Kansas	Atmos Energy Corp.	D-14-ATMG-320-RTS	Natural Gas	Distribution	9/4/2014	9.10	Below Average / 1			9.10	2014	3
Minnesota	Minnesota Energy Resources	D-G-011/GR-13-617	Natural Gas	Distribution	9/24/2014	9.35	Average / 2		9.35		2014	5
New Jersey	South Jersey Gas Co.	D-GR-13111137	Natural Gas	Distribution	9/30/2014	9.75	Below Average / 1			9.75	2014	3
Missouri	Summit Natural Gas of Missouri	C-GR-2014-0086	Natural Gas	Distribution	10/29/2014	10.80	Average / 3			10.80	2014	4
Wisconsin	Wisconsin Public Service Corp.	D-6690-UR-123 (Gas)	Natural Gas	Distribution	11/6/2014	10.20	Above Average / 2	10.20			2014	8
Wisconsin	Wisconsin Electric Power Co.	D-05-UR-107 (WEP-Gas)	Natural Gas	Distribution	11/14/2014	10.20	Above Average / 2	10.20			2014	8
Wisconsin	Wisconsin Gas LLC	D-05-UR-107 (WG)	Natural Gas	Distribution	11/14/2014	10.30	Above Average / 2	10.30			2014	8
Missouri	Madison Gas and Electric Co.	D-3270-UR-120 (Gas)	Natural Gas	Distribution	11/26/2014	10.20	Above Average / 2	10.20			2014	8
Illinois	Liberty Utilities (Midstates)	C-GR-2014-0152	Natural Gas	Distribution	12/3/2014	10.00	Average / 3			10.00	2014	4
Michigan	Consumers Energy Co.	C-U-17643	Natural Gas	Distribution	1/13/2015	10.30	Above Average / 3	10.30			2015	7
Illinois	North Shore Gas Co.	D-14-0224	Natural Gas	Distribution	1/21/2015	9.05	Average / 2		9.05		2015	5
Illinois	The Peoples Gas Light & Coke C	D-14-0225	Natural Gas	Distribution	1/21/2015	9.05	Average / 2		9.05		2015	5
Oregon	Avista Corp.	D-UG-284	Natural Gas	Distribution	4/9/2015	9.50	Average / 2		9.50		2015	5
Tennessee	Atmos Energy Corp.	D-14-00146	Natural Gas	Distribution	5/11/2015	9.80	Above Average / 3	9.80			2015	7
New York	Central Hudson Gas & Electric	C-14-G-0319	Natural Gas	Distribution	6/17/2015	9.00	Average / 2		9.00		2015	5
Virginia	Columbia Gas of Virginia Inc	C-PU-E-2014-00020	Natural Gas	Distribution	8/21/2015	9.75	Average / 1	9.75			2015	6
Massachusetts	Eversource Gas Company of MA	DPU 15-50	Natural Gas	Distribution	10/7/2015	9.55	Average / 2		9.55		2015	5
West Virginia	Mountainair Gas Co.	C-15-0003-G-42T	Natural Gas	Distribution	10/13/2015	9.75	Below Average / 2			9.75	2015	2
New York	Orange & Rockland Utlts Inc.	C-14-G-0494	Natural Gas	Distribution	10/15/2015	9.00	Average / 2		9.00		2015	5
Massachusetts	NSTAR Gas Co.	DPU 14-150	Natural Gas	Distribution	10/30/2015	9.80	Average / 2		9.80		2015	5
Wisconsin	Wisconsin Public Service Corp.	D-6690-UR-124 (Gas)	Natural Gas	Distribution	11/19/2015	10.00	Above Average / 2	10.00			2015	8
Wisconsin	Northern States Power Co.	D-4220-UR-121 (Gas)	Natural Gas	Distribution	12/3/2015	10.00	Above Average / 2	10.00			2015	8
