OFFICIAL COPY

PLACE: Dobbs Building

            Raleigh, North Carolina

DATE: Monday, March 12, 2018

TIME: 9:30 a.m. - 12:31 p.m.

DOCKET NO.:   E-7, Sub 1146

FILED

MAR 1 5 2018

Clerk's Office
N.C. Utilities Commission

ORIGINAL

BEFORE: Chairman Edward S. Finley, Jr., Presiding

         Commissioner ToNola D. Brown-Bland

         Commissioner Jerry C. Dockham

         Commissioner James G. Patterson

         Commissioner Lyons Gray

         Commissioner Daniel G. Clodfelter

                IN THE MATTER OF:

         DUKE ENERGY CAROLINAS, LLC

   Application for Adjustment of Rates and Charges

     Applicable to Electric Utility Service

               in North Carolina.

                VOLUME: 11

Noteworthy
Reporting Services, LLC

```
 1   A P P E A R A N C E S:

 2   FOR DUKE ENERGY CAROLINAS, LLC:

 3   Lawrence B. Somers, Esq.

 4   Deputy General Counsel

 5   410 South Wilmington Street, NCRH 20

 6   Raleigh, North Carolina 27602.

 7

 8   John Burnett, Esq.

 9   Deputy General Counsel

10   Camal O. Robinson, Esq.

11   Senior Counsel

12   550 South Tryon Street

13   Charlotte, North Carolina 28202

14

15   Robert W. Kaylor, Esq.

16   Law Office of Robert W. Kaylor, P.A.

17   353 East Six Forks Road, Suite 260

18   Raleigh, North Carolina 27609

19

20

21

22

23

24
```

```
 1    A P P E A R A N C E S  Cont'd.:
 2    Mary Lynne Grigg, Esq.
 3    Joan Dinsmore, Esq.
 4    McGuireWoods LLP
 5    434 Fayetteville Street, Suite 2600
 6    Raleigh, North Carolina 27601
 7
 8    Brandon Frank Marzo, Esq.
 9    Troutman Sanders LLP
10    600 Peachtree Street NE, Suite 5200
11    Atlanta, Georgia 30308
12
13    Kiran Mehta, Esq.
14    Molly McIntosh Jagannathan, Esq.
15    Troutman Sanders LLP
16    301 South College Street, Suite 3400
17    Charlotte, North Carolina 28202
18
19    FOR CAROLINA UTILITY CUSTOMERS ASSOCIATION, INC.:
20    Robert F. Page, Esq.
21    Crisp & Page, PLLC
22    4010 Barrett Drive, Suite 205
23    Raleigh, North Carolina 27609
24
```

```
 1   A P P E A R A N C E S  Cont'd.:

 2   FOR NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION:

 3   Peter Ledford, Esq.

 4   Benjamin Smith, Esq.

 5   General Counsel

·6   4800 Six Forks Road, Suite 300

 7   Raleigh, North Carolina 27609

 8

 9   FOR CAROLINA INDUSTRIAL GROUP FOR FAIR UTILITY

10   RATES II:

11   Ralph McDonald, Esq.

12   Warren K. Hicks, Esq.

13   Bailey & Dixon, LLP

14   Post Office Box 1351

15   Raleigh, North Carolina 27602-1351

16

17   FOR NC WARN:

18   John D. Runkle, Esq.

19   Kristen Wills, Esq.

20   2121 Damascus Church Road

21   Chapel Hill, North Carolina 27516

22

23

24
```

```
 1   A P P E A R A N C E S   Cont'd.:

 2   FOR THE KROGER COMPANY:

 3   Jody Kyler Cohn, Esq.

 4   Boehm, Kurtz & Lowry

 5   36 East 7th Street, Suite 1510

 6   Cincinnati, Ohio 45202

 7

 8   FOR SIERRA CLUB:

 9   Dorothy E. Jaffe, Esq.

10   50 F Street NW, Floor 8

11   Washington, DC 20001

12

13   F. Bryan Brice, Jr., Esq.

14   Matthew D. Quinn, Esq.

15   Law Office of F. Bryan Brice, Jr.

16   127 West Hargett, Street, Suite 600

17   Raleigh, North Carolina 27601

18

19   FOR ENVIRONMENTAL DEFENSE FUND:

20   John J. Finnigan, Jr., Esq.

21   Senior Counsel

22   6735 Hidden Hills Drive

23   Cincinnati, Ohio 45230

24
```

Page 6

```
1   A P P E A R A N C E S  Cont'd.:

2   FOR PIEDMONT ELECTRIC MEMBERSHIP CORPORATION:

3   Ralph McDonald, Esq.

4   Warren K. Hicks, Esq.

5   Bailey & Dixon, LLP

6   Post Office Box 1351

7   Raleigh, North Carolina 27602-1351

8

9   FOR HAYWOOD ELECTRIC MEMBERSHIP CORPORATION:

10  Ralph McDonald, Esq.

11  Warren K. Hicks, Esq.

12  Bailey & Dixon, LLP

13  Post Office Box 1351

14  Raleigh, North Carolina 27602-1351

15

16  FOR BLUE RIDGE ELECTRIC MEMBERSHIP CORPORATION:

17  Ralph McDonald, Esq.

18  Warren K. Hicks, Esq.

19  Bailey & Dixon, LLP

20  Post Office Box 1351

21  Raleigh, North Carolina 27602-1351

22

23

24
```

1   A P P E A R A N C E S Cont'd.:

2   FOR RUTHERFORD ELECTRIC MEMBERSHIP CORPORATION:

3   Ralph McDonald, Esq.

4   Warren K. Hicks, Esq.

5   Bailey & Dixon, LLP

6   Post Office Box 1351

7   Raleigh, North Carolina 27602-1351

8

9   FOR THE COMMERCIAL GROUP:

10   Alan Jenkins, Esq.

11   Jenkins at Law, LLC

12   2950 Yellowtail Avenue

13   Marathon, Florida 33050

14

15   FOR NORTH CAROLINA JUSTICE CENTER, NORTH CAROLINA

16   HOUSING COALITION, NATURAL RESOURCES DEFENSE COUNCIL,

17   and SOUTHERN ALLIANCE FOR CLEAN ENERGY:

18   Gudrun Thompson, Esq.

19   Senior Attorney

20   David L. Neal, Esq.

21   Senior Attorney

22   Southern Environmental Law Center

23   601 West Rosemary Street, Suite 220

24   Chapel Hill, North Carolina 27516

Page 8

1 A P P E A R A N C E S Cont'd.:

2 FOR APPLE, INC., FACEBOOK, INC., and GOOGLE, INC. (TECH

3 CUSTOMERS):

4 Marcus Trathen, Esq.

5 Charles Coble, Esq.

6 Brooks, Pierce, McLendon, Humphrey & Leonard, LLP

7 150 Fayetteville Street, Suite 1700

8 Raleigh, North Carolina 27601

9

10 FOR THE NORTH CAROLINA LEAGUE OF MUNICIPALITIES:

11 Karen Kemerait, Esq.

12 Deborah Ross, Esq.

13 Smith Moore Leatherwood, LLP

14 434 Fayetteville Street, Suite 2800

15 Raleigh, North Carolina 27601

16

17 FOR THE CITY OF DURHAM:

18 Sherri Zann Rosenthal, Esq.

19 Senior Assistant City Attorney

20 101 City Hall Plaza

21 Durham, North Carolina 27701

22

23

24

1 A P P E A R A N C E S Cont'd.:

2 FOR THE NORTH CAROLINA DEPARTMENT OF JUSTICE:

3 Jennifer T. Harrod, Esq.

4 Special Deputy Attorney General

5 Margaret A. Force, Esq.

6 Assistant Attorney General

7 Teresa L. Townsend, Esq.

8 Assistant Attorney General

9 North Carolina Department of Justice

10 Post Office Box 629

11 Raleigh, North Carolina 27602

12

13

14

15

16

17

18

19

20

21

22

23

24

1   A P P E A R A N C E S Cont'd:

2   FOR THE USING AND CONSUMING PUBLIC:

3   David T. Drooz, Esq.

4   Chief Counsel

5   Lucy E. Edmondson, Esq.

6   Dianna W. Downey, Esq.

7   Tim R. Dodge, Esq.

8   Robert Gillam, Esq.

9   William E. Grantmyre, Esq.

10   Heather D. Fennell, Esq.

11   Robert Josey, Jr., Esq.

12   Layla Cummings, Esq.

13   Public Staff - North Carolina Utilities Commission

14   4326 Mail Service Center

15   Raleigh, North Carolina 27699-4300

16

17

18

19

20

21

22

23

24

T A B L E   O F   C O N T E N T S
E X A M I N A T I O N S

1   to delete them from this packet.

2   CHAIRMAN FINLEY: All right. We will

3   receive all the exhibits and the cross examination

4   exhibits with regards to these two witnesses, with

5   the exception of the two that we will wait to hear

6   from when the Tech witness comes, and you two may

7   be excused, and thank you very much.

8   THE WITNESS: (Christopher Fallon)

9   Thank you.

10   THE WITNESS: (Nils Diaz) Thank you.

11   (Whereupon, Diaz Direct Exhibit Nos. 1

12   through 3, NC WARN Diaz Cross Exhibit

13   No. 1, and Tech Customers Fallon Cross

14   Exhibit Nos. 1 through 3 were marked for

15   identification.)

16   CHAIRMAN FINLEY: We'll return to the

17   Attorney General now.

18   MS. FORCE: The Attorney General's

19   Office calls Dr. Randall Woolridge to the stand.

20   J. RANDALL WOOLRIDGE,

21   having first been duly sworn, was examined

22   and testified as follows:

23   DIRECT EXAMINATION BY MS. FORCE:

24   Q.   Dr. Woolridge, I'm sorry I'm over to the

1 side, but you can look back and forth.

2   Please state your name and business address

3 for the record.

4   A.   My name is the initial J. Randall Woolridge,

5 and that's spelled W-O-O-L-R-I-D-G-E. I'm a professor

6 of finance at Pennsylvania State University. My

7 address is 120 Haymaker Circle, State College,

8 Pennsylvania.

9   Q.   And Dr. Woolridge, did you cause to be filed

10 in this docket direct testimony consisting of 76 pages,

11 together with Appendices A through C, and 15 exhibits?

12   A.   I did.

13   Q.   And do you have any changes or corrections to

14 make to that prefiled direct testimony at this time?

15   A.   No.

16   Q.   And if asked -- if I were to ask you the same

17 questions here today, would your answers be the same?

18   A.   Yes.

19   Q.   Dr. Woolridge, did you also cause to be

20 prefiled in this docket supplemental testimony

21 consisting of eight pages together with Appendix A and

22 three exhibits?

23   A.   I did.

24   Q.   Do you have any changes or corrections to

1   your prefiled supplemental testimony?

2   A.   No.

3   Q.   And if asked -- if I were to ask you those

4   same questions today, would your answers be the same?

5   A.   Yes.

6   MS. FORCE: I would like to offer that

7   we have copies of the testimony -- the supplemental

8   testimony, if somebody did not bring copies. They

9   were filed Friday.

10   CHAIRMAN FINLEY: Anybody need copies of

11   Dr. Woolridge's supplemental testimony?

12   MS. FORCE: Looks like we are okay.

13   Mr. Chairman, I'd move that

14   Dr. Woolridge's prefiled direct testimony, together

15   with prefiled appendices and exhibits, as well as

16   his supplemental testimony, Appendix A, and

17   exhibits be entered into the record as if orally

18   given from the stand, and that his -- excuse me,

19   his Exhibits 1 through 15 in his direct and 1

20   through 3 be marked for identification.

21   CHAIRMAN FINLEY: Dr. Woolridge's direct

22   prefiled testimony, consisting of 76 pages, filed

23   on January 23, 2018, plus his 23 pages of

24   attachments is copied into the record as if given

1 orally from the stand, and his 15 exhibits are

2 marked for identification as premarked in the

3 filing. His supplemental testimony, consisting of

4 eight pages filed on Friday and the Appendix A is

5 copied into the record as though given orally from

6 the stand, and his three supplemental exhibits are

7 marked for identification as premarked in the file.

8   MS. FORCE: Thank you.

9   (Whereupon, Exhibit JRW Nos. 1 through

10   15 and Supplemental Exhibit JRW Nos. 1

11   through 3 were identified as marked when

12   prefiled.)

13   (Whereupon, the prefiled direct

14   testimony and prefiled supplemental

15   testimony of J. Randall Woolridge was

16   copied into the record as if given

17   orally from the stand.)

18

19

20

21

22

23

24

0093

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-7 SUB 1146

In the Matter of	)	
	)	**DIRECT TESTIMONY OF**
Application of Duke Energy Carolinas, LLC	)	**J. RANDALL WOOLRIDGE, PH.D.**
For Adjustment of Rates and Charges	)	**EXPERT WITNESS FOR**
Applicable to Electric Service in North Carolina	)	**THE ATTORNEY GENERAL'S**
	)	**OFFICE**

FILED

JAN 2 3 2018

Clerk's Office
N.C. Utilities Commission

EXPERT WITNESS FOR

NORTH CAROLINA ATTORNEY GENERAL'S OFFICE

DOCKET NO. E-7 SUB 1146

JANUARY 23, 2018

Duke Energy Carolinas, LLC
Docket No. E-7, SUB 1146

Direct Testimony of
Dr. J. Randall Woolridge

TABLE OF CONTENTS

Duke Energy Carolinas, LLC
Docket No. E-7, SUB 1146

Direct Testimony of
Dr. J. Randall Woolridge

<u>LIST OF EXHIBITS</u>

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

A.   My name is J. Randall Woolridge, and my business address is 120 Haymaker

Circle, State College, PA 16801. I am a Professor of Finance and the Goldman, Sachs &

Co. and Frank P. Smeal Endowed University Fellow in Business Administration at the

University Park Campus of the Pennsylvania State University. I am also the Director of

the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A

summary of my educational background, research, and related business experience is

provided in Appendix A.

I.   SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS

Q.   WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: I have been asked by the North Carolina Attorney General's Office (AGO") to

provide an overall fair rate of return or cost of capital recommendation for Duke Energy

Carolinas, LLC ("Duke Carolinas" or "Company").[1]

Q.   HOW IS YOUR TESTIMONY ORGANIZED?

A.   First, I summarize my cost of capital recommendation for the Company, and review

the primary areas of contention on the Company's position. Second, I discuss the proxy groups

that I have used to estimate an equity cost rate for Duke Carolinas. Third, I review the

---

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

Company's recommended capital structure and debt cost rates. Fourth, I estimate the equity

cost rate for the Company. Finally, I critique DE Carolina's rate of return analysis and

testimony. I have included three appendices. Appendix A is a summary of my education and

business experience. In Appendix B, I provide an assessment of capital costs in today's capital

markets. And in Appendix C, I discuss the concept of the cost of equity capital.

Q.   WHAT COMPRISES A UTILITY'S "RATE OF RETURN"?

A.   A company's overall rate of return consists of three main categories: (1) capital

structure (*i.e.*, ratios of short-term debt, long-term debt, preferred stock and common

equity); (2) cost rates for short-term debt, long-term debt, and preferred stock; and (3)

common equity cost, otherwise known as Return on Equity ("ROE").

Q.   WHAT IS A UTILITY'S ROE INTENDED TO REFLECT?

A.   An ROE is most simply described as the allowed rate of profit for a regulated

company. In a competitive market, a company's profit level is determined by a variety of

factors, including the state of the economy, the degree of competition a company faces, the

ease of entry into its markets, the existence of substitute or complementary

products/services, the company's cost structure, the impact of technological changes, and

the supply and demand for its services and/or products. For a regulated monopoly, the

regulator determines the level of profit available to the public utility. The United States

Supreme Court established the guiding principles for determining an appropriate level of

profitability for regulated public utilities in two cases: (1) *Hope* and (2) *Bluefield*.[2] In those

---

[2] *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) ("*Hope*") and *Bluefield Water*

cases, the Court recognized that the fair rate of return on equity should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

Thus, the appropriate ROE for a regulated utility requires determining the market-based cost of capital. The market-based cost of capital for a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. The purpose of all of the economic models and formulas in cost of capital testimony (including those presented later in my testimony) is to estimate, using market data of similar-risk firms, the rate of return on equity investors require for that risk-class of firms in order to set an appropriate ROE for a regulated firm.

Q.   PLEASE REVIEW THE COMPANY'S PROPOSED RATE OF RETURN.

A.   The Company has proposed an end-of-test year capital structure with 53.00% long-term debt and 47.00% common equity and a long-term debt cost rate of 4.74%. Duke Carolina's witness Mr. Robert B. Hevert has recommended a common equity cost rate of 10.75% for the electric utility operations of the Company. The Company's overall proposed rate of return is 7.93% from investor-supplied capital.

Works and Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. 679 (1923) ("*Bluefield*").

Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING THE APPROPRIATE RATE OF RETURN FOR DUKE CAROLINAS?

A.   I have reviewed the Company's proposed capital structure and overall cost of capital. Duke Carolinas' proposed capitalization has a common equity ratio that is higher than the average common equity ratios of electric utility companies. Therefore, I am adjusting Duke Carolinas' capital structure. I am adopting the Company's proposed long-term debt cost rate. Nonetheless, the primary rate of return issue between Duke Carolinas and the AGO is the Company's proposed common equity cost estimate of 10.75%.

I have adjusted the Company's proposed capital structure and used a common equity ratio of 50.0%. This common equity ratio is more in line with the capital structures of the utilities in the proxy groups as well as Duke Carolinas' parent, Duke Energy. To estimate an equity cost rate for the Company, I have applied the Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM") to my proxy group of electric utilities ("Electric Proxy Group"). I have also used Mr. Hevert's proxy group ("Hevert Proxy Group"). My recommendation is that the appropriate ROE for the Company is 8.40%. This figure is at the upper end of my equity cost rate range of 7.9% to 8.40%. Using the Company's proposed debt cost rate and my recommended capital structure, this provides an overall rate of return of 6.57% from investor-supplied capital. This is shown in Exhibit JRW-1.

Q. DO YOU BELIEVE THAT YOUR CAPITAL STRUCTURE AND ROE RECOMMENDATIONS MEETS *HOPE* AND *BLUEFIELD* STANDARDS?

A.   Yes. As I discuss in my testimony, (1) my recommended capital structure includes a common equity ratio of 50.0% which is higher than the averages of the companies in the two proxy groups as well as Duke Carolinas' parent, Duke Energy, and (2), my ROE recommendation of 8.40% reflects the earned ROEs of Electric utilities as well as Duke Carolinas' parent, Duke Energy. As I note in my testimony, with these capital structures and ROEs, electric utilities are seeing their credit ratings upgraded by S&P and Moody's and are raising about $50 billion per year in capital.

Q.   **WHAT ARE THE PRIMARY AREAS OF DISAGREEMENT IN ESTIMATING THE RATE OF RETURN OR COST OF CAPITAL IN THIS PROCEEDING?**

A.   The primary areas of disagreement are: (1) the Company's proposed capital structure; (2) our opposing views regarding the state of the markets and capital costs; (3) the Company's DCF equity cost rate estimates, and in particular, (a) the lack of weight Mr. Hevert gives his constant-growth DCF results, (b) Mr. Hevert's exclusive use of the earnings per share growth rates of Wall Street analysts and *Value Line*, (c) his use of an inflated terminal GDP growth rate of 5.38% in his multi-stage DCF model, and (d) Mr. Hevert's terminal P-E approach (4) the base interest rate and market or equity risk premiums in Mr. Hevert's CAPM model and in his alternative risk premium approach that uses *authorized* returns instead of market data; and (5) Mr. Hevert's assessment of Duke Carolinas' business risk and the need to consider flotation costs.

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

A.   Mr. Hevert and I have different opinions regarding capital market conditions. Mr. Hevert's analyses and ROE results and recommendations reflect the assumption of higher interest rates and capital costs. In Appendix B, I review current market conditions and conclude that interest rates and capital costs are at low levels and are likely to remain low for some time. Also see Exhibits JRW-2 and JRW-3, which reflect Treasury Yields and Public Utility Bond Yields and are discussed in Appendix B. On this issue, I show that the economists' forecasts of higher interest rates and capital costs, which are used by Mr. Hevert, have been consistently wrong for a decade.