Illinois	Ameren Illinois	D-15-0142	Natural Gas	Distribution	12/9/2015	9.60	Average / 2		9.60		2015	5
Michigan	Michigan Gas Utilities Corp.	C-U-17880	Natural Gas	Distribution	12/11/2015	9.90	Above Average / 3	9.90			2015	7
Idaho	Avista Corp.	C-AVU-G-15-01	Natural Gas	Distribution	12/18/2015	9.50	Average / 2		9.50		2015	5
Oklahoma	Oklahoma Natural Gas Co	Ca-PU0201500213	Natural Gas	Distribution	1/6/2016	9.50	Average / 2		9.50		2016	5
Washington	Avista Corp.	D-UG-150205	Natural Gas	Distribution	1/6/2016	9.50	Average / 3			9.50	2016	4
Arkansas	Black Hills Energy Arkansas	D-15-011-U	Natural Gas	Distribution	1/28/2016	9.40	Average / 1	9.40			2016	6
Massachusetts	Liberty Utilities (NE Nat Gas)	DPU 15-75	Natural Gas	Distribution	2/10/2016	9.60	Average / 2		9.60		2016	6
Colorado	Public Service Co. of CO	D-15AL-0135G	Natural Gas	Distribution	2/16/2016	9.50	Average / 1	9.50			2016	6
Oregon	Avista Corp.	D-UG 288	Natural Gas	Distribution	2/29/2016	9.40	Average / 2		9.40		2016	5
Massachusetts	Fitchburg Gas & Electric Light	DPU 15-81	Natural Gas	Distribution	4/29/2016	9.80	Average / 2		9.80		2016	5
Minnesota	CenterPoint Energy Resources	D-G-008/GR-15-424	Natural Gas	Distribution	5/5/2016	9.49	Average / 2		9.49		2016	5
Maine	Maine Natural Gas	D-2015-00005	Natural Gas	Distribution	6/1/2016	9.55	Average / 3		9.55		2016	4
Maryland	Baltimore Gas and Electric Co.	C-9406 (gas)	Natural Gas	Distribution	6/3/2016	9.65	Average / 3		9.65		2016	4
New York	NY State Electric & Gas Corp.	C-15-G-0284	Natural Gas	Distribution	6/15/2016	9.00	Average / 2		9.00		2016	5
New York	Rochester Gas & Electric Co	C-15-G-0286	Natural Gas	Distribution	6/15/2016	9.00	Average / 2		9.00		2016	5
Arkansas	CenterPoint Energy Resources	D-15-098-U	Natural Gas	Distribution	9/2/2016	9.50	Average / 1	9.50			2016	6
New Jersey	New Jersey Natural Gas Co.	D-GR-15111304	Natural Gas	Distribution	9/23/2016	9.75	Below Average / 1			9.75	2016	3
Texas	Texas Gas Service Co.	D-GUD-10506	Natural Gas	Distribution	9/27/2016	9.50	Average / 3			9.50	2016	4
Minnesota	Minnesota Energy Resources	D-G-011/GR-15-736	Natural Gas	Distribution	9/29/2016	9.11	Average / 2		9.11		2016	5
South Carolina	Piedmont Natural Gas Co.	D-2016-7-G	Natural Gas	Distribution	10/13/2016	10.20	Average / 3			10.20	2016	4
North Carolina	Public Service Co. of NC	D-G-5, Sub 565	Natural Gas	Distribution	10/28/2016	9.70	Average / 1	9.70			2016	6
Wisconsin	Madison Gas and Electric Co.	D-3270-UR-121 (Gas)	Natural Gas	Distribution	11/9/2016	9.80	Above Average / 2	9.80			2016	8
Wisconsin	Wisconsin Power and Light Co	D-6680-UR-120 (Gas)	Natural Gas	Distribution	11/18/2016	10.00	Above Average / 2	10.00			2016	8
Michigan	DTE Gas Co.	C-U-17999	Natural Gas	Distribution	12/9/2016	10.10	Above Average / 3	10.10			2016	7
New York	Brooklyn Union Gas Co.	C-16-G-0059	Natural Gas	Distribution	12/15/2016	9.00	Average / 2		9.00		2016	5
New York	KeySpan Gas East Corp.	C-16-G-0058	Natural Gas	Distribution	12/15/2016	9.00	Average / 2		9.00		2016	5
Delaware	Chesapeake Utilities Corp.	D-15-1734	Natural Gas	Distribution	12/20/2016	9.75	Average / 3			9.75	2016	4
Nevada	Sierra Pacific Power Co.	D-16-06007	Natural Gas	Distribution	12/22/2016	9.50	Average / 2		9.50		2016	5
New York	Consolidated Edison Co. of NY	C-16-G-0061	Natural Gas	Distribution	1/24/2017	9.00	Average / 2		9.00		2017	5

Piedmont Natural Gas Company  
Recently Authorized ROEs by RRA Ranking

								Natural Gas Utilities				
								Top Third (Average/1 and higher)	Middle Third (Average/2)	Bottom Third (Average/3 and lower)	Year	RRA Rank
State	Company	Case Identification	Service	Case Type	Date	Return on Equity (%)	RRA Rank					
Idaho	Avista Corp.	C-AVU-G-17-01	Natural Gas	Distribution	12/28/2017	9.50	Average / 2		9.50		2017	5
Illinois	Northern Illinois Gas Co.	D-17-0124	Natural Gas	Distribution	1/31/2018	9.80	Average / 2		9.80		2018	5
Missouri	Missouri Gas Energy	C-GR-2017-0216	Natural Gas	Distribution	2/21/2018	9.80	Average / 3			9.80	2018	4
Missouri	Spire Missouri Inc.	C-GR-2017-0215	Natural Gas	Distribution	2/21/2018	9.80	Average / 3			9.80	2018	4
Maine	Northern Utilities Inc.	D-2017-00065	Natural Gas	Distribution	2/28/2018	9.50	Average / 3			9.50	2018	4
New York	Niagara Mohawk Power Corp.	C-17-G-0239	Natural Gas	Distribution	3/15/2018	9.00	Average / 2		9.00		2018	5
Florida	Pivotal Utility Holdings Inc.	20170179-GU	Natural Gas	Distribution	3/26/2018	10.19	Above Average / 2	10.19			2018	8
Washington	Avista Corp.	D-UG-170486	Natural Gas	Distribution	4/26/2018	9.50	Average / 3			9.50	2018	4
New Hampshire	Liberty Utilities Energy/North	D-DG-17-048	Natural Gas	Distribution	4/27/2018	9.30	Average / 3			9.30	2018	4
New Hampshire	Northern Utilities Inc.	D-DG-17-070	Natural Gas	Distribution	5/2/2018	9.50	Average / 3			9.50	2018	4
Kentucky	Atmos Energy Corp.	C-2017-00349	Natural Gas	Distribution	5/3/2018	9.70	Average / 1	9.70			2018	6
Montana	MDU Resources Group	D20179.79	Natural Gas	Distribution	5/29/2018	9.40	Below Average / 1			9.40	2018	3
Missouri	Liberty Utilities (Midstates)	C-GR-2018-0013	Natural Gas	Distribution	6/6/2018	9.80	Average / 3			9.80	2018	4
New York	Central Hudson Gas & Electric	C-17-G-0460	Natural Gas	Distribution	6/14/2018	8.80	Average / 2		8.80		2018	5