Q. ON THIS ISSUE, PLEASE REVIEW THE FEDERAL RESERVE'S DECISION TO RAISE THE FEDERAL FUNDS RATE.

A.   On December 16, 2015, the Federal Reserve increased its target rate for federal funds to 0.25 – 0.50 percent.[3] This increase came after the rate was kept in the 0.0 to .25 percent range for over five years in order to spur economic growth in the wake of the financial crisis. As the economy has improved, with lower unemployment, steady but slow GDP growth, improving consumer confidence, and a better housing market, the Federal Reserve has increased the target federal funds rate on four additional occasions: December, 2016, March, 2017, June, 2017, and December of 2017.

---

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

Q.   HOW HAVE LONG-TERM RATES RESPONDED TO THE ACTIONS OF THE FEDERAL RESERVE?

A.   Figure 1 shows the yield on thirty-year Treasury bonds over the 2015-2017 time period. These rates bottomed out in August 2016 and subsequently increased with improvements in the economy. Then came November 8, 2016, and financial markets moved significantly in the wake of the unexpected results in the U.S. presidential election. The stock market gained more than 10% and the 30-year Treasury yield increased about 50 basis points to 3.2% by year-end 2016.   During 2017, even as the Federal Reserve increased the federal funds rate in March, June and December, the yield on thirty-year bonds decreased to below 3.0%. The bottom line is that despite increases in the short-term federal funds rate, long-term rates have not increased due to relatively slow economic growth and low inflation.

Figure 1
Thirty-Year Treasury Yield
2015-2017
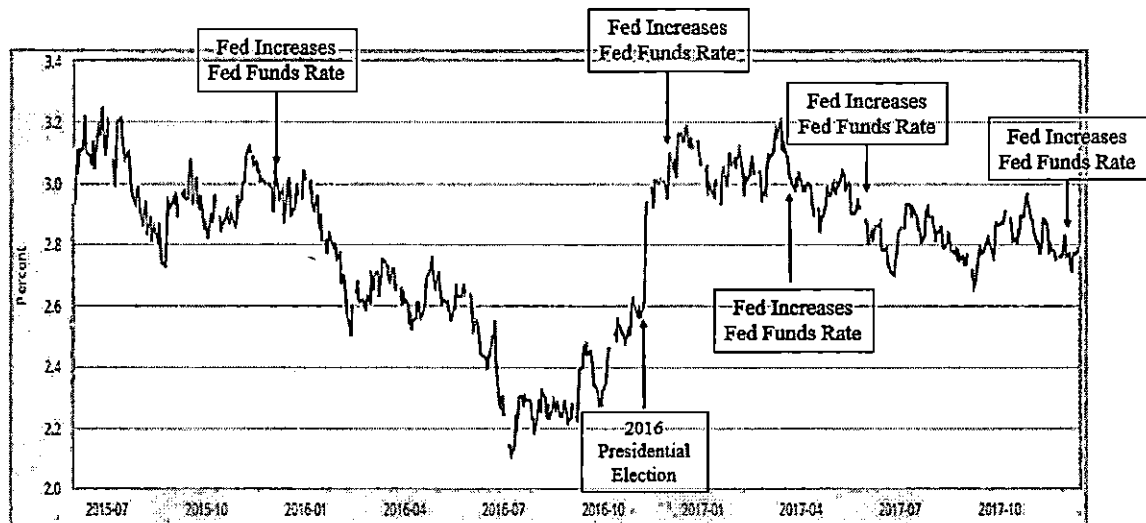
Q. WHAT ARE THE PRIMARY ISSUES WITH RESPECT TO MEASURING THE COST OF EQUITY CAPITAL IN THIS PROCEEDING?

A. There are two primary errors in Mr. Hevert's DCF analysis. First, in his constant-growth and multi-stage DCF models, he has relied exclusively on the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line.* Even using the high growth rate forecasts, his average results indicate that ROEs for the proxy group range from 8.74% to 8.93%. Second, in his multi-stage DCF model, he has employed a terminal growth rate of 5.38%. This figure is excessive for a number of reasons, especially the fact that it is not reflective of prospective economic growth in the U.S. and is more than 100 basis points above the projected long-term growth in U.S. Gross Domestic Product ("GDP"). Even using these high growth rate forecasts, his average results indicate that ROEs for the proxy group range from 8.88% to 9.09%. Third, Mr. Hevert's highest DCF results are from his Multi-Stage DCF Terminal P-E Ratio method. This approach sets a terminal price-earnings ratio of 24.30X which is much higher than current P-E ratios for electric utilities and therefore overstates the terminal growth rate requirement and resulting equity cost rate estimates.

In my DCF model, I develop a DCF growth rate after reviewing thirteen growth rate measures including historic and projected growth rate measures and have evaluated growth in dividends, book value, and earnings per share.

The CAPM approach requires an estimate of the risk-free interest rate, "beta," and the market or equity risk premium. There are two primary errors in Mr. Hevert's CAPM approach. First, for his risk-free interest rate, Mr. Hevert has used a projected near-term Treasury yield that is 50 basis points above the current market rate. Second, and most

significantly, Mr. Hevert's market risk premium ("MRP") is excessive and does not reflect current market fundamentals. Mr. Hevert uses projected MRPs of 10.79% and 10.89%. These MRPs, in turn, are based on expected stock market returns of 13.70% and 13.80%. There are several issues with these figures. First, these MRPs are much higher than published estimates of the MRP. Second, Mr. Hevert's projected stock market returns and MRPs use analysts' EPS five-year growth rate projections to compute an expected stock market returns and MRPs. These EPS growth rate projections are overly optimistic and upwardly biased and therefore the resulting expected stock market returns and MRPs include unrealistic assumptions regarding future economic and earnings growth and stock returns. As I highlight in my testimony, there are three procedures for estimating a market or equity risk premium – historic returns, surveys, and expected return models. I have used a market risk premium of 5.5%, which: (1) factors in all three approaches to estimating a market premium; and (2) employs the results of many studies of the market risk premium. As I note, my market risk premium reflects the market risk premiums: (1) determined in recent academic studies by leading finance scholars; (2) employed by leading investment banks and management consulting firms; and (3) found in surveys of companies, financial forecasters, financial analysts, and corporate CFOs.

In addition, Mr. Hevert also estimates an equity cost rate using the Bond Yield Risk Premium ("Authorized Return") Approach. His risk premium is based on the historical relationship between the long-term Treasury yields and authorized ROEs for electric utility companies. There are several problems with this approach. First, Mr. Hevert uses projected near-term and long-term Treasury rate of 3.40% and 4.40%.[4] These are 50 and 150 basis

---

[4] I should note that whereas I use a 4.0% risk-free interest rate in my CAPM, this figure is not based on

points above current market rates, respectively. Second, this approach is a gauge of regulatory commission behavior and not investor behavior. Capital costs are determined in the market place through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility and rate case-specific information. As such, Mr. Hevert's Authorized Return approach and results reflect other factors used by utility commissions in authorizing ROEs in addition to capital costs. This may especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated. Third, the methodology produces an inflated measure of the risk premium because the approach uses historic authorized ROEs and Treasury yields, and the resulting risk premium is applied to *projected* utility bond yields. Finally, the risk premium is inflated as a measure of an investor's required risk premium since electric utility companies have been selling at market-to-book ratios in excess of 1.0. This indicates that the authorized rates of return have been greater than the return that investors require. In other words, customers have been paying too much for too long.

Q. DO YOU BELIEVE THAT THESE ERRORS ARE REFLECTED IN THE DIFFERENCES BETWEEN MR. HEVERT'S AUTHORIZED RETURN APPROACH RESULTS AND THE AVERAGE STATE-LEVEL AUTHORIZED

---

interest rate forecasts. My 4.0% rate reflects the 30-year Treasury yield over a period of time, and therefore is effectively normalized over time so as to be synchronized with my MRP of 5.50%

ROES FOR ELECTRIC UTILITY COMPANIES NATIONWIDE?

A.   Yes.   Mr. Hevert's risk premium equity cost rate estimates for electric utility

companies range from 9.97% to 10.33%.   These figures overstate actual state-level

authorized ROEs.   On an annual basis, these authorized ROEs for electric utilities have

declined from an average of 10.01% in 2012, 9.8% in 2013, 9.76% in 2014, 9.58% in 2015,

9.60% in 2016, and 9.61% in the first nine months of 2017, according to Regulatory

Research Associates.[5]

Figure 2
Authorized ROEs for Electric Utility and Gas Distribution Companies
2000-2017
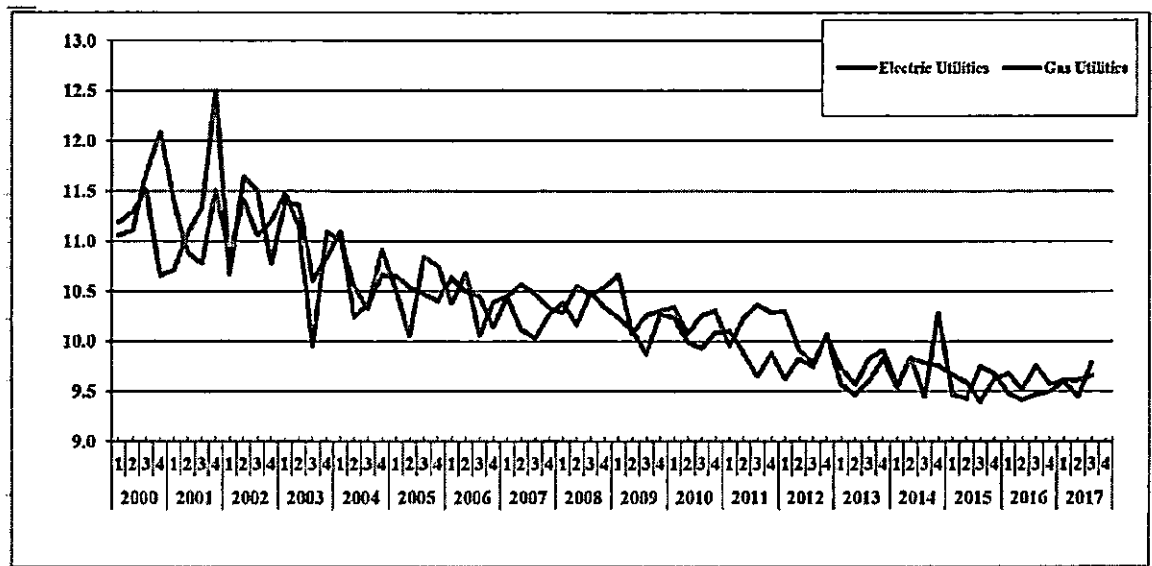
Q.   **PLEASE REVIEW MR. HEVERT'S ASSESSMENT OF HIS EQUITY COST**

RATE RESULTS RELATIVE TO THE BUSINESS RISKS OF THE COMPANY.

A.   Mr. Hevert claims that his mean equity cost rate results are not appropriate for Duke

Carolinas due, in part, to the Company's business risks. He notes that these business risks

---

[5] *Regulatory Focus*, Regulatory Research Associates, July, 2017. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE	DOCKET NO. E-7 SUB 1146
EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE	P a g e 11

include: (1) environmental regulations (2) the Company's coal and nuclear generation portfolio; (3) North Carolina's renewable energy and energy efficiency standards; and (4) the Company's planned capital investment program.

Q.   DO YOU AGREE WITH HIS ASSESMENT OF THE RISKINESS OF DUKE CAROLINAS RELATIVE TO THE PROXY OTHER ELECTRIC UTILITIES?

A.   No. I use credit ratings to assess the riskiness of Duke Carolinas relative to the two proxy groups. Credit rating agencies consider the business and financial risk of utilities in the rating process. Duke Carolinas' S&P issuer credit rating of A- is one notch above the average of the two proxy groups (BBB+) and Duke Carolinas Moody's issuer credit rating of A1 is three one notches above the average of the two proxy groups (Baa1). Therefore, contrary to Mr. Hevert's assertions, Duke Carolinas is less risky than the proxy groups and no risk adjustments or considerations are needed.

Q.   DO YOU AGREE WITH MR. HEVERT THAT FLOTATION COSTS SHOULD BE CONSIDERED IN SETTING DUKE CAROLINAS'S ROE?

A.   No. Mr. Hevert's proposed ROE of 10.75% includes the consideration of equity flotation costs. He has not identified any specific prospective equity issues by Duke Carolinas' parent company, Duke Energy ("DUK"). Therefore, no such consideration is needed.

II.   PROXY GROUP SELECTION

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

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

Q.   PLEASE DESCRIBE YOUR PROXY GROUP OF COMPANIES.

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

1.   At least 50% of revenues from regulated electric operations as reported in SEC Form 10-K Report;

2.   Listed as an Electric Utility by *Value Line Investment Survey*;

3.   An investment-grade corporate credit and bond rating;

4.   Has paid a cash dividend for the past six months, with no cuts or omissions;

5.   Not involved in an acquisition of another utility, and not the target of an acquisition; and

6.   Analysts' long-term EPS growth rate forecasts available from Yahoo, Reuters, and/or Zack's.

The Electric Proxy Group includes twenty-nine companies. Summary financial statistics for the proxy group are listed in Exhibit JRW-4.[6] The median operating revenues

---

[6] Dominion's proposed acquisition of SCANA was announced after testimony and exhibits were prepared. Financial data used for both firms were preceded the announcement.

and net plant among members of the Electric Proxy Group are $6,399.0 million and $19,730.0 million, respectively. [7] The group receives 82% of its revenues from regulated electric operations, has a BBB+ bond rating from Standard & Poor's and a Baa1 rating from Moody's, a current common equity ratio of 46.8%, and an earned return on common equity of 9.3%.

Q. PLEASE DESCRIBE THE HEVERT PROXY GROUP.

A.   Mr. Hevert's group is smaller (nineteen utilities). [8] Summary financial statistics for Mr. Hevert's proxy group are provided in Panel B of page 1 of Exhibit JRW-4. The median operating revenues and net plant for the Hevert Proxy Group are $3,498.7 million and $12,714.3 million, respectively. The group receives 81% of its revenues from regulated electric operations, has a BBB+ bond rating from Standard & Poor's and a Baa1 rating from Moody's, a common equity ratio of 44.6%, and a current earned return on common equity of 9.4%.

Q. HOW DOES THE INVESTMENT RISK OF THE COMPANY COMPARE TO THAT OF YOUR ELECTRIC PROXY GROUP AND THE HEVERT PROXY GROUP?

A.   I believe that bond ratings provide a good assessment of the investment risk of a company. The S&P and Moody's issuer credit ratings for Duke Carolinas are A- and A1.

---

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

[8] Mr. Hevert's group is smaller because he screens electric utilities for several other factors, including 60 percent of regulated operating income, integrated versus distribution-only service, and 10 percent coal-fired generation. Since I also use this group and make risk comparisons using S&P and Moody's credit ratings, his proxy group being different than mine is not a significant issue.

The averages for the Electric and Hevert Proxy Groups are BBB+ and Baa1. Hence, Duke Carolinas' S&P issuer credit rating of A- is one notch above than the average of the two proxy groups (BBB+) and Duke Carolinas Moody's issuer credit rating of A1 is three notches above the average of the two proxy groups (Baa1). Therefore, Duke Carolinas is less risky than the two proxy groups.

On page 2 of Exhibit JRW-4, I have assessed the riskiness of the two proxy groups using five different risk measures. These measures include Beta, Financial Strength, Safety, Earnings Predictability, and Stock Price Stability. These risk measures indicate that the two proxy groups are similar in risk. The comparisons of the risk measures include Beta (0.69 vs. 0.71), Financial Strength (A vs. A) Safety (1.9 vs. 1.9), Earnings Predictability (79 vs. 83), and Stock Price Stability (94 vs. 94). On balance, these measures suggest that the two proxy groups are similar in risk.

III.   CAPITAL STRUCTURE RATIOS AND DEBT COST RATE

Q.   WHAT ARE DUKE CAROLINAS' RECOMMENDED CAPITAL STRUCTURE AND SENIOR CAPITAL COST RATES FOR RATEMAKING PURPOSES?

A.   The Company has proposed an end-of-test year capital structure with 47.00% long-term debt and 53.00% common equity and a long-term debt cost rate of 4.74%.

Q.   HAS DUKE CAROLINAS SHOWN THAT A CAPITAL STRUCTURE WITH A COMMON EQUITY RATIO AS HIGH AS 53% IS REQUIRED TO MAINTAIN SUFFICIENT FINANCIAL INTEGRITY?

A.   No. In fact, as shown on Panel C of page 1 of Exhibit JRW-5, Duke Energy's

trailing four-quarter capital structure includes a common equity ratio of only 42.8%. This

highlights the fact that Duke Energy's capitalization includes a much lower common equity

ratio and hence much more financial risk than the capital structure proposed by Duke

Carolinas. Yet, there is no evidence that the Company's parent, Duke Energy, has had any

issues with financial integrity or raising capital.

**Q.   PLEASE DISCUSS THE CAPITAL STRUCTURES OF THE COMPANIES
IN THE PROXY GROUPS.**

A.   As shown in Panel B of Exhibit JRW-4, the median common equity ratios of the

Electric and Hevert Proxy Groups are 46.8% and 44.6%, respectively. Therefore, Duke

Carolinas' proposed capital structures includes a common equity ratio that is significantly

higher than the two proxy groups.

**Q.   BASED ON THESE OBSERVATIONS, WHAT DO YOU CONCLUDE
ABOUT THE COMPANY'S PROPOSED CAPITAL STRUCTURE?**

A.   Duke Carolinas has proposed a capital structure that has more common equity and

less financial risk than the capital structures of other electric utilities companies as well as

Duke Carolinas' parent, Duke Energy.

**Q.   PLEASE DISCUSS THE SIGNIFICANCE OF THE AMOUNT OF EQUITY
THAT IS INCLUDED IN A UTILITY'S CAPITAL STRUCTURE.**

A.   A utility's decision as to the amount of equity capital it will incorporate into its

capital structure involves fundamental trade-offs relating to the amount of financial risk

the firm carries, the overall revenue requirements its customers are required to bear through

the rates they pay, and the return on equity that investors will require.

Q.   PLEASE DISCUSS A UTILITY'S DECISION TO USE DEBT VERSUS EQUITY TO MEET ITS CAPITAL NEEDS.

A.   Utilities satisfy their capital needs through a mix of equity and debt. Because equity

capital is more expensive than debt, the issuance of debt enables a utility to raise more

capital for a given commitment of dollars than it could raise with just equity. Debt is,

therefore, a means of "leveraging" capital dollars. However, as the amount of debt in the

capital structure increases, its financial risk increases and the risk of the utility, as perceived

by equity investors also increases. Significantly for this case, the converse is also true. As

the amount of debt in the capital structure decreases, the financial risk decreases. The

required return on equity capital is a function of the amount of overall risk that investors

perceive, including financial risk in the form of debt.

Q.   WHY IS THIS RELATIONSHIP IMPORTANT TO THE UTILITY'S CUSTOMERS?

A.   Just as there is a direct correlation between the utility's authorized return on equity

and the utility's revenue requirements (the higher the return, the greater the revenue

requirement), there is a direct correlation between the amount of equity in the capital

structure and the revenue requirements the customers are called on to bear. Again, equity

capital is more expensive than debt. Not only does equity command a higher cost rate, it

also adds more to the income tax burden that ratepayers are required to pay through rates.

As the equity ratio increases, the utility's revenue requirements increase and the rates paid

by customers increase. If the proportion of equity is too high, rates will be higher than they

need to be. For this reason, the utility's management should pursue a capital acquisition

strategy that results in the proper balance in the capital structure.

Q.   HOW HAVE UTILITIES TYPICALLY STRUCK THIS BALANCE?

A.   Due to regulation and the essential nature of its output, a regulated utility is exposed

to less business risk than other companies that are not regulated. This means that an electric

utility can reasonably carry relatively more debt in its capital structure than can most

unregulated companies. Thus, a utility should take appropriate advantage of its lower

business risk to employ cheaper debt capital at a level that will benefit its customers

through lower revenue requirements. Typically, one may see equity ratios for electric

utilities range from the 40% to 50% range.

Q.   HAVE RATING AGENCIES RECOGNIZED THE TREND TOWARD UTILITY HOLDING COMPANIES USING MORE DEBT THAN THEIR OPERATING SUBSIDIARIES?

A.   Yes, they have. The strategy of using low-cost debt at the parent level to finance

equity in a regulated subsidiary is known as "double leverage." Moody's published an article

on the use of low-cost debt financing by public utility holding companies to increase their

ROEs. The summary observations included the following: [9]

US utilities use leverage at the holding-company level to invest in

---

[9] Moody's Investors' Service, "High Leverage at the Parent Often Hurts the Whole Family," May 11, 2015, p.1.