Wyoming	Black Hills Northwest Wyoming	D-30011-97-GR-17	Natural Gas	Distribution	7/16/2018	9.60	Average / 2		9.60		2018	5
Washington	Cascade Natural Gas Corp.	D-UG-170929	Natural Gas	Distribution	7/20/2018	9.40	Average / 3			9.40	2018	4
Rhode Island	Narragansett Electric Co.	D-4770 (gas)	Natural Gas	Distribution	8/24/2018	9.28	Average / 2			9.28	2018	5
Michigan	Consumers Energy Co.	C-U-18424	Natural Gas	Distribution	8/28/2018	10.00	Above Average / 3	10.00			2018	7
Michigan	DTE Gas Co.	C-U-18999	Natural Gas	Distribution	9/13/2018	10.00	Above Average / 3	10.00			2018	7
Wisconsin	Wisconsin Power and Light Co	D-6680-UR-121 (Gas)	Natural Gas	Distribution	9/14/2018	10.00	Above Average / 2	10.00			2018	8
Indiana	Ca-44988	Northern IN Public Svc Co.	Natural Gas	Distribution	9/19/2018	9.85	Average / 1	9.85			2018	6
Wisconsin	Madison Gas and Electric Co.	D-3270-UR-122 (Gas)	Natural Gas	Distribution	9/20/2018	9.80	Above Average / 2	9.80			2018	8
North Dakota	MDU Resources Group	C-PU-17-295	Natural Gas	Distribution	9/26/2018	9.40	Average / 1	9.40			2018	6
South Carolina	Piedmont Natural Gas Co.	D-2018-7-G	Natural Gas	Distribution	9/26/2018	10.20	Average / 3			10.20	2018	4
Massachusetts	Boston Gas Co.	DPU-17-170 (Boston Gas)	Natural Gas	Distribution	9/28/2018	9.50	Average / 2		9.50		2018	5
Massachusetts	Colonial Gas Co.	DPU-17-170 (Colonial Gas)	Natural Gas	Distribution	9/28/2018	9.50	Average / 2		9.50		2018	5
Arkansas	Black Hills Energy Arkansas	D-17-071-U	Natural Gas	Distribution	10/5/2018	9.61	Average / 1	9.61			2018	6
Tennessee	Chattanooga Gas Co.	D-18-00017	Natural Gas	Distribution	10/15/2018	9.80	Above Average / 3	9.80			2018	7
Oregon	Northwest Natural Gas Co.	D-UG-344	Natural Gas	Distribution	10/26/2018	9.40	Average / 2		9.40		2018	5
New Jersey	Public Service Electric Gas	D-GR18010030	Natural Gas	Distribution	10/29/2018	9.60	Below Average / 1			9.60	2018	3
Illinois	Ameren Illinois	D-18-0463	Natural Gas	Distribution	11/1/2018	9.87	Average / 2	9.87			2018	5
Delaware	Delmarva Power & Light Co.	D-17-0978	Natural Gas	Distribution	11/8/2018	9.70	Average / 3		9.70		2018	4
Minnesota	Minnesota Energy Resources	D-G-011/GR-17-563	Natural Gas	Distribution	11/8/2018	9.70	Average / 2		9.70		2018	5
Maryland	Washington Gas Light Co.	C-9481	Natural Gas	Distribution	12/11/2018	9.70	Average / 3			9.70	2018	4
Connecticut	Yankee Gas Services Co.	D-18-05-10	Natural Gas	Distribution	12/12/2018	9.30	Average / 3			9.30	2018	4
Iowa	Interstate Power & Light Co.	D-RPU-2018-0002	Natural Gas	Distribution	12/13/2018	9.60	Above Average / 3	9.60			2018	7
Connecticut	CT Natural Gas Corp.	D-18-05-16	Natural Gas	Distribution	12/19/2018	9.30	Average / 3			9.30	2018	4
Colorado	Public Service Co. of CO	D-17AL-0363G	Natural Gas	Distribution	12/21/2018	9.35	Average / 1	9.35			2018	6
Nevada	Southwest Gas Corp.	D-18-05031 (Southern)	Natural Gas	Distribution	12/24/2018	9.25	Average / 2		9.25		2018	5
Nevada	Southwest Gas Corp.	D-18-05031 (Northern)	Natural Gas	Distribution	12/24/2018	9.25	Average / 2		9.25		2018	5
Maryland	Baltimore Gas & Electric Co.	C-9484	Natural Gas	Distribution	1/4/2019	9.80	Average / 3		9.80		2019	4
Massachusetts	The Berkshire Gas Co.	DPU 18-40	Natural Gas	Distribution	1/18/2019	9.70	Average / 2		9.70		2019	5
New York	Orange & Rockland Utls Inc.	C-18-G-0068	Natural Gas	Distribution	3/14/2019	9.00	Average / 2		9.00		2019	5
Kentucky	Duke Energy Kentucky Inc.	C-2018-00261	Natural Gas	Distribution	3/27/2019	9.70	Average / 1	9.70			2019	6
Kentucky	Louisville Gas & Electric Co.	C-2018-00295 (gas)	Natural Gas	Distribution	4/30/2019	9.73	Average / 1	9.73			2019	6
Kentucky	Atmos Energy Corp.	C-2018-00281	Natural Gas	Distribution	5/7/2019	9.65	Average / 1	9.65			2019	6
Texas	Atmos Energy Corp.	D-GUD-10779 (Mid-Tex Division)	Natural Gas	Distribution	5/21/2019	9.80	Average / 3			9.80	2019	4
Wisconsin	Northern States Power Co.	D-4220-UR-124 (Gas)	Natural Gas	Distribution	9/4/2019	10.00	Above Average / 2	10.00			2019	8
Michigan	Consumers Energy Co.	C-U-20322	Natural Gas	Distribution	9/26/2019	9.90	Above Average / 3	9.90			2019	7
Illinois	Northern Illinois Gas Co.	D-18-1775	Natural Gas	Distribution	10/2/2019	9.73	Average / 2		9.73		2019	5
Oregon	Avista Corp.	D-UG 366	Natural Gas	Distribution	10/8/2019	9.40	Average / 2		9.40		2019	5
Maryland	Washington Gas Light Co.	C-9605	Natural Gas	Distribution	10/15/2019	9.70	Average / 3			9.70	2019	4
Washington	Northwest Natural Gas Co.	D-UG-181053	Natural Gas	Distribution	10/21/2019	9.40	Average / 3			9.40	2019	4
North Carolina	Piedmont Natural Gas Co.	D-G-9, Sub 743	Natural Gas	Distribution	10/31/2019	9.70	Average / 1	9.70			2019	6
Wisconsin	Wisconsin Electric Power Co.	D-05-UR-109 (WEP-Gas)	Natural Gas	Distribution	10/31/2019	10.00	Above Average / 2	10.00			2019	8
Wisconsin	Wisconsin Gas LLC	D-05-UR-109	Natural Gas	Distribution	10/31/2019	10.20	Above Average / 2	10.20			2019	8
Wisconsin	Wisconsin Public Service Corp.	D-6690-UR-126 (Gas)	Natural Gas	Distribution	10/31/2019	10.00	Above Average / 2	10.00			2019	8
Louisiana	Entergy New Orleans LLC	D-UD-18-07 (gas)	Natural Gas	Distribution	11/7/2019	9.35	Average / 3			9.35	2019	4
New Jersey	Elizabethtown Gas Co.	D-GR19040486	Natural Gas	Distribution	11/13/2019	9.60	Below Average / 1		9.60		2019	3