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE	DOCKET NO. E-7 SUB 1146
EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE	P a g e 18

other businesses, make acquisitions and earn higher returns on equity. In some cases, an increase in leverage at the parent can hurt the credit profiles of its regulated subsidiaries.

Moody's defined double leverage in the following way:[10]

> Double leverage is a financial strategy whereby the parent raises debt but downstreams the proceeds to its operating subsidiary, likely in the form of an equity investment. Therefore, the subsidiary's operations are financed by debt raised at the subsidiary level and by debt financed at the holding-company level. In this way, the subsidiary's equity is leveraged twice, once with the subsidiary debt and once with the holding-company debt. In a simple operating-company / holding-company structure, this practice results in a consolidated debt-to-capitalization ratio that is higher at the parent than at the subsidiary because of the additional debt at the parent.

Moody's goes on to discuss the potential risk to utilities of this strategy, and specifically notes that regulators could take it into consideration in setting authorized ROEs.[11]

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

Q.   IS THERE EVIDENCE OF DOUBLE LEVERAGE WITH RESPECT TO DUKE CAROLINAS?

A.   Yes. As shown in Panel C of Exhibit JRW-5, the Company's parent, Duke Energy, the average common equity ratio of Duke Energy's capital structure over the past year is 45.5% (excluding short-term debt) and 42.3% (including short-term debt). This data was

---

[10] *Ibid.* p. 5.
[11] *Ibid.* p. 1.

provided in the Company's response to DEC AGO DR 6-6. Since Duke Energy's overall capitalization includes significantly more debt than its subsidiary Duke Carolina (common equity ratio = 53%), this indicates that some of the parent company's debt has been used to finance the equity of Duke Carolinas.

Q. DOES THE COMPANY'S PROPOSED CAPITALIZATION INCLUDE A COMMON EQUITY RATIO THAT IS HIGHER THAN THE PROXY GROUPS?

A.   Yes.

Q. HOW IS THIS USUALLY DEALT WITH IN A REGULATORY PROCEEDING?

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

Q. PLEASE ELABORATE ON THIS "DOWNWARD IMPACT."

A.   As I stated earlier, there is a direct correlation between the amount of debt in a utility's capital structure and the financial risk that an equity investor will associate with that utility. A relatively lower proportion of debt translates into a lower required return on equity, all other things being equal. Stated differently, a utility cannot expect to "have it both ways." Specifically, a utility cannot maintain an unusually high equity ratio and not

expect to have the resulting lower risk reflected in its authorized return on equity. The fundamental relationship between the lower risk and the appropriate authorized return should not be ignored.

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

A. In my opinion it is appropriate to use a capital structure with an imputed common equity ratio of 50.0%. In other words, as shown in Panel c of Exhibit JRW-5, I lower the common equity ratio from 53.00% to 50.00%, and make a proportional increase in the ratio for long-term debt (47.00% to 50.00%). Hence, my proposed capital structure includes 50.0% long-term debt, and 50.00% common equity. It should be noted that this capital structure includes a common equity ratio (50.0%) that is still above the averages of the two proxy groups (46.8% and 44.6%) utilized by myself and Duke Carolinas' Hevert, and a higher common equity ratio than Duke Carolinas' parent, Duke Energy (44.9%).

Q. WHAT SENIOR CAPITAL COST RATES ARE YOU USING FOR THE COMPANY?

A. I am using the Company's proposed long-term debt cost rate of 4.74%. However, it may be appropriate to adjust the cost based on a new debt issuance before the end of the hearings.

IV.   THE COST OF COMMON EQUITY CAPITAL

Q.   PLEASE DESCRIBE HOW THE FAIR RATE OF RETURN ON COMMON EQUITY CAPITAL IS DETERMINED FOR PUBLIC UTILITIES.

A.   In Appendix C, I review general principles that apply to determining the fair rate of return on equity for regulated public utilities. Also see Exhibits JRW-6, which shows the relationship between expected ROEs and market-to-book ratios, JRW-7, which shows public utility capital cost indicators, and JRW-8, which shows average "Betas" for various industries including public utilities, as discussed in Appendix C.

A.   Discounted Cash Flow Analysis

Q.   PLEASE DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF MODEL.

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

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

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

equity.

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

A.   Yes. Virtually all investment firms use some form of the DCF model as a valuation

technique. One common application for investment firms is called the three-stage DCF or

dividend discount model ("DDM"). The stages in a three-stage DCF model are presented

in Exhibit JRW-9, Page 1 of 2. This model presumes that a company's dividend payout

progresses initially through a growth stage, then proceeds through a transition stage, and

finally assumes a maturity (or steady-state) stage. The dividend-payment stage of a firm

depends on the profitability of its internal investments which, in turn, is largely a function

of the life cycle of the product or service.

1.   Growth stage: Characterized by rapidly expanding sales, high profit

margins, and an abnormally high growth in earnings per share. Because of highly

profitable expected investment opportunities, the payout ratio is low. Competitors are

attracted by the unusually high earnings, leading to a decline in the growth rate.

2.   Transition stage: In later years, increased competition reduces profit

margins and earnings growth slows. With fewer new investment opportunities, the

company begins to pay out a larger percentage of earnings.

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

In using the 3-stage model to estimate a firm's cost of equity capital, dividends are projected into the future using the different growth rates in the alternative stages, and then the equity cost rate is the discount rate that equates the present value of the future dividends to the current stock price.

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

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

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

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

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

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

A.   Yes. The economics of the public utility business indicate that the industry is in the steady-state or constant-growth stage of a three-stage DCF. The economics include the relative stability of the utility business, the maturity of the demand for public utility services, and the regulated status of public utilities (especially the fact that their returns on investment are effectively set through the ratemaking process). The DCF valuation procedure for companies in this stage is the constant-growth DCF. In the constant-growth version of the DCF model, the current dividend payment and stock price are directly observable. However, the primary problem and controversy in applying the DCF model to estimate equity cost rates entails estimating investors' expected dividend growth rate.

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

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

Q. WHAT DIVIDEND YIELDS HAVE YOU REVIEWED?

A.   I have calculated the dividend yields for the companies in the proxy group using the current annual dividend and the 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided in Panel A of page 2 of Exhibit JRW-10. For the Electric Proxy Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 3.00% to 3.20%. I am using the average of the medians, 3.10%, as the dividend yield for the Electric Proxy Group. The dividend yields for the Hevert Proxy Group are shown in Panel B of page 2 of Exhibit JRW-10. The median dividend yields range from 3.0% to 3.2% using the 30-day, 90-day, and 180-day average stock prices. I am using the average of the medians, 3.1%, as the dividend yield for the Hevert Proxy Group.

Q. PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT DIVIDEND YIELD.

A.   According to the traditional DCF model, the dividend yield term relates the dividend paid over the coming period to the current stock price. As indicated by Professor Myron Gordon, who is commonly associated with the development of the DCF model for popular use, this is obtained by: (1) multiplying the expected dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price to determine the appropriate dividend yield for a firm that pays dividends on a quarterly basis.[12]

In applying the DCF model, some analysts adjust the current dividend for growth over the coming year as opposed to the coming quarter. This can be complicated because

---

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

firms tend to announce changes in dividends at different times during the year. As such, the dividend yield computed based on presumed growth over the coming quarter as opposed to the coming year can be quite different. Consequently, it is common for analysts to adjust the dividend yield by some fraction of the long-term expected growth rate.

Q.   **GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR DO YOU USE FOR YOUR DIVIDEND YIELD?**

A.   I adjust the dividend yield by one-half (1/2) of the expected growth so as to reflect growth over the coming year. This is the approach employed by the Federal Energy Regulatory Commission ("FERC").[13] The DCF equity cost rate ("K") is computed as:

$$K = [(D/P) * (1 + 0.5g)] + g$$

Q.   **PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF MODEL.**

A.   There is debate as to the proper methodology to employ in estimating the growth component of the DCF model. By definition, this component is investors' expectation of the long-term dividend growth rate. Investment information sources such as *Value Line* and Yahoo Finance provide investors with both historical and projected growth rates for earnings and dividends per share and for internal or book-value growth to assess long-term potential.

---

[13] Opinion No. 414-A, *Transcontinental Gas Pipe Line Corp.*, 84 FERC ¶61,084 (1998).

Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE PROXY GROUPS?

A.   I have analyzed a number of measures of growth for companies in the proxy groups. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS"). In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Yahoo, Reuters and Zacks. These services solicit five-year earnings growth rate projections from securities analysts and compile and publish the means and medians of these forecasts. Finally, I also assessed prospective growth as measured by prospective earnings retention rates and earned returns on common equity.

Q. PLEASE DISCUSS HISTORICAL GROWTH IN EARNINGS AND DIVIDENDS AS WELL AS INTERNAL GROWTH.

A.   Historical growth rates for EPS, DPS, and BVPS are readily available to investors and are presumably an important ingredient in forming expectations concerning future growth. However, one must use historical growth numbers as measures of investors' expectations with caution. In some cases, past growth may not reflect future growth potential. Also, employing a single growth rate number (for example, for five or ten years) is unlikely to accurately measure investors' expectations, due to the sensitivity of a single growth rate figure to fluctuations in individual firm performance as well as overall economic fluctuations (*i.e.*, business cycles). However, one must appraise the context in which the growth rate is being employed. According to the conventional DCF model, the expected return on a security is equal to the sum of the dividend yield and the expected

long-term growth in dividends. Therefore, to best estimate the cost of common equity capital using the conventional DCF model, one must look to long-term growth rate expectations.

Internally generated growth, also known as sustainable growth, is a function of the percentage of earnings retained within the firm (the earnings retention rate) and the rate of return earned on those earnings (the return on equity). The internal or sustainable growth rate is computed as the retention rate times the return on equity. Internal growth is significant in determining long-run earnings and, therefore, dividends. Investors recognize the importance of internally generated growth and pay premiums for stocks of companies that retain earnings and earn high returns on internal investments.

Q.   PLEASE DISCUSS THE SERVICES THAT PROVIDE ANALYSTS' EARNINGS FORECASTS.

A.   Analysts' EPS (Earnings Per Share) forecasts for companies are collected and published by a number of different investment information services, including Institutional Brokers Estimate System ("I/B/E/S"), Bloomberg, FactSet, Zacks, First Call and Reuters, among others. Thompson Reuters publishes analysts' EPS forecasts under different product names, including I/B/E/S, First Call, and Reuters. Bloomberg, FactSet, and Zacks each publish their own set of analysts' EPS forecasts for companies. These services do not reveal (1) the analysts who are solicited for forecasts or (2) the identity of the analysts who actually provide the EPS forecasts that are used in the compilations published by the services. I/B/E/S, Bloomberg, FactSet, and First Call are fee-based services. These services usually provide detailed reports and other data in addition to analysts' EPS forecasts. In contrast, Thompson

---

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE   DOCKET NO. E-7 SUB 1146
EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE   P a g e 29

Reuters and Zacks do provide limited EPS forecast data free-of-charge on the Internet. Yahoo finance (http://finance.yahoo.com) lists Thompson Reuters as the source of its summary EPS forecasts. The Reuters website (www.reuters.com) also publishes EPS forecasts from Thompson Reuters, but with more detail. Zacks (www.zacks.com) publishes its summary forecasts on its website. Zacks estimates are also available on other websites, such as msn.money (http://money.msn.com).

Q.   PLEASE PROVIDE AN EXAMPLE OF THESE EPS FORECASTS.

A.   The following example provides the EPS forecasts compiled by Reuters for Alliant Energy Corp. (stock symbol "LNT"). The figures are provided on page 2 of Exhibit JRW-9. Line one shows that one analyst has provided EPS estimates for the quarter ending December 31, 2017. The mean, high and low estimates are $0.36, $0.43, and $0.31, respectively. The second line shows the quarterly EPS estimates for the quarter ending March 31, 2018 of $0.54 (mean), $0.69 (high), and $0.45 (low). Line three shows the annual EPS estimates for the fiscal year ending December 2017 (($1.95 (mean), $2.02 (high), and $1.92 (low)). Line four shows the annual EPS estimates for the fiscal year ending December 2018 ($2.12 (mean), $2.18 (high), and $2.07 (low)). The quarterly and annual EPS forecasts in lines 1-4 are expressed in dollars and cents. As in the LNT case shown here, it is common for more analysts to provide estimates of annual EPS as opposed to quarterly EPS. The bottom line (5) shows the projected long-term EPS growth rate, which is expressed as a percentage. For LNT, one analyst has provided a long-term EPS growth rate forecast, with mean, high, and low growth rates of 6.90%, 6.90%, and 6.90%.

Q. PLEASE PROVIDE MORE DETAILS ON THE LONG-TERM PROJECTED EPS GROWTH RATE.

A.   Thompson Reuters is a primary provider of long-term analysts' EPS growth rate estimates. Thompson Reuters defines this growth rate in the following manner:[14]

> The long term growth rate represents an expected annual increase in operating earnings over the company's next full business cycle. These forecasts refer to a period of between three and five years, and are expressed as a percentage. Long term growth rate forecasts are received directly from contributing analysts; they are not calculated by Thomson Reuters. While different analysts apply different methodologies, the Long Term Growth Forecast generally represents an expected annual increase in operating earnings over the company's next full business cycle. In general, these forecasts refer to a period of between three to five years.

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

A.   There are several issues with using the EPS growth rate forecasts of Wall Street analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Nonetheless, over the long term, dividend and earnings will have to grow at a similar growth rate. Second, a study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[15] Employing data over a twenty-year period, these authors

---

[14] Thompson Reuters, METHODOLOGY FOR ESTIMATES A GUIDE TO UNDERSTANDING THOMSON REUTERS METHODOLOGIES, TERMS AND POLICIES FOR THE FIRST CALL AND I/B/E/S ESTIMATES DATABASES, 2009, p. 37.

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

demonstrate that using the most recent year's actual EPS figure to forecast EPS in the next

3-5 years proved to be just as accurate as using the EPS estimates from analysts' long-term

earnings growth rate forecasts. In the authors' opinion, these results indicate that analysts'

long-term earnings growth rate forecasts should be used with caution as inputs for valuation

and cost of capital purposes. Finally, and most significantly, it is well known that the long-

term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and

upwardly biased. This has been demonstrated in a number of academic studies over the

years.[16] Hence, using these growth rates as a DCF growth rate will provide an overstated

equity cost rate. On this issue, a study by Easton and Sommers (2007) found that optimism

in analysts' growth rate forecasts leads to an upward bias in estimates of the cost of equity

capital of almost 3.0 percentage points.[17]

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

A.   Yes, given the publicized research on the topic, I do believe that investors are well

aware of the optimism in analysts' long-term EPS growth rate forecasts, and therefore

---

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

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

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE   DOCKET NO. E-7 SUB 1146

EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE   P a g e 32 |

account for the upward bias in evaluating risk and return prospects when buying and selling stocks. Therefore, I believe that stock prices reflect the upward bias.

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

A.   According to the DCF model, the equity cost rate is a function of the dividend yield and expected growth rate. As discussed above, I believe that investors are aware of the upward bias in analysts' long-term EPS growth rate forecasts, and therefore stock prices reflect the bias. But, I believe that the DCF growth rate needs to be adjusted to reflect the upward bias in the DCF model.

Q.   PLEASE DISCUSS THE HISTORICAL GROWTH OF THE COMPANIES IN THE PROXY GROUPS, AS PROVIDED BY *VALUE LINE*.

A.   Page 3 of Exhibit JRW-10 provides the 5- and 10- year historical growth rates per share for earnings (EPS), dividends (DPS), and book values (BVPS) for the companies in the two proxy groups, as published in the *Value Line Investment Survey*. The median historical growth measures for EPS, DPS, and BVPS for the Electric Proxy Group, as provided in Panel A, range from 4.3% to 6.0%, with an average of the medians of 4.8%. For the Hevert Proxy Group, as shown in Panel B of page 3 of Exhibit JRW-10, the historical growth measures in EPS, DPS, and BVPS, as measured by the medians, range from 4.0% to 6.6%, with an average of the medians of 4.8%.

Q.   PLEASE SUMMARIZE *VALUE LINE'S* PROJECTED GROWTH RATES FOR THE COMPANIES IN THE PROXY GROUPS.

A.   *Value Line's* projections of growth per share of earnings, dividends, and book values for the companies in the proxy groups are shown on page 4 of Exhibit JRW-10. As stated above, due to the presence of outliers, the medians are used in the analysis. For the Electric Proxy Group, as shown in Panel A of page 4 of Exhibit JRW-10, the medians range from 4.0% to 5.8%, with an average of the medians of 5.1%. The range of the medians for the Hevert Proxy Group, shown in Panel B of page 4 of Exhibit JRW-10, is from 4.0% to 6.0%, with an average of the medians of 5.2%.

Also provided on page 4 of Exhibit JRW-10 are the prospective internal or sustainable growth rates for the companies in the two proxy groups as measured by *Value Line*'s average projected retention rate and return on shareholders' equity. As noted above, internal or sustainable growth is a significant and a primary driver of long-run earnings growth. For the Electric and Hevert Proxy Groups, the median prospective sustainable growth rates are 3.8% and 3.8%, respectively.

Q.   PLEASE ASSESS GROWTH FOR THE PROXY GROUPS AS MEASURED BY ANALYSTS' FORECASTS OF EXPECTED 3-5-YEAR EPS GROWTH.

A.   Yahoo, Zacks, and Reuters collect, summarize, and publish Wall Street analysts' 3-5-year EPS growth rate forecasts for the companies in the proxy groups. These forecasts are provided for the companies in the proxy groups on page 5 of Exhibit JRW-10. I have reported both the mean and median growth rates for the groups. Since there is considerable overlap in analyst coverage between the three services, and not all of the companies have

forecasts from the different services, I have averaged the expected five-year EPS growth rates

from the three services for each company to arrive at an expected EPS growth rate for each

company. The mean of analysts' projected EPS growth rates for the Electric and Hevert

Proxy Groups are 4.6% and 4.9%, respectively. The corresponding medians of EPS growth

rates are 4.5% and 5.2%.[18]

Q.   PLEASE SUMMARIZE YOUR ANALYSIS OF THE HISTORICAL AND PROSPECTIVE GROWTH OF THE PROXY GROUPS.

A.   Page 6 of Exhibit JRW-10 shows the summary DCF growth rate indicators for the

proxy groups.

The historical growth rate indicators for my Electric Proxy Group imply a baseline

growth rate of 4.8%. The average of the projected EPS, DPS, and BVPS growth rates from

Value Line is 5.1%, and *Value Line*'s projected sustainable growth rate is 3.8%. The

projected EPS growth rates of Wall Street analysts for the Electric Proxy Group are 4.6%

and 4.5% as measured by the mean and median growth rates. The overall range for the

projected growth rate indicators (ignoring historical growth) is 3.8% to 5.1%. Giving

primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the

appropriate projected growth rate is 5.0%. This growth rate figure is in the upper end of

the range of historic and projected growth rates for the Electric Proxy Group.

For the Hevert Proxy Group, the historical growth rate indicators indicate a growth

rate of 4.8%. The average of the projected EPS, DPS, and BVPS growth rates from *Value*

---

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

Line is 5.2%, and *Value Line*'s projected sustainable growth rate is 3.9%. The projected

EPS growth rates of Wall Street analysts are 4.9% and 5.2% as measured by the mean and

median growth rates. The overall range for the projected growth rate indicators is 3.8% to

5.2%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I

believe that the appropriate projected growth rate is 5.2% for the Hevert Group. This

growth rate figure is in the upper end of the range of historic and projected growth rates

for the Hevert Proxy Group.

Q. BASED ON THE ABOVE ANALYSIS, WHAT ARE YOUR INDICATED COMMON EQUITY COST RATES FROM THE DCF MODEL FOR THE PROXY GROUPS?

A. My DCF-derived equity cost rates for the groups are summarized on page 1 of

Exhibit JRW-10 and in Table 1 below.

Table 1
DCF-Derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Electric Proxy Group	3.10%	1.025	5.00%	8.20%
Hevert Proxy Group	3.10%	1.026	5.20%	8.40%

The result for the Electric Proxy Group is the 3.10% dividend yield, times the one

and one-half growth adjustment of 1.025, plus the DCF growth rate of 5.00%, which results

in an equity cost rate of 8.20%. The result for the Hevert Proxy Group is 8.40%, which

includes a dividend yield of 3.10%, an adjustment factor of 1.026, and a DCF growth rate

of 5.20%.