New Jersey	New Jersey Natural Gas Co.	D-GR19030420	Natural Gas	Distribution	11/13/2019	9.60	Below Average / 1		9.60		2019	3
Michigan	SEMCO Energy Inc.	C-U-20479	Natural Gas	Distribution	12/6/2019	9.87	Above Average / 3	9.87			2019	7
Wyoming	Black Hills Gas Distribution	D-30026-2-GR-19	Natural Gas	Distribution	12/11/2019	9.40	Average / 2		9.40		2019	5
Maryland	Baltimore Gas and Electric Co.	C-9610 (GAS)	Natural Gas	Distribution	12/17/2019	9.75	Average / 3		9.75		2019	4
Iowa	Interstate Power & Light Co.	D-RPU-2019-0002	Natural Gas	Distribution	12/18/2019	9.60	Above Average / 3	9.60			2019	7
Maryland	Columbia Gas of Maryland Inc	C-9609	Natural Gas	Distribution	12/18/2019	9.60	Average / 3			9.60	2019	4
California	San Diego Gas & Electric Co.	A-19-04-017 (Gas)	Natural Gas	Distribution	12/19/2019	10.20	Average / 2		10.20		2019	5
California	Southern California Gas Co.	A-19-04-018	Natural Gas	Distribution	12/19/2019	10.05	Average / 2		10.05		2019	5
Georgia	Atlanta Gas Light Co.	D-42315	Natural Gas	Distribution	12/19/2019	10.25	Above Average / 2	10.25			2019	8
Virginia	Washington Gas Light Co.	C-PUR-2018-00080	Natural Gas	Distribution	12/20/2019	9.20	Average / 1	9.20			2019	6
West Virginia	Mountaineer Gas Co.	C-19-0316-G-42T	Natural Gas	Distribution	12/26/2019	9.75	Below Average / 2		9.75		2019	2
Wyoming	MDU Resources Group	D-30013-351-GR-19	Natural Gas	Distribution	1/15/2020	9.35	Average / 2		9.35		2020	5
New York	Consolidated Edison Co. of NY	C-19-G-0066	Natural Gas	Distribution	1/16/2020	8.80	Average / 2		8.80		2020	5
Virginia	Roanoke Gas Co.	C-PUR-2018-00013	Natural Gas	Distribution	1/24/2020	9.44	Average / 1	9.44			2020	6
Washington	Cascade Natural Gas Corp.	D-UG-190210	Natural Gas	Distribution	2/3/2020	9.40	Average / 3			9.40	2020	4
Kansas	Atmos Energy Corp.	D-19-ATMG-525-RTS	Natural Gas	Distribution	2/24/2020	9.10	Below Average / 1			9.10	2020	3
Utah	Questar Gas Co.	D-19-057-02	Natural Gas	Distribution	2/25/2020	9.50	Average / 2		9.50		2020	5
Massachusetts	Fitchburg Gas & Electric Light	DPU 19-131	Natural Gas	Distribution	2/28/2020	9.70	Average / 2		9.70		2020	5
Washington	Avista Corp.	D-UG-190335	Natural Gas	Distribution	3/25/2020	9.40	Average / 3			9.40	2020	4
Maine	Northern Utilities Inc.	D-2019-00092	Natural Gas	Distribution	3/26/2020	9.48	Average / 3			9.48	2020	4
Texas	Atmos Energy Corp.	D-GUD-10900	Natural Gas	Distribution	4/21/2020	9.80	Average / 3			9.80	2020	4
Colorado	Black Hills Colorado Gas Inc.	D-19AL-0075G	Natural Gas	Distribution	5/19/2020	9.20	Average / 1	9.20			2020	6
Texas	CenterPoint Energy Resources	D-GUD-10920	Natural Gas	Distribution	6/16/2020	9.65	Average / 3		9.65		2020	4
Washington	Puget Sound Energy Inc.	D-UG-190530	Natural Gas	Distribution	7/8/2020	9.40	Average / 3		9.40		2020	4
Texas	Texas Gas Service Co.	D-GUD-10928	Natural Gas	Distribution	8/4/2020	9.50	Average / 3			9.50	2020	4
Michigan	DTE Gas Co.	C-U-20642	Natural Gas	Distribution	8/20/2020	9.90	Above Average / 3	9.90			2020	7
Wyoming	Questar Gas Co.	D-30010-187-GR-19	Natural Gas	Distribution	8/21/2020	9.35	Average / 2		9.35		2020	7
Michigan	Consumers Energy Co.	C-U-20650	Natural Gas	Distribution	9/10/2020	9.90	Above Average / 3	9.90			2020	7
New Jersey	South Jersey Gas Co.	D-GR20030243	Natural Gas	Distribution	9/23/2020	9.60	Below Average / 1			9.60	2020	3
Nevada	Southwest Gas Corp.	D-20-02023 (Southern)	Natural Gas	Distribution	9/25/2020	9.25	Average / 2		9.25		2020	5
Nevada	Southwest Gas Corp.	D-20-02023 (Northern)	Natural Gas	Distribution								

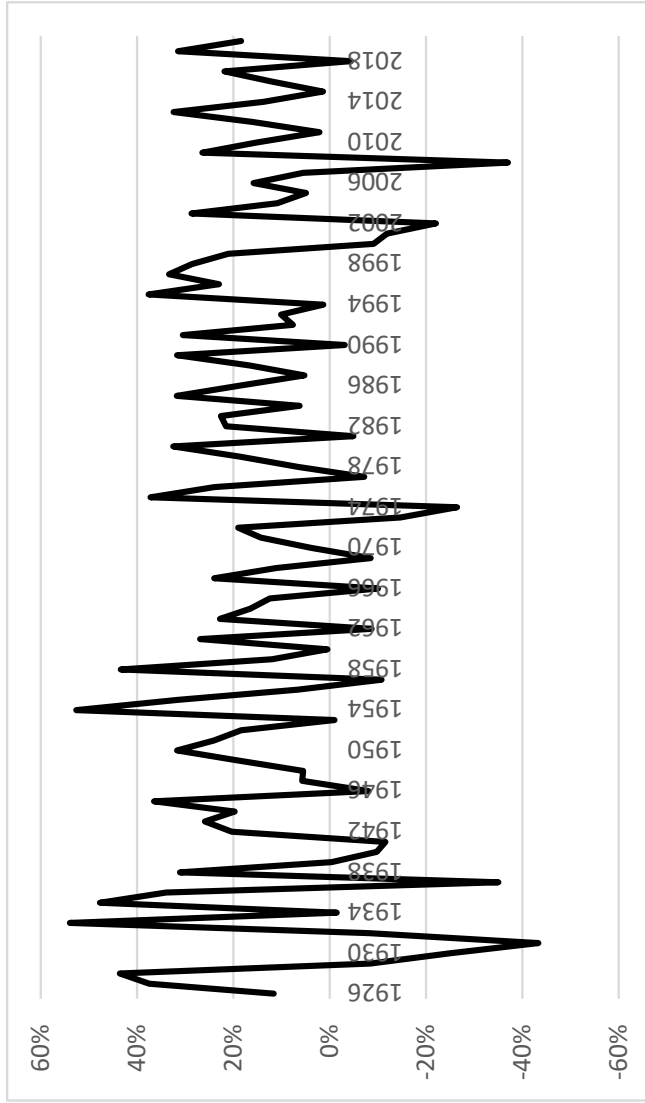
Piedmont Natural Gas Company  
Recently Authorized ROEs by RRA Ranking

State	Company	Case Identification	Service	Case Type	Date	Return on Equity (%)	RRA Rank	Natural Gas Utilities			Year	RRA Rank
								Top Third (Average/1 and higher)	Middle Third (Average/2)	Bottom Third (Average/3 and lower)		
District of Columbia	Washington Gas Light Co.	FC-1162	Natural Gas	Distribution	2/24/2021	9.25	Below Average / 3			9.25	2021	1
California	Southwest Gas Corp.	A-19-08-015 (SoCal)	Natural Gas	Distribution	3/25/2021	10.00	Average / 2		10.00		2021	5
California	Southwest Gas Corp.	A-19-08-015 (NoCal)	Natural Gas	Distribution	3/25/2021	10.00	Average / 2		10.00		2021	5
California	Southwest Gas Corp.	A-19-08-015 (LkTah)	Natural Gas	Distribution	3/25/2021	10.00	Average / 2		10.00		2021	5
Maryland	Washington Gas Light Co.	C-9651	Natural Gas	Distribution	4/9/2021	9.70	Average / 3			9.70	2021	4
North Dakota	MDU Resources Group	C-PU-20-379	Natural Gas	Distribution	5/5/2021	9.30	Average / 1	9.30			2021	6
Washington	Cascade Natural Gas Corp.	D-UG-200568	Natural Gas	Distribution	5/18/2021	9.40	Average / 3			9.40	2021	4
New York	Corning Natural Gas Corp.	C-20-G-0101	Natural Gas	Distribution	5/19/2021	8.80	Average / 2		8.80		2021	5
Pennsylvania	PECO Energy Co.	D-R-2020-3018929	Natural Gas	Distribution	6/17/2021	10.24	Above Average / 2	10.24			2021	8
Kentucky	Louisville Gas & Electric Co.	C-2020-00350 (gas)	Natural Gas	Distribution	6/30/2021	9.43	Average / 1	9.43			2021	6
West Virginia	Hope Gas Inc.	C-20-0746-G-42T	Natural Gas	Distribution	7/27/2021	9.54	Below Average / 2			9.54	2021	2
New Hampshire	Liberty Utilities EnergyNorth	D-DG-20-105	Natural Gas	Distribution	7/30/2021	9.30	Average / 3			9.30	2021	4