B. Capital Asset Pricing Model

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

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

$$k \quad = \quad R_f \quad + \quad RP$$

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

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

$$K = (R_f) + \beta * [E(R_m) - (R_f)]$$

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

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

Q.   PLEASE DISCUSS EXHIBIT JRW-11.

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

Q.   PLEASE DISCUSS THE RISK-FREE INTEREST RATE.

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

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

A.   As shown on page 2 of Exhibit JRW-11, the yield on 30-year U.S. Treasury bonds has been in the 2.5% to 4.0% range over the 2013–2017 time period. The current 30-year

Treasury yield is in the middle of this range. Given the recent range of yields, I use the higher end 4.0% as the risk-free rate, or R_f, in my CAPM.

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

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

Q. WHAT BETAS ARE YOU EMPLOYING IN YOUR CAPM?

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

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

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

Q. PLEASE DISCUSS THE MARKET RISK PREMIUM ("MPR").

A. The MRP is equal to the expected return on the stock market (e.g., the expected return on the S&P 500, $E(R_m)$ minus the risk-free rate of interest (R_f)). The MRP is the difference in the expected total return between investing in equities and investing in "safe" fixed-income assets, such as long-term government bonds. However, while the MRP is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the overall stock market. As is discussed below, there are different ways to measure the MRP, and studies have come up with significantly different magnitudes for MRP because of these alternative methods are dependent of different assumptions regarding the expected stock market return. As Merton Miller, the 1990 Nobel

Prize winner in economics indicated, the expected stock market return is very difficult to measure and is one of the great mysteries in finance.[19]

Q.   PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING THE MRP.

A.   Page 4 of Exhibit JRW-11 highlights the primary approaches to, and issues in, estimating the expected MRP. The traditional way to measure the MRP was to use the difference between historical average stock and bond returns. In this case, historical stock and bond returns, also called *ex post* returns, were used as the measures of the market's expected return (known as the *ex-ante* or forward-looking expected return). This type of historical evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor Roger Ibbotson, who popularized this method of using historical financial market returns as measures of expected returns. Most historical assessments of the equity risk premium suggest an equity risk premium range of 5% to 7% above the rate on long-term U.S. Treasury bonds. However, this can be a problem because: (1) *ex post* returns are not the same as *ex ante* expectations; (2) market risk premiums can change over time, increasing when investors become more risk-averse and decreasing when investors become less risk-averse; and (3) market conditions can change such that *ex post* historical returns are poor estimates of *ex ante* expectations.

The use of historical returns as market expectations has been criticized in numerous academic studies as discussed later in my testimony. The general theme of these studies is

---

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

that the large MRP discovered in historical stock and bond returns cannot be justified by the fundamental data. These studies, which fall under the category *"Ex Ante* Models and Market Data,"* compute *ex ante* expected returns using market data to arrive at an expected equity risk premium. These studies have also been called "Puzzle Research" after the famous study by Mehra and Prescott in which the authors first questioned the magnitude of historical MRPS relative to fundamentals.[20]

In addition, there are a number of surveys of financial professionals regarding the MRP. There have also been several published surveys of academics on the MRP. *CFO Magazine* conducts a quarterly survey of CFOs, which includes questions regarding their views on the current expected returns on stocks and bonds. Usually, over 300 CFOs participate in the survey.[21] Questions regarding expected stock and bond returns are also included in the Federal Reserve Bank of Philadelphia's annual survey of financial forecasters, which is published as the *Survey of Professional Forecasters*.[22] This survey of professional economists has been published for almost fifty years. In addition, Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[23]

Q.   PLEASE PROVIDE A SUMMARY OF THE MRP STUDIES.

---

[20] Rajnish Mehra & Edward C. Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics*, 145 (1985).
[21] *See* DUKE/CFO Magazine Global Business Outlook Survey, www.cfosurvey.org, March, 2017.
[22] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (Feb, 2017). The Survey of Professional Forecasters was formerly conducted by the American Statistical Association ("ASA") and the National Bureau of Economic Research ("NBER") and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.
[23] Pablo Fernandez, Vitaly Pershin and Isabel Fernandez Acín, "Discount Rate (Risk-Free Rate and Market Risk Premium) used for 41 countries in 2017: a survey." *IESE Business School*, May, 2017.

A.   Derrig and Orr (2003), Fernandez (2007), and Song (2007) completed the most comprehensive review of the research on the MRP.[24] Derrig and Orr's study evaluated the various approaches to estimating MRPs, as well as the issues with the alternative approaches and summarized the findings of the published research on the MRP. Fernandez examined four alternative measures of the MRP – historical, expected, required, and implied. He also reviewed the major studies of the MRP and presented the summary MRP results. Song provides an annotated bibliography and highlights the alternative approaches to estimating the MRP.

Page 5 of Exhibit JRW-11 provides a summary of the results of the primary risk premium studies reviewed by Derrig and Orr, Fernandez, and Song, as well as other more recent studies of the MRP. In developing page 5 of Exhibit JRW-11, I have categorized the studies as discussed on page 4 of Exhibit JRW-11. I have also included the results of studies of the "Building Blocks" approach to estimating the equity risk premium. The Building Blocks approach is a hybrid approach employing elements of both historical and *ex ante* models.

Q.   PLEASE DISCUSS PAGE 5 OF EXHIBIT JRW-11.

A.   Page 5 of Exhibit JRW-11 provides a summary of the results of the MRP studies that I have reviewed. These include the results of: (1) the various studies of the historical risk premium, (2) *ex ante* MRP studies, (3) MRP surveys of CFOs, financial forecasters,

---

[24] *See* Richard Derrig & Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, (August 28, 2003); Pablo Fernandez, "Equity Premium: Historical, Expected, Required, and Implied," IESE Business School Working Paper, (2007); Zhiyi Song, "The Equity Risk Premium: An Annotated Bibliography," CFA Institute, (2007).

analysts, companies and academics, and (4) the Building Blocks approach to the MRP.

There are results reported for over forty studies, and the median MRP is 4.56%.

Q. PLEASE HIGHLIGHT THE RESULTS OF THE MORE RECENT MRP STUDIES AND SURVEYS.

A. The studies cited on page 5 of Exhibit JRW-11 include every MRP study and survey I could identify that was published over the past decade and that provided an MRP estimate. Most of these studies were published prior to the financial crisis that began in 2008. In addition, some of these studies were published in the early 2000s at the market peak. It should be noted that many of these studies (as indicated) used data over long periods of time (as long as fifty years of data) and so were not estimating an MRP as of a specific point in time (e.g., the year 2001). To assess the effect of the earlier studies on the MRP, I have reconstructed page 5 of Exhibit JRW-11 on page 6 of Exhibit JRW-11; however, I have eliminated all studies dated before January 2, 2010. The median for this subset of studies is 5.07%.

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

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

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

A.   Yes. In the September 2017 CFO survey conducted by *CFO Magazine* and Duke University, which included approximately 300 responses, the expected 10-year MRP was 4.32%.[25] Thus, my 5.5% value is a conservatively high estimate of the MRP.

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

A.   The financial forecasters in the previously referenced Federal Reserve Bank of Philadelphia survey projected both stock and bond returns. In the February 2017 survey, the median long-term expected stock and bond returns were 5.60% and 3.68%, respectively. This provides an expected MRP of 1.92% (5.60%-3.68%). Again, my 5.5% value is a conservatively high estimate of the MRP.

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

A.   Yes. Pablo Fernandez published the results of his 2017 survey of academics, financial analysts, and companies.[26] This survey included over 4,000 responses. The median MRP employed by U.S. analysts and companies was 5.7%.

---

[25] *Id.* p. 42.
[26] *Ibid.* p. 3.

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE   DOCKET NO. E-7 SUB 1146
EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE   P a g e 45

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

A.   Yes. Duff & Phelps is a well-known valuation and corporate finance advisor that publishes extensively on the cost of capital. As of 2017, Duff & Phelps recommended using a 5.5% MRP for the U.S, with a normalized risk-free interest rate of 3.5%.[27]

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

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

Table 2
CAPM-Derived Equity Cost Rate/ROE
$$K = (R_f) + \beta * [E(R_m) - (R_f)]$$

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

For the Electric Proxy Group, the risk-free rate of 4.0% plus the product of the beta of 0.70 times the equity risk premium of 5.5% results in a 7.9% equity cost rate. For the Hevert Proxy Group, the risk-free rate of 4.0% plus the product of the beta of 0.70 times the equity risk premium of 5.5% results in a 7.9% equity cost rate.

C. Equity Cost Rate Summary

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EQUITY COST RATE

---

[27] *See* http://www.duffandphelps.com/insights/publications/cost-of-capital/index.

STUDIES.

A.   My DCF analyses for the Electric and Hevert Proxy Groups indicate equity cost rates of 8.20% and 8.40%, respectively. The CAPM equity cost rates for the groups are 7.9% and 7.9%.

<div align="center">

Table 3
ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Electric Proxy Group	8.20%	7.90%
Hevert Proxy Group	8.40%	7.90%

</div>

Q.   GIVEN THESE RESULTS, WHAT IS YOUR ESTIMATED EQUITY COST RATE FOR THE GROUPS?

A.   Given these results, I conclude that the appropriate equity cost rate for companies in the Electric and Hevert Proxy Groups is in the 7.90% to 8.40% range.   Because I give primary weight to the DCF results and to be conservative, I would using an equity cost rate of 8.40% for Duke Carolinas.

Q.   PLEASE   INDICATE   WHY   YOUR   EQUITY   COST   RATE RECOMMENDATION OF 8.40% IS APPROPRIATE FOR THE ELECTRIC OPERATIONS OF DUKE CAROLINAS.

A.   There are a number of reasons why an equity cost rate of 8.40% is appropriate and fair for the Company in this case:

1.   I have employed a capital structure for Duke Carolinas that includes 50/50 equity and debt, which uses more common equity than the two proxy groups as well as Duke Carolinas' parent, Duke Energy, and corresponds to a lower ROE;

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

3.   As shown in Exhibit JRW-8, the electric utility industry is among the lowest risk industries in the U.S. as measured by beta. As such, the cost of equity capital for this industry is amongst the lowest in the U.S., according to the CAPM;

4.   The investment risk of Duke Carolinas, as indicated by the Company's S&P and Moody's issuer credit ratings of A- and A1, is below the average of the Electric and Hevert Proxy Groups whose S&P and Moody's issuer credit ratings are BBB+ and Baa1;

5.   As shown in Figure 2, the authorized ROEs for electric utility and gas distribution companies have declined in recent years. The authorized ROEs for electric utilities have declined from 10.01% in 2012, to 9.8% in 2013, to 9.76% in 2014, 9.58% in 2015, 9.60% in 2016, and 9.61% in the first nine months of 2017, according to Regulatory Research Associates.[28] In my opinion, these authorized ROEs have lagged behind capital market cost rates, or in other words, authorized ROEs have been slow to reflect low capital market cost rates. This has been especially true in recent years as some state commissions have been reluctant to authorize ROEs below 10%. However, the trend has been towards lower ROEs, and the norm now is below ten percent. Hence, I believe that my recommended ROE reflects the low capital cost rates in today's markets, and these low capital cost rates are finally being recognized by state utility commissions.

---

[28] *Regulatory Focus*, Regulatory Research Associates, October, 2017. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.

Q.   ARE YOU AWARE OF ANY OTHER AUTHORIZED ROES FOR ELECTRIC UTILITIES AS LOW AS 8.40%?

A.   Yes. On December 6, 2017, the Illinois Commerce Commission provided for an authorized ROE of 8.40% for both Commonwealth Edison and Ameren Illinois.[29] Even though both of these companies are distribution-only electric utilities, their S&P and Moody's issuer credit ratings of BBB+ and Baa1 indicate that they are both more risky than Duke Carolinas. This is because credit ratings include the impact of all business and financial risks, including whether a utility is integrated and includes the risks of generation or if it only distributes electricity.

Q.   DO YOU BELIEVE THAT YOUR RECOMMENDED ROE OF 8.40% MEETS *HOPE* AND *BLUEFIELD* STANDARDS?

A.   Yes, my ROE recommendation meets the criteria established in the *Hope* and *Bluefield* decisions. As previously noted, according to the *Hope* and *Bluefield* decisions, returns on capital should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

Utilities have been earning ROEs of about 9.0% (on average) in recent years. As shown on page of Exhibit JRW-4, the median earned ROE for the year 2016 for the companies in the Electric and Hevert Proxy Groups are 9.3% and 9.4%, respectively.

---

[29]   Commonwealth   Edison   Order,   https://www.icc.illinois.gov/docket/files.aspx?no=17-0196&docId=259505;
Ameren Illinois Illinois Order, https://www.icc.illinois.gov/docket/files.aspx?no=17-0197&docId=259511

Given this level of return, the credit ratings of utility companies are going up. The Edison

Electric Institute ("EEI") tracks the rating actions of Standard & Poor's ("S&P", Moody's,

and Fitch. Figure 3 shows the rating actions from 2003-2016.[30] The bottom line is the

number of rating actions, and the top line is the percentage of upgrades. The percentage of

upgrades have been at least 70% over the past four years. This provides direct evidence

that the investment risk of utility companies is low and declining.

Figure 3
Electric Utility Rating Actions and Percentage of Credit Upgrades
2003-2017
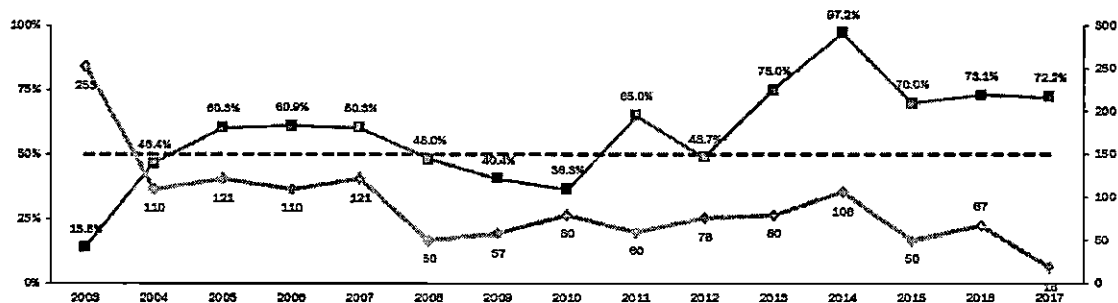
Source: Edison Electric Institute, 2017.

Q.   PLEASE ALSO DISCUSS YOUR RECOMMENDATION IN LIGHT OF A

MOODY'S PUBLICATION ON ROEs AND CREDIT QUALITY.

A.   Moody's published an article on utility ROEs and credit quality in 2015. In the

article, Moody's recognizes that authorized ROEs for electric and gas companies are

declining due to lower interest rates. The article explains:

> The credit profiles of US regulated utilities will remain intact over
> the next few years despite our expectation that regulators will
> continue to trim the sector's profitability by lowering its authorized
> returns on equity (ROE). Persistently low interest rates and a
> comprehensive suite of cost recovery mechanisms ensure a low
> business risk profile for utilities, prompting regulators to scrutinize

---

[30] http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/QtrlyFinancialUpdates/Pages/default.aspx

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE	DOCKET NO. E-7 SUB 1146
EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE	Page 50

their profitability, which is defined as the ratio of net income to book equity. We view cash flow measures as a more important rating driver than authorized ROEs, and we note that regulators can lower authorized ROEs without hurting cash flow, for instance by targeting depreciation, or through special rate structures.[31]

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

Robust cost recovery mechanisms will help ensure that US regulated utilities' credit quality remains intact over the next few years. As a result, falling authorized ROEs are not a material credit driver at this time, but rather reflect regulators' struggle to justify the cost of capital gap between the industry's authorized ROEs and persistently low interest rates. We also see utilities struggling to defend this gap, while at the same time recovering the vast majority of their costs and investments through a variety of rate mechanisms.[32]

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

Q.   ARE UTILITIES ABLE TO ATTRACT CAPITAL WITH THE LOWER ROEs?

A.   Moody's also highlights in the article that utilities are raising about $50 billion a year in debt capital, despite the lower ROEs.

---

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

V.   CRITIQUE OF DUKE CAROLINAS' RATE OF RETURN TESTIMONY

Q.   PLEASE SUMMARIZE THE COMPANY'S COST OF CAPITAL RECOMMENDATION.

A.   The Company has proposed a capital structure with 47.00% long-term debt and 53.00% common equity and a long-term debt cost rate of 4.74%. Duke Carolinas witness Mr. Robert B. Hevert has recommended a common equity cost rate of 10.75% for the Company. The Company's overall proposed rate of return is 7.93% from investor-supplied capital. This is summarized on page 1 of Exhibit JRW-12.

Q.   PLEASE SUMMARIZE THE PRIMARY DIFFERENCES YOUR POSITION AND THE COMPANY'S POSITION REGARDING THE COMPANY'S COST OF CAPITAL.

A.   The primary areas of disagreement are: (1) the Company's proposed capital structure; (2) our opposing views regarding the state of the markets and capital costs; (3) the Company's DCF equity cost rate estimates, and in particular, (a) Mr. Hevert's exclusive use of the earnings per share growth rates of Wall Street analysts and *Value Line*; (b) his use of an inflated terminal GDP growth rate of 5.38% in his multi-stage DCF model; (4) the base interest rate and market or equity risk premiums in Mr. Hevert's CAPM and Authorized Return approaches; and (5) Mr. Hevert's assessment of Duke Carolinas' business risk and the need to consider flotation costs.

Q.   PLEASE REVIEW MR. HEVERT'S EQUITY COST RATE APPROACHES AND RESULTS.

A.   Mr. Hevert has developed a proxy group of electric utility companies and employs

DCF, CAPM, and Authorized Return equity cost rate approaches. Mr. Hevert's equity cost

rate estimates for Duke Carolinas are summarized on page 1 of Exhibit JRW-13. Based on

these figures, he concludes that the appropriate equity cost rate is 10.75% for the Company.

A.   DCF Approach

Q.   PLEASE SUMMARIZE MR. HEVERT'S DCF ESTIMATES.

A.   On pages 17-35 of his testimony and in Exhibit Nos. RBH-1 and RBH-2, Mr.

Hevert develops an equity cost rate by applying the DCF model to the companies in his

proxy group. Mr. Hevert's DCF results are summarized in Panel A of Exhibit JRW-13.

He uses constant-growth and multi-stage growth DCF models. Mr. Hevert uses three

dividend yield measures (30, 90, and 180) in his DCF models. In his constant-growth DCF

model, Mr. Hevert has relied on the forecasted EPS growth rates of Zacks, Yahoo Finance,

and *Value Line*. His multi-stage DCF model uses analysts' EPS growth rate forecasts as a

short-term growth rate and his projection of GDP growth as the long-term growth rate. For

all three models, he reports Mean Low, Mean, and Mean High results. His DCF results are

summarized in Panel A of Exhibit JRW-13 and his mean results range from 8.74% to

10.53%.

Q.   WHAT ARE THE ERRORS IN MR. HEVERT'S DCF ANALYSES?

A.   The primary issues in Mr. Hevert's DCF analyses are: (1) he gives very little or no

weight to his constant-growth DCF results; (2) his exclusive use of the overly optimistic

and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line;* (3)

the use of an inflated terminal growth rate of 5.38% in his multi-stage DCF model that it

is not reflective of prospective economic growth in the U.S. and is more than 100 basis

points above the projected long-term GDP growth; and finally, Mr. Hevert's Multi-Stage

Terminal PE Ratio approach uses a terminal price-earnings ratio of 24.30X which is much

higher than current P-E ratios for electric utilities and therefore overstates the terminal

growth rate requirement and resulting equity cost rate estimates.

1. The Low Weight Given the Constant-Growth DCF Results

Q. HOW MUCH WEIGHT HAS MR. HEVERT GIVEN HIS CONSTANT-GROWTH DCF RESULTS IN ARRIVING AT AN EQUITY COST RATE FOR THE COMPANY?

A. Apparently, very little, if any at all. The average of his mean constant-growth stage

DCF equity cost rates is only 8.83%. Had he given these results more weight, or even any

weight, he would have arrived at a much lower equity cost rate recommendation.

2. Analysts' EPS Growth Rates

Q. PLEASE REVIEW MR. HEVERT'S DCF GROWTH RATE.

A. In his constant-growth DCF model, Mr. Hevert's DCF growth rate is the average

of the EPS growth rate forecasts of: (1) Wall Street analysts as compiled by First Call,

Zacks; and (2) *Value Line*.

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

A.   Another issue with Mr. Hevert's DCF analyses is his excessive reliance on the EPS growth rate forecasts of Wall Street analysts.