Total Cases						232		71	83	78		
Mean						9.63		9.83	9.45	9.62	0.22	
Median						9.60		9.85	9.49	9.60	0.25	
Maximum						11.88		10.55	10.20	11.88		
Minimum						8.70		9.20	8.70	9.10		
2021 Mean						9.60						
2021 Median						9.57						

Source: Regulatory Research Associates



Piedmont Natural Gas Company  
U.S. Large Company Stock Returns 1926-2020



Source: Duff & Phelps, 2021 SBBI Yearbook

Piedmont Natural Gas Company  
Hypothetical Example: Flotation Cost Recovery

Return on Equity 10.75%  
Flotation Costs 2.75%  
Market Value \$ 25.00  
Dividend Yield 3.50%  
Growth Rate 7.25%  
Adjusted ROE 10.85%  
**Flotation Cost Recovery: No**  
**DCF Estimate 10.65%**

	Common Stock	Retained Earnings	Book Value	Market Price	Market/ Book Value	Earnings Per Share	Dividends Per Share	Payout Ratio
1	\$ 24.31		\$ 24.31	\$ 25.00	1.0283	\$ 2.61	\$ 0.88	33.48%
2	\$ 24.31	\$ 1.74	\$ 26.05	\$ 26.79	1.0283	\$ 2.80	\$ 0.94	33.48%
3	\$ 24.31	\$ 3.60	\$ 27.91	\$ 28.70	1.0283	\$ 3.00	\$ 1.00	33.48%
4	\$ 24.31	\$ 5.60	\$ 29.91	\$ 30.76	1.0283	\$ 3.22	\$ 1.08	33.48%
5	\$ 24.31	\$ 7.74	\$ 32.05	\$ 32.96	1.0283	\$ 3.45	\$ 1.15	33.48%
6	\$ 24.31	\$ 10.03	\$ 34.34	\$ 35.31	1.0283	\$ 3.69	\$ 1.24	33.48%
7	\$ 24.31	\$ 12.48	\$ 36.80	\$ 37.84	1.0283	\$ 3.96	\$ 1.32	33.48%
8	\$ 24.31	\$ 15.12	\$ 39.43	\$ 40.54	1.0283	\$ 4.24	\$ 1.42	33.48%
9	\$ 24.31	\$ 17.94	\$ 42.25	\$ 43.44	1.0283	\$ 4.54	\$ 1.52	33.48%
10	\$ 24.31	\$ 20.96	\$ 45.27	\$ 46.55	1.0283	\$ 4.87	\$ 1.63	33.48%
	Growth Rate		7.15%	7.15%		7.15%	7.15%	

Return on Equity 10.75%  
Flotation Costs 2.75%  
Market Value \$ 25.00  
Dividend Yield 3.50%  
Growth Rate 7.25%  
Adjusted ROE 10.85%  
**Flotation Cost Recovery: Yes**  
**DCF Estimate 10.75%**

	Common Stock	Retained Earnings	Book Value	Market Price	Market/ Book Value	Earnings Per Share	Dividends Per Share	Payout Ratio
1	\$ 24.31		\$ 24.31	\$ 25.00	1.0283	\$ 2.64	\$ 0.88	33.17%
2	\$ 24.31	\$ 1.76	\$ 26.08	\$ 26.81	1.0283	\$ 2.83	\$ 0.94	33.17%
3	\$ 24.31	\$ 3.65	\$ 27.97	\$ 28.76	1.0283	\$ 3.03	\$ 1.01	33.17%
4	\$ 24.31	\$ 5.68	\$ 29.99	\$ 30.84	1.0283	\$ 3.25	\$ 1.08	33.17%
5	\$ 24.31	\$ 7.86	\$ 32.17	\$ 33.08	1.0283	\$ 3.49	\$ 1.16	33.17%
6	\$ 24.31	\$ 10.19	\$ 34.50	\$ 35.48	1.0283	\$ 3.74	\$ 1.24	33.17%
7	\$ 24.31	\$ 12.69	\$ 37.00	\$ 38.05	1.0283	\$ 4.01	\$ 1.33	33.17%
8	\$ 24.31	\$ 15.37	\$ 39.68	\$ 40.81	1.0283	\$ 4.31	\$ 1.43	33.17%
9	\$ 24.31	\$ 18.25	\$ 42.56	\$ 43.76	1.0283	\$ 4.62	\$ 1.53	33.17%
10	\$ 24.31	\$ 21.33	\$ 45.65	\$ 46.94	1.0283	\$ 4.95	\$ 1.64	33.17%
	Growth Rate		7.25%	7.25%		7.25%	7.25%	