Q.   PLEASE DISCUSS MR. HEVERT'S EXCLUSIVE RELIANCE ON THE PROJECTED GROWTH RATES OF WALL STREET ANALYSTS AND *VALUE LINE*.

A.   It is highly unlikely that investors today would rely exclusively on the EPS growth rate forecasts of Wall Street analysts and ignore other growth rate measures in arriving at their expected growth rates for equity investments. As I discussed in my cost of capital report, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Hence, consideration must be given to other indicators of growth, including historical prospective dividend growth, internal growth, as well as projected earnings growth. Also, as noted previously, a study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[33] And finally, and most significantly, it is well-known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.[34] Hence, using these growth rates as a DCF constant growth rate produces an overstated equity cost rate. A study by Easton and Sommers (2007) found that optimism in analysts'

---

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

[34] See previous discussion and footnote no. 17.

earnings growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[35]

3. The GDP Growth Rate in the Multi-Stage DCF Analysis

Q. PLEASE DISCUSS MR. HEVERT'S TWO MULTI-STAGE DCF ANALYSIS.

A.   Mr. Hevert has employed a multi-stage growth DCF model in which: (1) the first-stage is the average projected growth rate of Wall Street analysts as published by Yahoo Finance, Zacks, and *Value Line;* and (2) the terminal stage is his projected measure of long-term GDP growth. He uses a long-term nominal GDP growth rate of 5.38% which is based on (1) a real GDP growth rate of 3.22% which is calculated over the 1929-2016 time period and (2) an inflation rate of 2.09%.

Q. WHAT ARE THE PRIMARY ERRORS WITH MR. HEVERT'S MULTI-STAGE DCF ANALYSIS?

A.   There are two primary errors with Mr. Hevert's multi-stage DCF analysis; (1) the first-stage DCF growth rate is the average projected EPS growth rate from Wall Street analysis which, as discussed above, are overly optimistic and upwardly biased; and (2) the long-term GDP growth rate is based on historical GDP growth and is about 100 basis points above long-term projections of GDP growth.

---

[35] Easton, P., & Sommers, G. (2007). Effect of analysts' optimism on estimates of the expected rate of return implied by earnings forecasts. *Journal of Accounting Research*, 45(5), 983–1015.

Q. PLEASE IDENTIFY THE ERRORS WITH MR. HEVERT'S PROJECTED LONG-TERM GDP GROWTH RATE OF 5.38%.

A. There are two major errors in this analysis. First, Mr. Hevert has not provided any theoretical or empirical support that long-term GDP growth is a reasonable proxy for the expected growth rate of the companies in his proxy group. Five-year and ten-year historic measures of growth for earnings and dividends for electric utility companies, as shown on page 3 of Exhibit JRW-10, suggest growth that is more than 50 basis points below Mr. Hevert's 5.38% GDP growth rate. Mr. Hevert has provided no evidence as to why investors would rely on his estimate of long-term GDP growth as the appropriate growth rate for electric utility companies.

The second error is the magnitude of Mr. Hevert's long-term GDP growth rate estimate of 5.38%. On page 1 of Exhibit JRW-14 of my testimony, I provide an analysis of GDP growth since 1960. Whereas nominal GDP has grown at a compounded rate of 6.51% since 1960, economic growth in the U.S. has slowed considerably in recent decades. Page 2 of Exhibit JRW-14 provides the nominal annual GDP growth rates over the 1961 to 2016 time period. Nominal GDP growth grew from 6.0% to over 12% from the 1960s to the early 1980s due in large part to inflation and higher prices. With the exception of an uptick during the mid-2000s, annual nominal GDP growth rates have declined to the 2.5% to 4.0% range over the past five years.

The components of nominal GDP growth are real GDP growth and inflation. Page 3 of Exhibit JRW-14 shows the annual real GDP growth rate over the 1961 to 2016 time period. Real GDP growth has gradually declined from the 5.0% to 6.0% range in the 1960s to the 2.0% range during the most recent five-year period. The second component of

nominal GDP growth is inflation. Page 4 of Exhibit JRW-14 shows inflation as measured by the annual growth rate in the Consumer Price Index ("CPI") over the 1961 to 2016 time period. The large increase in prices from the late 1960s to the early 1980s is readily evident. Equally evident is the rapid decline in inflation during the 1980s as inflation declined from above 10% to about 4%. Since that time inflation has gradually declined and has been in the 2.0% range or below over the past five years.

The graphs on pages 2, 3, and 4 of Exhibit JRW-14 provide very clear evidence of the decline in nominal GDP as well as its components, real GDP and inflation, in recent decades. To gauge the magnitude of the decline in nominal GDP growth, Table 5 provides the compounded GDP growth rates for 10-, 20-, 30-, 40- and 50- years. Whereas the 50-year compounded GDP growth rate is 6.45%, there has been a monotonic and significant decline in nominal GDP growth over subsequent 10-year intervals. These figures indicate that nominal GDP growth in recent decades has slowed and that a growth rate in the range of 4.0% is more appropriate today for the U.S. economy. Mr. Hevert's long-term GDP growth rate of 5.38% is clearly inflated.

Table 4
Historic GDP Growth Rates

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

Q.   ARE THE LOWER GDP GROWTH RATES OF RECENT DECADES CONSISTENT WITH THE FORECASTS OF GDP GROWTH?

A.   Yes. A lower range is also consistent with long-term GDP forecasts. There are several

forecasts of annual GDP growth that are available from economists and government agencies.

These are listed in Panel B of on page 5 of Exhibit JRW-14. The mean 10-year nominal GDP

growth forecast (as of February 2017) by economists in the recent *Survey of Financial*

Forecasters is 4.7%. The Energy Information Administration ("EIA"), in its projections

used in preparing *Annual Energy Outlook,* forecasts long-term GDP growth of 4.2% for

the period 2017-2050.[36] The Congressional Budget Office ("CBO"), in its forecasts for the

period 2017 to 2047, projects a nominal GDP growth rate of 4.0%.[37] Finally, the Social

Security Administration ("SSA"), in its Annual OASDI Report, provides a projection of

nominal GDP from 2017-2095.[38] SSA's projected growth GDP growth rate over this

period is 4.4%.

Q.   **DOES MR. HEVERT PROVIDE ANY REASONS WHY HE HAS IGNORED**
THE WELL-KNOWN LONG-TERM REAL GDP FORECASTS OF THE CBO,
SSA, AND EIA?

A.   No.

---

[36]Energy Information Administration, *Annual Energy Outlook,*
https://www.eia.gov/outlooks/aeo/data/browser/#/?id=18-AEO2017&cases=ref2017&sourcekey=0
[37]Congressional   Budget   Office,   The   *2017   Long-Term   Budget   Outlook,*   March   2017.
https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52480-ltbo.pdf (Table A-1, p. 30).
[38] Social Security Administration, 2017 Annual Report of the Board of Trustees of the Old-Age, Survivors,
and Disability Insurance (OASDI) Program. https://www.ssa.gov/oact/tr/2017/tr2017.pdf, Table VI.G4, p.
211. The 4.4% represents the compounded growth rate in projected GDP from $19,455 trillion in 2017 to
$564,614 trillion in 2095.

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE	DOCKET NO. E-7 SUB 1146
EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE	P a g e 59

Q.   WHAT IS WRONG WITH MR. HEVERT'S REAL GDP FORECAST ON
HISTORIC DATA AND IGNORING THE WELL-KNOWN LONG-TERM GDP
FORECASTS OF THE CBO AND EIA?

A.   In developing a DCF growth rate for his constant-growth DCF analysis, Mr. Hevert
has totally ignored historic EPS, DPS, and BVPS data and relied solely on the 5-year EPS
growth rate projections of Wall Street analysts and *Value Line*. However, in developing a
terminal DCF growth rate for his multi-stage growth DCF analysis, Mr. Hevert has also
totally ignored the well-known long-term real GDP growth rate forecasts of the CBO and
EIA and relied solely on historic data going back to 1929. Simply put, he is inconsistent
with his methodology of estimating investor expectations.

4.   Mr. Hevert's Multi-Stage DCF Terminal P-E Approach

Q.   PLEASE DISCUSS MR. HEVERT'S MULTI-STAGE DCF TERMINAL P-E
APPROACH.

A.   Mr. Hevert's highest DCF results are from his Multi-Stage DCF Terminal P-E Ratio
method. This approach is based on: (1) the inflated GDP growth rate figure of 5.38%; and (2)
a terminal price-earnings ratio of 24.30X and an assumed terminal price-earnings ratio to
growth rate (PEG Ratio) of 4.52X (see Exhibit RBH-2, page 28, columns (12) and (13). The
issue with the 5.38% GDP growth rate figure was discussed above. The Terminal P-E and
PEG ratios are much higher than the current P-E and PEG ratios for the proxy group, which
are 21.08X and 3.92X (see Exhibit RBH-2, page 1 - the 21.08X and 3.96X represent the mean
values for columns (12) and (13). The net effect of using abnormally high GDP growth rate
and P-E and PEG ratios is that the implied multi-stage DCF growth rate and required rate of

return are overstated. This is demonstrated by the fact that Mr. Hevert's multi-stage DCF Terminal P-E results are 100 to 150 basis points above his Multi-Stage DCF Terminal P-E Ratio results (See Panel A of Exhibit JRW-13).

B.   CAPM Approach

Q.   PLEASE DISCUSS MR. HEVERT'S CAPM.

A.   On pages 35-39 of his testimony and in Exhibit Nos. RBH-3 - RBH-5, Mr. Hevert develops an equity cost rate by applying the CAPM model to the companies in his proxy group. The CAPM approach requires an estimate of the risk-free interest rate, beta, and the equity risk premium. Mr. Hevert uses two different measures of the 30-Year Treasury bond yield (a) current yield of 2.90% and a near-term projected yield of 3.40% (b) two different Betas (an average Bloomberg Beta of 0.575 and an average *Value Line* Beta of 0.703, and (c) two market risk premium measures - a Bloomberg, DCF-derived market risk premium of 10.79% and *Value Line* derived market risk premium of 10.89%. Based on these figures, he finds a CAPM equity cost rate range from 9.26% to 11.20%. Mr. Hevert's CAPM results are summarized in Panel B of page 1 of Exhibit JRW-13

Q.   WHAT ARE THE ERRORS IN MR. HEVERT'S CAPM ANALYSES?

A.   The primary errors with Mr. Hevert's CAPM analysis are: (1) the projected near-term risk-free interest rate of 3.40%; and (2) most significantly, the expected market returns that are used to compute the market risk premiums.

1. Projected Near-Term Risk-Free Interest Rate

Q. PLEASE DISCUSS THE BASE YIELD OF MR. HEVERT'S CAPM/ECAPM ANALYSES.

A. Mr. Hevert uses a projected near-term risk-free interest rate 3.40% in his CAPM. This figure is more than 50 basis points above the current yield on long-term Treasury bonds and therefore is not a realistic expectation of the market. This is excessive for two reasons. First, as previously discussed, economists are always predicting that interest rates are going up, and yet they are almost always wrong. Obviously, investors are well aware of the consistently wrong forecasts of higher interest rates, and therefore place little weight on such forecasts. Second, investors would not be buying long-term Treasury bonds at their current yields if they expected interest rates to suddenly increase. If interest rates do increase, the prices of the bonds investors bought at today's yields go down, producing a negative return.

2. Market Risk Premiums

Q. WHAT ARE THE ERRORS IN MR. HEVERT'S MARKET RISK PREMIUM IN HIS CAPM ANALYSES?

A. The primary errors in Mr. Hevert's CAPM analysis are the market premiums of 10.79% and 10.89% which are based on the upwardly-biased long-term EPS growth rate estimates of Wall Street analysts.

Q. PLEASE ASSESS MR. HEVERT'S MARKET RISK PREMIUMS DERIVED FROM APPLYING THE DCF MODEL TO THE S&P 500 AND *VALUE LINE INVESTMENT SURVEY.*

A. For his Bloomberg and *Value Line* market risk premiums, Mr. Hevert computes market risk premiums of 10.79% and 10.89% by: (1) calculating an expected market return by applying the DCF model to the S&P 500; and then (2) subtracting the current 30-year Treasury bond yield from the calculation. Mr. Hevert's estimated expected market returns from these are 13.70% (using Bloomberg three- to five-year EPS growth rate estimates) and of 13.80% (using *Value Line* three- to five-year EPS growth rate estimates). Mr. Hevert also uses (1) a dividend yield of 1.95% and an expected DCF growth rate of 11.75% for Bloomberg and (2) a dividend yield of 1.90% and an expected DCF growth rate of 11.90% for *Value Line.* These results are not realistic in today's market.

Q. HOW DID MR. HEVERT ERR WHEN ANALYZING MARKET PREMIUMS?

A. The primary error is that Mr. Hevert computed the expected market return using the DCF model with the growth rate being the projected 5-year EPS growth rate from Wall Street analysts. As explained below, this produces an overstated expected market return and equity risk premium.

Q. WHAT EVIDENCE CAN YOU PROVIDE THAT MR. HEVERT'S GROWTH RATES ARE ERRONEOUS?

A.   Mr. Hevert's expected long-term EPS growth rates of 11.75% for Bloomberg and 11.90% for *Value Line* represent the forecasted 5-year EPS growth rates of Wall Street analysts. The error with this approach is that the EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.

Q.   ARE EPS GROWTH RATES OF 11.75% and 11.90% CONSISTENT WITH HISTORICAL AND · PROJECTED GROWTH IN EARNINGS AND THE ECONOMY?

A.   No. Long-term EPS growth rates of 11.75% and 11.90% are not consistent with historic or projected economic and earnings growth in the U.S for several reasons: (1) long-term growth in EPS is far below Mr. Hevert's projected EPS growth rates; (2) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower long-term economic and earnings growth in the future; and (3) over time, EPS growth tends to lag behind GDP growth.

The long-term economic, earnings, and dividend growth rate in the U.S. has only been in the 5% to 7% range. I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page 1 of Exhibit JRW-14, and a summary is provided in Table 5 below.

Table 5
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

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

The results are presented graphically on page 6 of Exhibit JRW-14. In sum, the historical

long-run growth rates for GDP, S&P EPS, and S&P DPS are in the 5% to 7% range.

Q.   DO MORE RECENT DATA SUGGEST THAT U.S. ECONOMIC GROWTH

IS FASTER OR SLOWER THAN THE LONG-TERM DATA?

A.   As previously discussed and presented in Table 4, the more recent trend suggests

lower future economic growth than the long-term historic GDP growth. The historic GDP

growth rates for 10-, 20-, 30-, 40- and 50- years clearly suggest that nominal GDP growth

in recent decades has slowed to the 4.0% to 5.0% area. By comparison, Mr. Hevert's long-

run growth rate projections of 11.75% and 11.90% are vastly overstated. This estimate

suggests that companies in the U.S. would be expected to: (1) increase their growth rate of

EPS by almost 100% in the future and (2) maintain that growth indefinitely in an economy

that is expected to grow at about one-half of his projected growth rate.

Q.   WHAT LEVEL OF GDP GROWTH IS FORECASTED BY ECONOMISTS

AND VARIOUS GOVERNMENT AGENCIES?

A.   As previously discussed, there are several forecasts of annual GDP growth that are

available from economists and government agencies. These are listed in page 5 of

Exhibit JRW-14. These forecasts suggest long-term GDP growth rate in the 4.1% - 4.7%

range.

Q. WHY IS GDP GROWTH RELEVANT IN YOUR DISCUSSION OF MR. HEVERT'S USE OF THE LONG-TERM EPS GROWTH RATES IN DEVELOPING A MARKET RISK PREMIUM FOR HIS CAPM?

A. Because, as indicated in recent research, the long-term earnings growth rates of companies are on average limited to the growth rate in GDP.

Q. PLEASE EXPLAIN THE LINK BETWEEN ECONOMIC AND EARNINGS GROWTH AND EQUITY RETURNS.

A. Brad Cornell of the California Institute of Technology published a study on GDP growth, earnings growth, and equity returns. He finds that long-term EPS growth in the U.S. is directly related to GDP growth, with GDP growth providing an upward limit on EPS growth. In addition, he finds that long-term stock returns are determined by long-term earnings growth. He concludes with the observation that "real GDP growth in excess of 3 percent in the long run is highly unlikely in the developed world" and that, in real terms, "investors should anticipate real returns on U.S. common stocks to average no more than about 4–5 percent":[39]

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

---

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

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE   DOCKET NO. E-7 SUB 1146
EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE   P a g e 66 |

Given current inflation in the 2% to 3% range and real returns in the 4% to 5% range, the results imply nominal expected stock market returns in the 6% to 8% range. As such, Mr. Hevert's projected earnings growth rates and implied expected stock market returns and equity risk premiums are not indicative of the realities of the U.S. economy and stock market. As such, his expected CAPM equity cost rate is significantly overstated.

Q.   PLEASE PROVIDE A SUMMARY ASSESSMENT OF MR. HEVERT'S PROJECTED EQUITY RISK PREMIUM DERIVED FROM EXPECTED MARKET RETURNS.

A.   Mr. Hevert's market risk premiums derived from his DCF application to the S&P 500 are inflated due to errors and bias in his study. Investment banks, consulting firms, and CFOs use the equity risk premium concept every day in making financing, investment, and valuation decisions. On this issue, the opinions of CFOs and financial forecasters are especially relevant. CFOs deal with capital markets on an ongoing basis since they must continually assess and evaluate capital costs for their companies. They are well aware of the historical stock and bond return studies of Ibbotson. The CFOs in the September 2017 *CFO Magazine* – Duke University Survey of about 300 CFOs shows an expected return on the S&P 500 of 6.50% over the next ten years. In addition, the financial forecasters in the February 2017 Federal Reserve Bank of Philadelphia survey expect an annual nominal market return of 5.60% over the next ten years. As such, with a more realistic equity or market risk premium, the appropriate equity cost rate for a public utility should be in the 8.0% to 9.0% range and not in the 10.0% to 11.0% range.

C.   Bond Yield Risk Premium ("Authorized Return") Approach

Q.   PLEASE DISCUSS MR. HEVERT'S AUTHORIZED RETURN APPROACH.

A.   On pages 39-43 of his testimony and in Exhibit No. RBH-6, Mr. Hevert develops an equity cost rate using his Authorized Return Approach. Mr. Hevert develops an equity cost rate by: (1) regressing the average quarterly authorized returns on equity for electric utility companies from the January 1, 1980, to May 31, 2017, time period on the thirty-year Treasury Yield; and (2) adding the risk premium established in step (1) to three different thirty-year Treasury yields: (a) current yield of 2.90%, a near-term projected yield of 3.40%, and a long-term projected yield of 4.40%. Mr. Hevert's risk premium results are provided in Panel C of Exhibit JRW-13. He reports equity cost rates ranging from 9.97% to 10.33% using this approach.

Q.   WHAT ARE THE ERRORS IN MR. HEVERT'S RISK PREMIUM ANALYSIS?

A.   The two issues are: (1) the near-term and long-term projected 30-Year Treasury yield of 3.40% and 4.40%; and (2) primarily, the excessive risk premium developed based on *authorized* rates of return rather than market data.

1. Projected Near-Term and Long-Term Risk-Free Interest Rate

Q.   PLEASE DISCUSS THE BASE YIELD OF MR. HEVERT'S CAPM/ECAPM ANALYSES.

A.   Mr. Hevert uses projected near-term and long-term risk-free interest rates of 3.40%

and 4.40% in his CAPM. These figures are 50 and 150 basis points above the current yield

on long-term Treasury bonds and therefore are not a realistic expectation of the market.

This is excessive for two reasons. First, as discussed previously, economists are always

predicting that interest rates are going up, and yet they are almost always wrong. Obviously,

investors are well aware of the consistently wrong forecasts of higher interest rates, and

therefore place little weight on such forecasts. Second, investors would not be buying long-

term Treasury bonds at their current yields if they expected interest rates to suddenly increase.

If interest rates do increase, the prices of the bonds investors bought at today's yields go down,

producing a negative return.

2. Risk Premium

Q.   WHAT ARE THE ISSUES WITH MR. HEVERT'S RISK PREMIUM?

A.   There are several problems with this approach. The methodology produces an

inflated measure of the risk premium because the approach uses historic authorized ROEs

and Treasury yields, and the resulting risk premium is applied to projected Treasury Yields.

Since Treasury yields are always forecasted to increase, the resulting risk premium would

be smaller if done correctly, which would be to use projected Treasury yields in the analysis

rather than historic Treasury yields.

In addition, Mr. Hevert's RP approach is a gauge of *commission* behavior and not

investor behavior. Capital costs are determined in the market place through the financial

decisions of investors and are reflected in such fundamental factors as dividend yields,

expected growth rates, interest rates, and investors' assessment of the risk and expected

return of different investments. On this issue, the North Carolina Supreme Court has

explicitly noted that reliance on past ROE determinations authorized for other utilities in

other states, without evidence tying those determinations to the facts of the current case, is

unlawful, and prevents the Commission from fairly considering current economic

conditions.[40] Regulatory commissions evaluate capital market data in setting authorized

ROEs, but also take into account other utility- and rate case-specific information in setting

ROEs. As such, Mr. Hevert's approach and results reflect other factors such as capital

structure, credit ratings and other risk measures, service territory, capital expenditures,

energy supply issues, rate design, investment and expense trackers, and other factors used

by utility commissions in determining an appropriate ROE in addition to capital costs. This

may especially be true when the authorized ROE data includes the results of rate cases that

are settled and not fully litigated.

Finally, Mr. Hevert's methodology produces an inflated required rate of return

since utilities have been selling at market-to-book ratios in excess of 1.0 for many years.

This indicates that the authorized rates of return have been greater than the return that

investors require. The relationship between ROE, the equity cost rate, and market-to-book

ratios was explained earlier in this testimony. In short, a market-to-book ratio above 1.0

indicates a company's ROE is above its equity cost rate. Therefore, the risk premium

produced from the study is overstated as a measure of investor return requirements and

produced an inflated equity cost rate.

---

[40] State ex rel. Utilities Comm'n v. Cooper, 367 N.C. at 443, 758 S.E.2d at 643; State ex rel. Utilities Comm'n v. Public Staff, 331 N.C. 215, 225, 415 S.E.2d 354, 361 (1992).

D.   DUKE CAROLINAS' RELATIVE BUSINESS RISK

Q.   PLEASE DISCUSS MR. HEVERT'S ASSESSMENT OF HIS EQUITY COST RATE RESULTS AND THE RELATIVE BUSINESS RISKS OF THE COMPANY.

A.   Mr. Hevert claims that his mean equity cost rate results are not appropriate for Duke Carolinas because of the Company's higher level of business risks relative to his peer group. He notes that these business risks include: (1) environmental regulations (2) the Company's coal and nuclear generation portfolio; (3) North Carolina's renewable energy and energy efficiency standards; and (4) the Company's planned capital investment program.

Q.   DO YOU AGREE WITH HIS ASSESSMENT OF THE RISKINESS OF DUKE CAROLINAS RELATIVE TO THE PROXY OTHER ELECTRIC UTILITIES?

A.   No. I use credit ratings to assess the riskiness of Duke Carolinas relative to the two proxy groups. That is what the ratings are for. Credit rating agencies consider business risks such as a utility's generation portfolio, environmental regulations, capital expenditures, customers, and cost recovery programs in the credit rating process. As previously noted, Duke Carolinas' S&P issuer credit rating of A- is one notch better than the average of the two proxy groups which is BBB+ and Carolinas' Moody's issuer credit rating of A1 is three notches better than the average of the two proxy groups which is Baa1. Therefore, Duke Carolinas is less risky than the proxy groups. Therefore, Mr. Hevert's

claim that the Company is riskier than his proxy group is erroneous and hence he should not ignore his mean ROE results.

E.   Flotation Costs

Q.   PLEASE DISCUSS MR. HEVERT'S CONSIDERATION OF FLOTATION COSTS IN RECOMMENDING A ROE FOR THE COMPANY.

A.   Mr. Hevert's proposed ROE of 10.75% includes the consideration of equity flotation costs. There are several errors in considering flotation costs in this case.

First and foremost, Mr. Hevert has not identified any specific prospective equity issues by the Company or by Duke Carolinas' parent company, Duke Energy ("DUK"). Therefore, Duke Carolinas is asking for recovery of flotation costs in the form of a higher annual revenues and ROE without identifying any costs that need to be recovered.

Beyond this issue, it is commonly argued that a flotation cost adjustment (such as that used by the Company) is necessary to prevent the dilution of the existing shareholders. However, this is incorrect for several reasons:

(1)   If an equity flotation cost adjustment is similar to a debt flotation cost adjustment, the fact that the market-to-book ratios for electric utility companies are over 1.5X actually suggests that there should be a flotation cost *reduction* (and not an increase) to the equity cost rate. This is because when (a) a bond is issued at a price in excess of face or book value, and (b) the difference between its market price and the book value is greater than the flotation or issuance costs, the cost of that debt is lower than the coupon rate of the debt. The amount by which market values of electric utility companies are in excess of book values is much greater than flotation costs. Hence, if common stock flotation costs

were exactly like bond flotation costs, and one was making an explicit flotation cost adjustment to the cost of common equity, the adjustment would be downward;

(2) If a flotation cost adjustment is needed to prevent dilution of existing stockholders' investment, then the reduction of the book value of stockholder investment associated with flotation costs can occur only when a company's stock is selling at a market price at or below its book value. As noted above, electric utility companies are selling at market prices well in excess of book value. Hence, when new shares are sold, existing shareholders realize an increase in the book value per share of their investment, not a decrease;

(3) Flotation costs consist primarily of the underwriting spread (or fee) rather than out-of-pocket expenses. On a per-share basis, the underwriting spread is the difference between the price the investment banker receives from investors and the price the investment banker pays to the company. Therefore, these are not expenses that must be recovered through the regulatory process. Furthermore, the underwriting spread is known to the investors who are buying the new issue of stock, and who are well aware of the difference between the price they are paying to buy the stock and the price that the company is receiving. The offering price which they pay is what matters when investors decide to buy a stock based on its expected return and risk prospects. Therefore, the Company is not entitled to an adjustment to the allowed return to account for those costs; and

(4) Flotation costs, in the form of the underwriting spread, are a form of a transaction cost in the market. They represent the difference between the price paid by investors and the amount received by the issuing company. Whereas Duke Carolinas

believes that it should be compensated for these transaction costs, it has not accounted for *other* market transaction costs in determining its cost of equity. Most notably, brokerage fees that investors pay when they buy shares in the open market are another market transaction cost. Brokerage fees increase the effective stock price paid by investors to buy shares. If the Company had included these brokerage fees or transaction costs in its DCF analysis, the higher effective stock prices paid for stocks would lead to lower dividend yields and equity cost rates. This would result in a downward adjustment to their DCF equity cost rate.

F.   Economic Conditions in North Carolina

Q.   **PLEASE DISCUSS MR. HEVERT'S CONSIDERATION OF ECONOMIC CONDITIONS IN NORTH CAROLINA.**

A.   Mr. Hevert has acknowledged that the North Carolina Commission must balance the interests of investors and customers in setting the Return on Equity. In addition, Mr. Hevert notes that the Commission's task is to set rates as low as possible consistent with the dictates of the United States and North Carolina Constitutions."[41] On this issue, the ROE should be the minimum amount needed to meet the *Hope* and *Bluefield* standards. Finally, Mr. Hevert also highlights that the Supreme Court also has indicated that "in retail electric service rate cases the Commission must make findings of fact regarding the impact of changing economic conditions on customers when determining the proper ROE for a

---

[41] State of North Carolina Utilities Commission, Docket No. E-7, Sub 1026, Order Granting General Rate Increase, Sept. 24, 2013 at 24; see also DEC Remand Order at 40 ("the Commission in every case seeks to comply with the North Carolina Supreme Court's mandate that the Commission establish rates as low as possible within Constitutional limits.").

DIRECT TESTIMONY OF DR. J. RANDALL WOOLRIDGE   DOCKET NO. E-7 SUB 1146
EXPERT WITNESS FOR THE ATTORNEY GENERAL'S OFFICE   P a g e 74 |

public utility."[42]

With respect to this latter mandate, Mr. Hevert evaluates a number of factors such as employment and income levels and comes to the following conclusion:[43]

> Economic conditions in North Carolina continue to improve from the recession following the 2008/2009 financial crisis, and they continue to be strongly correlated to conditions in the U.S., generally. In particular, unemployment, at both the State and county level, continues to fall and remains highly correlated with national rates of unemployment; real Gross Domestic Product recently has grown faster in North Carolina than the national rate of growth, although the two remain fairly well correlated; and median household income also has grown faster in North Carolina than the rest of the Country, and remains strongly correlated with national levels. On balance, the correlations between State-wide measures of economic conditions noted by the Commission in Docket No. E-22, Sub 479 remain in place and as such, they continue to be reflected in the models and data used to estimate the Cost of Equity.

Q.   DO YOU AGREE WITH MR. HEVERT'S ASSESSMENT OF ECONOMIC CONDITIONS IN NORTH CAROLINA?

A.   As highlighted by the correlations between U.S. and North Carolina economic data, I agree with Mr. Hevert that economic conditions have improved with the overall economy over the past decade.

Q.   DO YOU AGREE WITH MR. HEVERT'S CONCLUSION THAT THE IMPROVEMENT IN ECONOMIC CONDITIONS IN NOPRTH CAROLINA JUSTIFY THE COMPANY'S PROPOSED RATE OF RETURN INCLUDING A 10.75% ROE?

---

[42] State of North Carolina ex rel. Utilities Commission v. Cooper, 758 S.E.2d 635, 642 (2014) ("Cooper II").
[43] Hevert Testimony, pp. 62-3.

A.   No. Whereas economic conditions have improved in North Carolina, it does not justify such a high rate of return and ROE. As Mr. Hevert notes, median household income in North Carolina is more than 10% below the U.S. norm. As a result, affordability can be an issue. And Duke Carolinas overall rate of return request has a major impact on its overall requested increase in revenues.

Q.   HOW MUCH OF AN IMPACT DOES THE COMPANY'S RATE OF RETURN REQUEST HAVE ON THE COMPANY'S OVERALL INCREASE IN REVENUES.

A.   Page 1 of Exhibit JRW-15 provides a summary of Duke Carolinas' overall rate of return and revenue. This comes from page 2 of Ms. McManeus' Exhibit 1 and shows the Company's overall revenues increase of $612,647,000 from retail operations. Page 2 of Exhibit JRW-15 provides Duke Carolinas' revenues increase using the AG's proposed 50%/50% debt-equity capital structure and its base 8.40% ROE. This shows an overall revenue increase of $313,923,000. The difference is about a 100% higher request from the Company, and amounts to about $300,000,000 per year in higher annual revenues. Such a huge increase is not necessary. As I discussed earlier in my testimony, a 50%/50% debt-equity capital structure and an 8.40% ROE is more than adequate to meet *Hope* and *Bluefield* standards with respect to comparable returns, financial integrity and ability to attract capital.

Q   DOES THIS CONCLUDE YOUR TESTIMONY?

A.   Yes, it does.

Appendix A

Educational Background, Research, and Related Business Experience
J. Randall Woolridge

J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State University in University Park, PA. In addition, Professor Woolridge is Director of the Smeal College Trading Room and President and CEO of the Nittany Lion Fund, LLC.

Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina, a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. He has taught Finance courses including corporation finance, commercial and investment banking, and investments at the undergraduate, graduate, and executive MBA levels.

Professor Woolridge's research has centered on empirical issues in corporation finance and financial markets. He has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business Review.* His research has been cited extensively in the business press. His work has been featured in the *New York Times, Forbes, Fortune, The Economist, Barron's, Wall Street Journal, Business Week, Investors' Business Daily, USA Today,* and other publications. In addition, Dr. Woolridge has appeared as a guest to discuss the implications of his research on CNN's *Money Line,* CNBC's *Morning Call* and *Business Today,* and Bloomberg's *Morning Call.*

Professor Woolridge's stock valuation book, *The StreetSmart Guide to Valuing a Stock* (McGraw-Hill, 2003), was released in its second edition. He has also co-authored *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation, 1999) as well as a textbook entitled *Basic Principles of Finance* (Kendall Hunt, 2011).

Professor Woolridge has also consulted with corporations, financial institutions, and government agencies. In addition, he has directed and participated in university- and company- sponsored professional development programs for executives in 25 countries in North and South America, Europe, Asia, and Africa.

Over the past twenty-five years Dr. Woolridge has prepared testimony and/or provided consultation services in regulatory rate cases in the rate of return area in following states: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Washington, D.C. He has also testified before the Federal Energy Regulatory Commission.

J. Randall Woolridge

Office Address
302 Business Building
The Pennsylvania State University
University Park, PA 16802
814-865-1160

Home Address
120 Haymaker Circle
State College, PA 16801
814-238-9428

Academic Experience

Professor of Finance, the Smeal College of Business Administration, the Pennsylvania State University (July 1, 1990 to the present).
> **President, Nittany Lion Fund LLC**, (January 1, 2005 to the present)
> **Director, the Smeal College Trading Room** (January 1, 2001 to the present)
> **Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration** (July 1, 1987 to the present).

Associate Professor of Finance, College of Business Administration, the Pennsylvania State University (July 1, 1984 to June 30, 1990).

Assistant Professor of Finance, College of Business Administration, the Pennsylvania State University (September, 1979 to June 30, 1984).

Education

Doctor of Philosophy in Business Administration, the University of Iowa. Major field: Finance.

Master of Business Administration, the Pennsylvania State University.

Bachelor of Arts, the University of North Carolina Major field: Economics.

Books

James A. Miles and J. Randall Woolridge, *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation), 1999
Patrick Cusatis, Gary Gray, and J. Randall Woolridge, *The StreetSmart Guide to Valuing a Stock* (2nd Edition, McGraw-Hill), 2003.
J. Randall Woolridge and Gary Gray, *The New Corporate Finance, Capital Markets, and Valuation: An Introductory Text* (Kendall Hunt, 2003).

Research

Dr. Woolridge has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business Review*.

APPENDIX B

CAPITAL COSTS IN TODAY'S MARKETS

Historic Interest Rates and Capital Costs

Long-term capital cost rates for U.S. corporations are a function of the required returns on risk-free securities plus a risk premium. The risk-free rate of interest is the yield on long-term U.S. Treasury bonds. The yields on 10-year U.S. Treasury bonds from 1953 to the present are provided on Panel A of Exhibit JRW-2. These yields peaked in the early 1980s and have generally declined since that time. These yields fell to below 3.0% in 2008 as a result of the financial crisis. In 2012, the yields on 10-year Treasuries declined from 2.5% to 1.5% as the Federal Reserve initiated the third stage of its quantitative easing program ("QE III") to support a low interest rate environment. These yields increased to 3.0% as of December 2013 on speculation of a tapering of the Federal Reserve's QE III policy. The Federal Reserve ended the QE III program in 2015 and increased the federal funds rate in December 2015. Nonetheless, due to slow economic growth and low inflation, the 10-year Treasury yield subsequently declined to 1.5% in 2016. The 10-year Treasury yield has since increased to the 2.50% range, with much of that increase coming in response to the November 8, 2016 U.S. presidential election.

Panel B on Exhibit JRW-2 shows the differences in yields between ten-year Treasuries and

Moody's Baa-rated bonds since the year 2000. This differential primarily reflects the additional risk premium required by bond investors for the risk associated with investing in corporate bonds as opposed to obligations of the U.S. Treasury. The difference also reflects, to some degree, yield curve changes over time. The Baa rating is the lowest of the

investment grade bond ratings for corporate bonds. The yield differential hovered in the 2.0% to 3.5% range until 2005, declined to 1.5% until late 2007, and then increased significantly in response to the financial crisis. This differential peaked at 6.0% at the height of the financial crisis in early 2009 due to tightening in credit markets, which increased corporate bond yields, and the "flight to quality," which decreased Treasury yields. The differential subsequently declined and bottomed out at 2.4%. The differential has since increased to the 2.80% range.

The risk premium is the return premium required by investors to purchase riskier securities.

The risk premium required by investors to buy corporate bonds is observable based on yield differentials in the markets. The market risk premium is the return premium required to purchase stocks as opposed to bonds. The market or equity risk premium is not readily observable in the markets (like bond risk premiums) because expected stock market returns are not readily observable. As a result, equity risk premiums must be estimated using market data. There are alternative methodologies to estimate the equity risk premium, and these alternative approaches and equity risk premium results are subject to much debate. One way to estimate the equity risk premium is to compare the mean returns on bonds and stocks over long historical periods. Measured in this manner, the equity risk premium has been in the 5% to 7% range.[1] However, studies by leading academics indicate that the forward-looking equity risk premium is actually in the 4.0% to 6.0% range. These lower equity risk premium results are in line with the findings of equity risk premium surveys of CFOs, academics, analysts, companies, and financial forecasters.

---

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

Panel A of Exhibit JRW-3 provides the yields on A-rated public utility bonds. These yields peaked in November 2008 at 7.75% and henceforth declined significantly. These yields dropped below 4.0% on three occasions - in mid-2013, in the first quarter of 2015, and then again in the summer of 2016. These yields have increased to the 4.0% range, with much of the increase coming in the wake of the U.S. presidential election.

Panel B of Exhibit JRW-3 provides the yield spreads between long-term A-rated public utility bonds relative to the yields on 20-year U.S. Treasury bonds. These yield spreads increased dramatically in the third quarter of 2008 during the peak of the financial crisis and have decreased significantly since that time. The yield spreads between 20-year U.S. Treasury bonds and A-rated utility bonds peaked at 3.4% in November 2008, then declined to about 1.5% in the summer of 2012 as investor return requirements declined. The differential has gradually increased in recent years, and is now close to 2.0%.

Capital Market Conditions and Outlook for Interest Rates

A company's rate of return is its overall cost of capital. Capital costs, including the cost of debt and equity financing, are established in capital markets and reflect investors' return requirements on alternative investments based on risk and capital market conditions. These capital market conditions are a function of investors' expectations concerning many factors, including economic growth, inflation, government monetary and fiscal policies, and international developments, among others. In the wake of the financial crisis, much of the focus in the capital markets has been on the interaction of economic growth, interest

rates, and the actions of the Federal Reserve (the "Fed"). In addition, capital markets capital costs are impacted by global events.

Regarding interest rates, over the last decade, there have been continual forecasts of higher long-term interest rates. However, these forecasts have proven to be wrong. For example, after the announcement of the end of the QE III program in 2014, all the economists in Bloomberg's interest rate survey forecasted interest rates would increase in 2014, and 100% of the economists were wrong. According to the *Market Watch* article:[2]

> The survey of economists' yield projections is generally
> skewed toward rising rates — only a few times since early
> 2009 have a majority of respondents to the Bloomberg survey
> thought rates would fall. But the unanimity of the rising rate
> forecasts in the spring was a stark reminder of how one-sided
> market views can become. It also teaches us that economists
> can be universally wrong.

Two other financial publications have produced studies on how economists consistently predict higher interest rates, and yet they have been wrong. The first publication, entitled "How Interest Rates Keep Making People on Wall Street Look Like Fools," evaluated economists' forecasts for the yield on ten-year Treasury bonds at the beginning of the year for the last ten years.[3] The results demonstrated that economists consistently predict that interest rates will go higher, and interest rates have not fulfilled those predictions.

---

[2] Ben Eisen, "Yes, 100% of economists were dead wrong about yields, *Market Watch*," October 22, 2014. Perhaps reflecting this fact, *Bloomberg* reported that the Federal Reserve Bank of New York has stopped using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those forecasters' interest rate forecasts. See Susanne Walker and Liz Capo McCormick, "Unstoppable $100 Trillion Bond Market Renders Models Useless," *Bloomberg.com* (June 2, 2014). http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html.
[3] Joe Weisenthal, "How Interest Rates Keep Making People on Wall Street Look Like Fools," Bloomberg.com, March 16, 2015. http://www.bloomberg.com/news/articles/2015-03-16/how-interest-rates-keep-making-people-on-wall-street-look-like-fools.

The second study tracked economists' forecasts for the yield on ten-year Treasury bonds on an ongoing basis from 2010 until 2015.[4] The results of this study, which was entitled "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," are shown in Figure 1 and demonstrate how economists continually forecast that interest rates are going up, yet they do not. Indeed, as Bloomberg has reported, economists' continued failure in forecasting increasing interest rates has caused the Federal Reserve Bank of New York to stop using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those forecasters' interest rate forecasts.[5]

Figure 1

Economists' Forecasts of the Ten-Year Treasury Yield

2010-2015
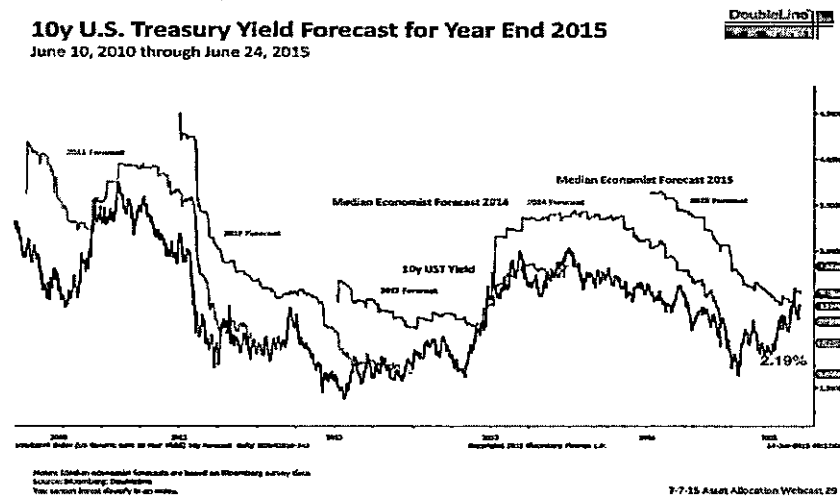
Source: Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business Insider*, July 18, 2015. _.

The Federal Reserve's Decision to Increase the Federal Fund Rate

---

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

[5] "*Market Watch*," October 22, 2014.

On December 16, 2015, the Fed decided to increase the target rate for federal funds to

0.25 – 0.50 percent. This increase came after the rate was kept in the 0.0 to 0.25 percent range for

over five years in order to spur economic growth in the wake of the financial crisis. The move occurred almost two years after the end of QE III program, the Federal Reserve's bond buying program. The Federal Reserve has been cautious in its approach to scaling its monetary intervention, and has paid close attention to a number of economic variables, including GDP growth, retail sales, consumer confidence, unemployment, the housing market, and inflation.

Long-term interest rates in the U.S. bottomed out in August 2016 and have increased since that time with improvements in the economy and the outcome of the U.S. Presidential election. Notable improvements include lower unemployment and improving economic growth and corporate earnings. Then came November 8, 2016, and financial markets moved significantly in the wake of the unexpected results in the U.S. presidential election. The stock market gained more than 15% and the 30-year Treasury yield increased more than 50 basis points to about 3.2%. These market adjustments reflected the expectation that the new administration will make changes in fiscal, regulatory, and possibly monetary policies which could lead to higher economic growth and inflation. Partly due to these developments, the Federal Reserve's decision at its December 13-14, 2016, meeting to raise its federal funds target rate to 0.50 - .075 percent was broadly expected and there was no significant market reaction.

The Federal Reserve again increased the federal funds rate target rate range to

0.75 – 1.00

percent at its March 13-14, 2017 meetings. And the yield on 30-year Treasury yields

declined! Subsequently, on June 14, 2017 and December 19, 2017, the Federal Reserve

again increased the federal funds rate target rate by 25 basis points. Despite these increases,

the 30-year Treasury yield has not increased and has remained below 3.0%. Furthermore,

it is expected that the Fed will increase the federal funds rate again on 2018.

Increases in the federal fund rate will not necessarily result in an increase in long-

term interest rates. As the Federal Reserve increased the federal funds rate in March and

June, the yield on 30-year Treasury bonds have drifted downward, to the current level of

about 2.80%. As discussed below, the Federal Reserve does not directly determine long-

term rates. Long-term rates are primarily driven by economic growth and inflation.

The Long-Term Driver's of GDP and Interest Rates

In the long term, the key drivers of economic growth measured in nominal dollars

are

population growth, the advancement and diffusion of science and technology, and currency

inflation. Although the U.S. experienced rapid economic growth during the "post-war"

period (the 63 years that separated the end of World War II and the 2008 financial crisis),

the post-war period is not necessarily reflective of expected future growth. It was marked

by a near-trebling of global population, from under 2.5 billion to approximately 6.7 billion.

Over the next 50 years, according to United Nations projections, the global population will

grow considerably more slowly, reaching approximately 10.3 billion in 2070. With

population growth slowing, life expectancies lengthening, and post-war "baby boomers"

reaching retirement age, median ages in developed-economy nations have risen and

continue to rise. The postwar period was also marked by rapid catch-up growth as Europe,

Japan, and China recovered from successive devastations and as regions such as India and

China deployed and leapfrogged technologies that had been developed over a much longer

period in earlier-industrialized nations. That period of rapid catch-up growth is coming to

an end. For example, although China remains one of the world's fastest-growing regions,

its growth is now widely expected to slow substantially. This convergence of projected

growth in the former "second world" and "third world" towards the slower growth of the

nations that have long been considered "first world" is illustrated in this "key findings"

chart published by the Organization for Economic Co-operation and Development.

Figure 2

Projected Global Growth[6]

Global growth will slow from 3.6% in 2010-2020 to 2.4% in
2050-2060 and will be increasingly driven by innovation and
investment in skills.

Global economic growth will slow
% average annual rate
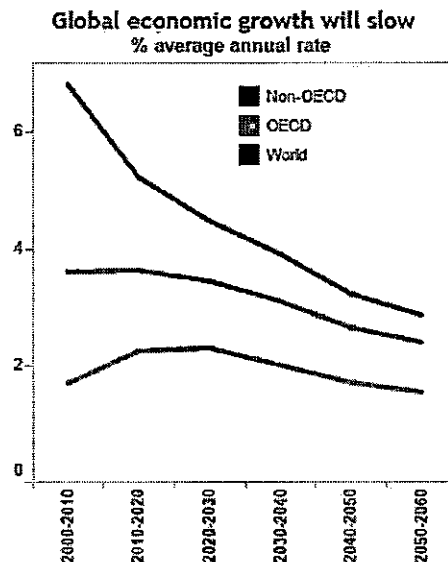
As to dollar inflation, it has declined to far below the level it reached in the 1970s. The
Federal Reserve targets a 2% inflation rate; however, actual inflation has been below this
figure. Indeed, inflation has been below the Fed's target rate for over five years due to a
number of factors, including slow global economic growth, slack in the economy, and
declining energy and commodity prices. The slow pace of inflation is also reflected in the
decline in forecasts of future inflation. The Energy Information Administration's annual
Energy Outlook includes in its nominal GDP growth projection a long-term inflation
component, which the EIA projects at only 2.1% per year for its forecast period through
2040.[7]

---

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

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

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

Figure 3

Global Wealth – 2000-2014

Total global wealth 2000–2014, by region

Source: James Davies, Rodrigo Lluberas and Anthony Shorrocks, Credit Suisse Global Wealth Databook 2014
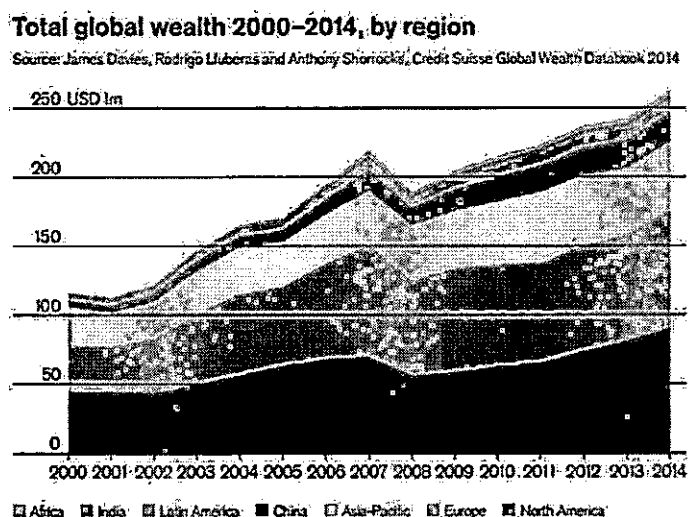
These long-term trends mean that overall, and relative to what had been the post-war norm, the world now has more wealth chasing fewer opportunities for investment rewards. Ben Bernanke, the former Chairman of the Federal Reserve, called this phenomenon a "global savings glut."[8] Like any other liquid market, capital markets are subject to the law of supply and demand. With a large supply of capital available for

---

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

investment and relatively scarce demand for investment capital, it should be no surprise to see the cost of investment capital decline, keeping interest rates low.

Former Federal Reserve Chairman Benjamin Bernanke addressed the issue of the continuing low interest rates in his weekly Brookings Blog. He indicated that the focus should be on real and not nominal interest rates and noted that, in the long term, these rates are *not* determined by the Federal Reserve:[9]

> If you asked the person in the street, "Why are interest rates so low?," he or she would likely answer that the Fed is keeping them low. That's true only in a very narrow sense. The Fed does, of course, set the benchmark nominal short-term interest rate. The Fed's policies are also the primary determinant of inflation and inflation expectations over the longer term, and inflation trends affect interest rates, as the figure above shows. But what matters most for the economy is the real, or inflation-adjusted, interest rate (the market, or nominal, interest rate minus the inflation rate). The real interest rate is most relevant for capital investment decisions, for example. The Fed's ability to affect real rates of return, especially longer-term real rates, is transitory and limited. Except in the short run, real interest rates are determined by a wide range of economic factors, including prospects for economic growth—not by the Fed.

Mr. Bernanke also addressed the issue about whether low-interest rates are a short-term aberration or a long-term trend:[10]

> Low interest rates are not a short-term aberration, but part of a long-term trend. As the figure below shows, ten-year government bond yields in the United States were relatively low in the 1960s, rose to a peak above 15 percent in 1981, and have been declining ever since. That pattern is partly explained by the rise and fall of inflation, also shown in the figure. All else equal, investors demand higher yields when inflation is high to compensate them for the declining purchasing power of the dollars with which they expect to be repaid. But yields on inflation-protected bonds are also very low today; the real or

---

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

inflation-adjusted return on lending to the U.S. government for
five years is currently about minus 0.1 percent.

Figure 4
Interest Rates and Inflation
1960-2015
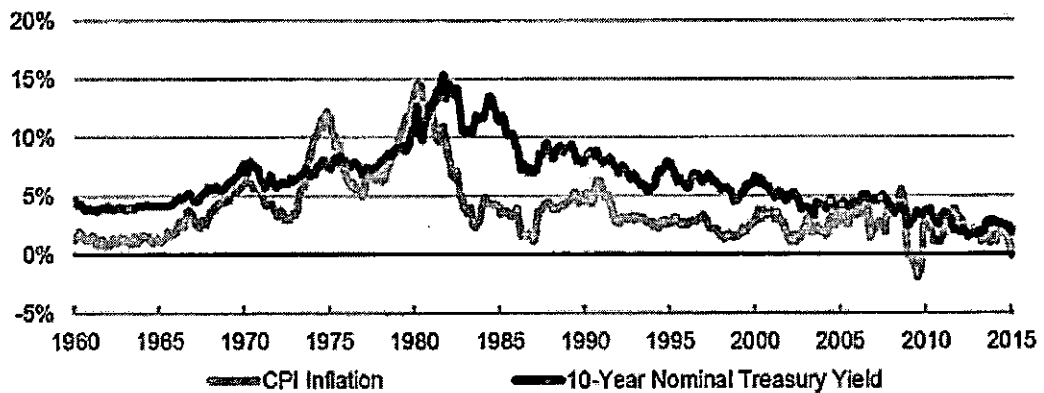
Source: Federal Reserve Board, BLS.   BROOKINGS

As far as the future outlook for interest rates and capital costs, first, the U.S.

economy has

been growing for over seven years, and, as noted above, the Federal Reserve sees

continuing strength in the economy. The labor market has improved, with unemployment

now below 5.0%, and the stock market is near an all-time high.

Second, interest rates remain at relatively low levels and are likely to remain low.

There are two factors driving the continued lower interest rates: (1) inflationary

expectations in the U.S. which remain low; and (2) global economic growth – including

Europe, where growth is slow, and China, where growth has declined significantly. As a

result, while the yields on long-term U.S. Treasury bonds are low by historical standards,

these yields are well above the government bond yields in Germany, Japan, and the United

Kingdom. Thus, U.S. Treasuries offer an attractive yield relative to those of other major

governments around the world, thereby attracting capital to the U.S. and keeping U.S.

interest rates down.

As the above studies indicate, economists are always predicting that interest rates are

going up, and yet they are almost always wrong. Obviously, investors are well aware of the

consistently wrong forecasts of higher interest rates, and therefore place little weight on such

forecasts. Moreover, investors would not be buying long-term Treasury bonds or utility

stocks at their current yields if they expected interest rates to suddenly increase, thereby

producing higher yields and negative returns. For example, consider a utility that pays a

dividend of $2.00 with a stock price of $50.00. The current dividend yield is 4.0%. If higher

return requirements led the dividend yield to increase from 4.0% to 5.0% in the next year, the

stock price would have to decline to $40, which would be a negative 20% return on the

stock.[11] Obviously, investors would not buy the utility stock with an expected return of

negative 20% due to higher dividend yield requirements.

In sum, it appears to be impossible to accurately forecast prices and rates that are

determined

in the financial markets, such as interest rates, the stock market, and gold prices. For interest

rates, I have never seen a study that suggests one forecasting service is consistently better than

others or that interest rate forecasts are consistently better than just assuming that the current

interest rate will be the rate in the future. Investors would not be buying long-term Treasury

---

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

bonds or utility stocks at their current yields if they expected interest rates to suddenly

increase, thereby producing higher yields and negative returns.

APPENDIX C

THE COST OF COMMON EQUITY CAPITAL

Determining the Costs of Capital or Fair Rate of Return for Public Utilities

In a competitive industry, the return on a firm's common equity capital is determined through the competitive market for its goods and services. Due to the capital requirements needed to provide utility services and the economic benefit to society from avoiding duplication of these services, some public utilities are monopolies. Because of the lack of competition and the essential nature of their services, it is not appropriate to permit monopoly utilities to set their own prices. Thus, regulation seeks to establish prices that are fair to consumers and, at the same time, sufficient to meet the operating and capital costs of the utility (i.e., provide an adequate return on capital to attract investors).

The total cost of operating a business includes the cost of capital. The cost of common equity capital is the expected return on a firm's common stock that the marginal investor would deem sufficient to compensate for risk and the time value of money. In equilibrium, the expected and required rates of return on a company's common stock are equal.

Normative economic models of a company or firm, developed under very restrictive assumptions, provide insight into the relationship between firm performance or profitability, capital costs, and the value of the firm. Under the economist's ideal model of perfect competition, where entry and exit are costless, products are undifferentiated, and there are increasing marginal costs of production, firms produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is established where price equals

average cost, including the firm's capital costs. In equilibrium, total revenues equal total costs, and because capital costs represent investors' required return on the firm's capital, actual returns equal required returns, and the market value must equal the book value of the firm's securities.

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

James M. McTaggart, founder of the international management consulting firm Marakon Associates, described this essential relationship between the return on equity, the cost of equity, and the market-to-book ratio in the following manner:[1]

> Fundamentally, the value of a company is determined by the cash flow it generates over time for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of equity capital" is used to discount the expected equity cash flow, converting it to a present value. The cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg, are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as Texas Instruments, barely generate enough cash flow to finance growth.
>
> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book

---

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

value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable and its market value will be less than book value.

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

This relationship between ROE and market-to-book ratios is discussed in a classic Harvard Business School case study entitled "Note on Value Drivers." On page 2 of that case study, the author describes the relationship very succinctly:[2]

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

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

To assess the relationship by industry, as suggested above, I performed a regression study between estimated ROE and market-to-book ratios using natural gas distribution, electric utility, and water utility companies. I used all companies in these three industries that are

---

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

covered by *Value Line* and have estimated ROE and market-to-book ratio data. The results are presented in Panels A-C of Exhibit JRW-6. The average R-squares for the electric, gas, and water companies are 0.78, 0.63, and 0.49, respectively.[3] This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities.

Economic Factors, Investor Expectations, and Investment Risk

Certain economic factors have affected the cost of equity captial for public utilities. Exhibit JRW-7 provides indicators of public utility equity cost rates over the past decade.

Page 1 shows the yields on long-term A-rated public utility bonds. These yields decreased from 2000 until 2003, and then hovered in the 5.50%-6.50% range from mid-2003 until mid-2008. These yields peaked in November 2008 at 7.75% during the Great Recession. Henceforth, these yields have generally declined since then, dropping below 4.0% on three occasions - in mid-2013, in the first quarter of 2015, and then again in the summer of 2016. These yields have increased to about 4.25% in the year, with much of the increase coming in the wake of the November 2016 U.S. presidential election.

Page 2 Exhibit JRW-7 provides the dividend yields for electric utilities over the past 16years. The dividend yields for this electric group have declined from the year 2000 to 2007, increased to 5.2% in 2009, and have declined steadily since that time. The average dividend yield was 3.40% in 2016. Average earned returns on common equity and market-to-book ratios for electric utilities are on page 3 of Exhibit JRW-7. For the electric group, earned returns on common equity have declined gradually since the year 2000 and have

---

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

been in the 9.0% range in recent years. The average market-to-book ratios for this group

peaked at 1.68X in 2007, declined to 1.07X in 2009, and have increased since that time.

As of 2016, the average market-to-book for the group was 1.75X. This means that, for at

least the last decade, returns on common equity have been greater than the cost of capital,

or more than necessary to meet investors' required returns. This also means that customers

have been paying more than necessary to support an appropriate profit level for regulated

utilities.

Regarding investors' expectations, the expected or required rate of return on

common stock

is a function of market-wide as well as company-specific factors. The most important

market

factor is the time value of money as indicated by the level of interest rates in the economy.

Common stock investor requirements generally increase and decrease with like changes in

interest rates. The perceived risk of a firm is the predominant factor that influences investor

return requirements on a company-specific basis. A firm's investment risk is often

separated into business and financial risk. Business risk encompasses all factors that affect

a firm's operating revenues and expenses. Financial risk results from incurring fixed

obligations in the form of debt in financing its assets.

Due to the essential nature of their service as well as their regulated status, public

utilities

are exposed to a lesser degree of business risk than other, non-regulated businesses. The

relatively low level of business risk allows public utilities to meet much of their capital

requirements through borrowing in the financial markets, thereby incurring greater than

average financial risk. Nonetheless, the overall investment risk of public utilities is below most other industries.

Exhibit JRW-8 provides an assessment of investment risk for 97 industries as measured by beta, which according to modern capital market theory, is the only relevant measure of investment risk. These betas come from the *Value Line Investment Survey.* The study shows that the investment risk of utilities is very low. The average betas for electric, water, and gas utility companies are 0.74, 0.74, and 0.80, respectively. As such, the cost of equity for utilities is among the lowest of all industries in the U.S.

The Cost of Common Equity Capital and Determining the Required Rate of Return

The costs of debt and preferred stock are normally based on historical or book values and

can be determined with a great degree of accuracy. The cost of common equity capital, however, cannot be determined precisely and must instead be estimated from market data and informed judgment. This return to the stockholder should be commensurate with returns on investments in other enterprises having comparable risks.

According to valuation principles, the present value of an asset equals the discounted value of its expected future cash flows. Investors discount these expected cash flows at their required rate of return that, as noted above, reflects the time value of money and the perceived riskiness of the expected future cash flows. As such, the cost of common equity is the rate at which investors discount expected cash flows associated with common stock ownership.

Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic assumptions. Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common equity capital, in determining the data inputs for these models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved as well as current conditions in the economy and the financial markets.

FILED

MAR 0 9 2018

0195

Clerk's Office
Utilities Commission

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-7 SUB 1146

In the Matter of	)
	)**SUPPLEMENTAL TESTIMONY OF**
Application of Duke Energy Carolinas, LLC	)**J. RANDALL WOOLRIDGE, PH.D.**
For Adjustment of Rates and Charges Applicable	) **EXPERT WITNESS FOR THE**
to Electric Service in North Carolina	) **ATTORNEY GENERAL'S**
	) **OFFICE**

EXPERT WITNESS FOR

NORTH CAROLINA ATTORNEY GENERAL'S OFFICE

DOCKET NO. E-7 SUB 1146

MARCH 9, 2018

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

2   A.   My name is J. Randall Woolridge, and my business address is 120 Haymaker

3   Circle, State College, PA 16801. I have previously provided testimony for the North

4   Carolina Attorney General's Office ("AGO") regarding the overall fair rate of return or

5   cost of capital recommendation for Duke Energy Carolinas, LLC ("DEC," "Duke

6   Carolinas" or "Company").

7

8   **Q.   WHAT IS THE PURPOSE OF YOUR SUPPLEMENTAL TESTIMONY?**

9   A.   I am covering three issues in my Supplemental Testimony. First, I am providing a

10   summary of my direct testimony filed on January 21, 2017. Second, due to changes in capital

11   market conditions since that time, I am updating my return on equity ("ROE") and overall

12   cost of capital recommendation for the Company. And third, I am responding to the

13   Settlement Testimony of Mr. Hevert and Staff Witness David Parcell. This includes an

14   assessment of the revenue impact of the rate of return in the settlement position versus my

15   position.

16

17   **I.   REVIEW OF INITIAL TESTIMONY**

18

19   **Q.   PLEASE REVIEW YOUR INITIAL TESTIMONY.**

20   A.   In my initial testimony, I provided a capital structure, cost of equity, and overall cost

21   of capital for the Company. I have adjusted the Company's proposed capital structure and

22   used a common equity ratio of 50.0%. This common equity ratio is more in line with the

23   capital structures of the utilities in the proxy groups as well as Duke Carolinas' parent,

1   Duke Energy.   To estimate an equity cost rate for the Company, I have applied the

2   Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM") to

3   my proxy group of electric utilities ("Electric Proxy Group"). I have also used Mr. Hevert's

4   proxy group ("Hevert Proxy Group"). My recommendation (based on the current market

5   information at the time that my initial testimony was filed) was that

6   (a) the appropriate ROE for the Company is 8.40%, at the upper end of my equity

7   cost rate range of 7.9% to 8.40%; and

8   (b) using the Company's proposed debt cost rate and capital structure, this provides

9   an overall rate of return of 6.70% from investor-supplied capital.

10   I explained that my ROE recommendation was appropriate for the Company for several

11   reasons: (1) interest rates and capital costs remain at historically low levels, despite forecast

12   for many years of higher interest rates; this is due to the low levels of economic growth

13   and inflation; (2) the electric utility industry is the lowest risk industry as measured by

14   *Value Line* betas; (3) the Company's investment risk, as indicated by the Company's S&P

15   and Moody's, is lower than the risk profile of the two proxy groups; and (4) authorized

16   ROEs for electric utilities have continued to decline with the low interest rate environment.

17   I also indicated that my recommendation meets *Hope* and *Bluefield* standard. On this issue,

18   I noted that electric utilities, as indicated by the proxy groups, have been earning ROEs of

19   about 9.0% in recent years. Given this level of return, the credit ratings of utility companies

20   are going up and as indicated by Moody's, lower authorized ROEs have not impaired the

21   credit quality of utilities and, in fact, utilities have been raising about $50 billion a year in

22   capital.

1   Mr. Hevert has recommended an ROE of 10.75%. He has employed the DCF and

2   the CAPM approaches as well as a Bond Yield Plus Risk Premium ("BYRP") approach.

3   In my initial testimony, I identified a number of errors in Mr. Hevert's ROE analyses. First,

4   he gives very little (if any) weight to his constant-growth DCF results. In his DCF analysis,

5   he also relies excessively on overly optimistic and upwardly biased EPS growth rate

6   forecasts of Wall Street analysts. Second, Mr. Hevert's testimony is based on the

7   assumption of higher interest rates and capital costs. Mr. Hevert employs inflated projected

8   interest rates and market or equity premiums in his BYRP and CAPM approaches.

9

10   **II.   UPDATED RATE OF RETURN RECOMMENDATION**

11

12   **Q.   WHY   ARE   YOU   UPDATING   YOUR   RATE   OF   RETURN**

13   **RECOMMENDATION?**

14   A.   Since the time that I collected data and prepared my testimony in this proceeding,

15   several developments have resulted in an increase in capital costs in the U.S. These factors

16   include: (1) a recognition of the effects of the Tax Cut and Jobs Act ("TCJA") of 2017 on

17   public utilities, including concerns expressed by credit rating agencies of the potential cash

18   flow impacts of lower tax rates and the loss of bonus depreciation; (2) an increased concern

19   over inflation, which has led to greater market volatility; and (3) an increase in interest rates

20   as well as a decline in public utility stock prices. The 30-year Treasury yield has increased

21   about 40 basis points, from the 2.80% range to the 3.20% range. Utility stock prices, as

22   measured by the Dow Jones Utilities Average, have declined from the 750 range to the 675

23   range, or about 10%.

1 Q. HOW ARE YOU UPDATING YOUR RATE OF RETURN

2 RECOMMENDATION?

3 A. I am updating my DCF study using more recent stock price, dividend, and growth rate

4 data. The DCF model results reflect the updated environment, as equity investors – who are

5 well aware of the recent tax law and interest rate changes – react to the current economic and

6 market developments. Their return requirements are reflected in stock prices. These results

7 are provided in Appendix A of this testimony. I have not updated my CAPM study, since I

8 have used a normalized 30-year Treasury yield of 4.0%, which is about 80 basis points above

9 the current 30-year Treasury yield of 3.20%.[1] My updated ROE recommendation reflecting

10 the recent market developments is 8.75%.

11

12 Q. WHAT IS YOUR UPDATED RATE OF RETURN RECOMMENDATION?

13 A. I have used the Company's updated debt cost rate of 4.59% and my updated equity

14 cost rate of 8.75%. My updated rate of return recommendation of 6.67% is provided in

15 Supplemental Exhibit JRW-1.

16

17   III.   **RESPONSE TO SETTLEMENT TESTIMONY**

18

19 Q. WHAT RATE OF RETURN HAVE THE PARTIES AGREED TO IN THE

20 SETTLEMENT?

21 A. The settling parties have agreed to a 48% long-term debt and 52% common equity

22 capital structure and a 9.9% ROE for DEC.

---

[1] This is discussed at pages 38-9 of my initial testimony.

1 Q.   HAS MR. HEVERT PROVIDED TESTIMONY IN SUPPORT OF THE

2 SETTLEMENT RATE OF RETURN?

3 A.   Yes. In his rebuttal and settlement testimonies, Mr. Hevert still supports his initial

4 recommendation of 10.75%. But, in his settlement testimony, he agrees that the 9.9% settled

5 ROE is adequate for DEC.

6

7 Q.   PLEASE RESPOND TO MR. HEVERT'S TESTIMONY IN SUPPORT OF

8 HIS ROE POSITION AND THE SETTLEMENT.

9 A.   Mr. Hevert's updated ROE results are provided in Table 11 of page 207 of his rebuttal

10 testimony. Of the thirty-eight DCF, CAPM, and risk premium equity cost rate results

11 presented, only four results support an ROE as high as 10.75%. These four results are all

12 based on his version of the CAPM, using *Value Line* Betas. His CAPM results using

13 Bloomberg betas do not support the 10.75% recommendation. Therefore, his

14 recommendation is supported by only one of his methods, and only using one specific risk

15 input. Furthermore, in accepting the Settlement in the Duke Energy Progress case, the

16 Commission gave no weight to any CAPM results, and noted that Mr. Hevert's CAPM

17 analysis was "upwardly biased and unreliable."[2] With respect to the settlement ROE, only

18 eight of the thirty-eight equity cost rate results are as high as 9.90%.

19

20 Q.   IS   MR.   PARCELL'S   ACCEPTANCE   OF   THE   SETTLEMENT

21 CONSISTENT WITH HIS TESTIMONY IN THIS CASE?

---

[2] Order Accepting Settlement, p. 85.

1   A.   No. Mr. Parcell's equity cost rate results that are described in his direct testimony are

2   not consistent with the 9.9% ROE in the settlement agreement.

3

4   **Q.   PLEASE REVIEW MR. PARCELL'S RECOMMENDATION IN DIRECT**

5   **TESTIMONY.**

6   A.   Mr. Parcell has proposed a capital structure with 50% long-term debt and 50% equity

7   capital structure. A summary of his equity cost rate results is presented in Table 1.

8   **Table 1**
9   **Staff's Summary ROE Results**

Methodology	Range
Discounted Cash Flow ("DCF")	8.4%-9.2% (8.70% mid-point)
Capital Asset Pricing Model ("CAPM")	6.3%-6.7% (6.5% mid-point)
Comparable Earnings ("CE")	9.0%-10.0% (9.50% mid-point)

10

11   **Q.   DO YOU AGREE WITH MR. PARCELL'S CAPITAL STRUCTURE**

12   **RECOMMENDATION?**

13   A.   Yes.

14   **Q.   DO YOU AGREE WITH MR. PARCELL'S ASSESSMENT OF CAPITAL ·**

15   **COSTS AND INTEREST RATES?**

16   A.   Yes. In contrast to the testimony of Mr. Hevert, I agree with Mr. Parcell's position

17   that interest rates and capital costs are at historically low levels and are likely to stay low.

18   However, I do not believe that Mr. Parcell's (1) ROE recommendation or (2) his support for

19   the settlement ROE of 9.9% reflect the low capital cost environment because neither

20   accurately reflect the results of his ROE studies.

1 Q.   DO YOU BELIEVE THAT MR. PARCELL'S SETTLEMENT TESTIMONY

2 AND ROE POSITION ARE CONSISTENT WITH HIS EQUITY COST RATE

3 STUDIES IN THIS CASE?

4 A.   No. In short, Mr. Parcell's three ROE studies suggest a significantly lower ROE for

5 DEC than the Settlement ROE.

6   First, Mr. Parcell reports a DCF range of 8.4% to 9.2% using only the high DCF

7 growth rate for each proxy company. Obviously, using only the high growth rates, as opposed

8 to the mean or median, produce high DCF equity cost rates. The DCF range using the mean

9 growth rates in his study is 7.7% to 7.9%. Therefore, his actual DCF results point to a much

10 lower ROE for DEC than 9.9%.

11   Second, Mr. Parcell's CAPM analysis produces a range of 6.3% to 6.5%, pointing to

12 a much, much lower ROE for DEC.

13   Third, while Mr. Parcell's comparable earnings or CE approach produces higher ROE

14 results at the top end of the range, it is a model of his own creation and interpretation, and

15 unlike the DCF and CAPM models, it is not a recognized approach to estimating the cost of

16 equity capital.

17

18 Q.   AS A FINAL NOTE, PLEASE INDICATE HOW MUCH OF AN IMPACT

19 THE SETTLEMENT CAPITAL STRUCTURE AND ROE HAVE ON THE

20 COMPANY'S OVERALL REVENUES.

21 A.   Page 1 of Settlement Exhibit JRW-3 provides a summary of the settlement overall

22 rate of return and revenue. This comes from page 2 of Ms. McManeus' Exhibit 1 and

23 shows the Company's overall revenues associated with rate of return. This Exhibit is Ms.

1 McManeus' original Exhibit 1, and therefore shows the impact prior to the change in the

2 corporate tax rate. Page 1 of Supplemental Exhibit JRW-3 shows revenues of $524,196,000

3 from retail operations using the settlement capital structure (48% debt/52% equity) and

4 ROE (9.9%). Page 2 of Settlement Exhibit JRW-3 provides DEC's revenues using the

5 AG's proposed 50%/50% debt-equity capital structure and its base 8.65% ROE. This

6 shows overall revenues of $335,964,000. The difference amounts to about $200,000,000

7 per year in higher annual revenues.

8

9 **Q** **DOES THIS CONCLUDE YOUR SUPPLEMENTAL TESTIMONY?**

10 A. Yes, it does.

SUPPLEMENTAL EXHIBIT A

Q. PLEASE DISCUSS YOUR UPDATED DCF STUDY.

A. My updated DCF study is provided in Supplemental Exhibit JRW-2. This is an updated version of Exhibit JRW-10 from my initial testimony. Page 1 of Supplemental Exhibit JRW-2 provides the updated dividend yields, and pages 2, 3, 4, and 5 show the updated historic growth rates, *Value Line*'s projected growth rates, and analysts' projected EPS growth rates, respectively. These updated growth rates for the two proxy groups are summarized on page 6 of Supplemental Exhibit JRW-2.

Q. WHAT DIVIDEND YIELD ARE YOU USING IN YOUR UPDATED DCF STUDY?

A. As in my initial testimony, I have shown the updated mean and median dividend yields using 30-day, 90-day, and 180-day average stock prices. However, so as to reflect the impact of the Tax Cut and Jobs Act ("TCJA"), the increase in interest rates and the decrease in utility stock prices, I am only using the dividend yields using the 30-day average stock prices for the two groups. In pricing utility stocks, investors are well aware of the recent tax law and interest rate changes and take these factors into account in pricing stocks. Investors also take into account the expectations of future interest rates, including expected increases in the federal funds rate by the Federal Reserve. The median dividend yield using 30-day average stock prices is 3.40% for both proxy groups.

Q. PLEASE SUMMARIZE YOUR UPDATED ANALYSIS OF THE HISTORICAL AND PROSPECTIVE GROWTH OF THE TWO PROXY GROUPS.

A.   Page 6 of Supplemental Exhibit JRW-2 shows the update summary DCF growth rate indicators for the proxy groups.

The updated historical growth rate indicators for my Electric Proxy Group imply a baseline growth rate of 4.8%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 4.9%, and *Value Line*'s projected sustainable growth rate is 3.9%. The projected EPS growth rates of Wall Street analysts for the Electric Proxy Group are 5.0% and 5.3% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators (ignoring historical growth) is 3.9% to 5.5%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate is 5.30%. This growth rate figure is in the upper end of the range of historic and projected growth rates for the Electric Proxy Group.

For the Hevert Proxy Group, the historical growth rate indicators indicate a growth rate of 4.9%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 5.3%, and *Value Line*'s projected sustainable growth rate is 4.0%. The projected EPS growth rates of Wall Street analysts are 5.1% and 5.5% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators is 4.0% to 5.5%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate is 5.3% for the Hevert Group. This growth rate figure is in the upper end of the range of historic and projected growth rates for the Hevert Proxy Group.

Q.   **BASED ON THE ABOVE ANALYSIS, WHAT ARE YOUR INDICATED COMMON EQUITY COST RATES FROM THE DCF MODEL FOR THE PROXY GROUPS?**

A-2

A. My DCF-derived equity cost rates for the groups are summarized on page 1 of Supplemental Exhibit JRW-2 and in Table 1 below.

Table 1
DCF-Derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Electric Proxy Group	3.40%	1.02650	5.30%	8.80%
Hevert Proxy Group	3.40%	1.02650	5.30%	8.80%

The result for the Electric Proxy Group is the 3.40% dividend yield, times the one and one-half growth adjustment of 1.02650, plus the DCF growth rate of 5.25%, which results in an equity cost rate of 8.80%. The result for the Hevert Proxy Group is 8.80%, which includes a dividend yield of 3.40%, an adjustment factor of 1.02650, and a DCF growth rate of 5.30%.

Q. **HAVE YOU UPDATED YOUR CAPITAL ASSET PRICING MODEL ("CAPM") RESULTS IN YOUR SUPPLEMENTAL TESTIMONY?**

A. No. I have used a risk-risk free interest rate of 4.0% in my CAPM, which is about 80 basis points above the current 30-year Treasury yield of 3.20%. As discussed in my initial testimony, the 4.0% is not based on interest rate forecasts. Forecasts of higher interest rates have been notoriously wrong for a decade. My 4.0% risk-free interest rate takes into account the range of interest rates in the past and effectively synchronizes the risk-free rate with the market risk premium. The risk-free rate and the market risk premium are interrelated in that the equity risk premium is developed in relation to the risk-free rate. My market risk premium is based on the results of many studies and surveys that have been published over time. Therefore, my risk-free interest rate of 4.0% is effectively a normalized risk-free rate

of interest and is not based on forecasts of higher interest rates. The equity cost rate from CAPM results is 7.9% for both proxy groups.

Q.   BASED ON THESE RESULTS, WHAT IS YOUR UPDATED RECOMMENDED ROE FOR THE COMPANY?

A.   My updated DCF results and my CAPM results indicate equity cost rates of 8.80% and 7.90% for both proxy groups. Based on these findings, I am now recommending an equity cost rate of 8.75% for the Company. This is at the upper end of the range of equity cost rate estimates, and reflects the current economic and market environment.

1 BY MS. FORCE:

2   Q.   Dr. Woolridge, do you have a summary of your

3 testimony?

4   A.   I do.

5   Q.   Would you please give that now?

6   A.   Okay. I will. In my initial testimony, I

7 provided capital structure, cost of equity, and overall

8 cost of capital recommendation for the Company. I have

9 adjusted the Company's proposed capital structure and

10 used a common equity ratio of 50 percent. This common

11 equity ratio is more in line with the capital

12 structures of the utilities in the proxy groups as well

13 as Duke Carolinas' parent, Duke Energy. To estimate an

14 equity cost of rate for the Company, I have applied the

15 discounted cash flow and capital asset pricing model to

16 my proxy group of electric utilities as well as to Mr.

17 Hevert's proxy group. Based on the current market

18 conditions at the time I filed my initial testimony, I

19 concluded that the appropriate ROE for the Company was

20 8.4 percent, which was at the upper end of my equity

21 cost rate range of 7.9 percent to 8.4 percent, and

22 using my proposed capital structure and ROE, I

23 recommended overall rate of return of 6.7 percent. I

24 explained that my recommendation was appropriate for

1   the Company for several reasons:

2   Number one, interest rates and capital costs

3   remain at historically low levels, despite forecasts

4   for many years of higher interest rates;

5   Number two, the electric utility industry is

6   the lowest-risk industry as measured by Value Line

7   betas;

8   Number three, the Company's investment risk

9   as indicated by the Company's S&P and Moody's ratings,

10   is lower that the risk profile of the two proxy groups;

11   And number four, the authorized ROEs for

12   electric utilities have continued to decline with the

13   low interest rate environment. I also indicated that

14   my recommendation meets the Hope and Bluefield

15   standard. On this issue, I noted that electric

16   utilities, as indicated by the proxy groups, have been

17   earning ROEs of about 9 percent in recent years. Given

18   this level of return, the credit ratings of utility

19   companies are going up, and, as indicated by Moody's,

20   lower authorized ROEs have not impaired the credit

21   quality of utilities; and, in fact, utilities have been

22   raising about $50 billion a year in capital.

23   Mr. Hevert has recommended an ROE of

24   10.75 percent. He has employed the DCF and CAPM

1 approaches as well as a bond yield plus risk premium

2 approach.   In my initial testimony, I identify a number

3 of errors in Mr. Hevert's ROE analysis.   The most

4 significant errors are:

5   Number one, he gives very little, if any,

6 weight to his constant growth DCF results, which are

7 below 9 percent;

8   Second, in its multistage DCF analysis, he

9 uses a projected GDP growth rate that is about

10 100 basis points above projected GDP growth rates;

11   Third, Mr. Hevert has employed inflated

12 projected interest rates and risk premiums in his bond

13 yield risk premium and CAPM approaches.   With respect

14 to the risk premium and his bond yield risk premium, it

15 is based on historic interest rates and

16 state-authorized electric utility ROEs, and as such, it

17 reflects past Commissions' behavior not investor

18 behavior.   Capital costs are set in the market and are

19 based on investors' assessments of expected risk and

20 return.

21   In his CAPM, Mr. Hevert uses risk premiums of

22 over 10 percent, which are based on a study he

23 conducted as well as experience reported -- and is well

24 above risk premiums reported in surveys of CFOs,

1   analysts, and economists, as well as in studies

2   published in academic and professional journals.

3   Mr. Hevert and I also disagree on the

4   investment risk of DEC. Mr. Hevert claims that his

5   mean equity cost rate results are not appropriate for

6   Duke Carolinas because he asserts the Company is

7   exposed to a higher degree of business risk than other

8   electric utilities. I use credit ratings to assess the

9   riskiness of DEC relative to the two proxy groups.

10   Credit rating agencies consider the business and

11   financial risk of utilities in the rating process.

12   Duke Energy Carolinas S&P credit issuer rating of A

13   minus is one notch above the average of the two proxy

14   groups, which is triple B plus, and Duke Energy

15   Carolinas Moody's issuer credit rating of A1 is three

16   notches above the average of the two proxy groups,

17   which is Baa1. Therefore, contrary to Mr. Hevert's

18   assertion, Duke Carolinas is less risky than the proxy

19   groups and therefore should be afforded a

20   lower-authorized ROE.

21   I have also prepared supplemental testimony

22   in this proceeding. In this testimony, I review my

23   initial testimony, I update my ROE and rate of return

24   recommendation due to changes of capital markets, and I

1 respond to the settlement testimony of Company witness

2 Mr. Hevert and Staff witness Mr. Parcell.

3   Since the time that I collected data and

4 prepared my testimony in this proceeding, several

5 developments have resulted in increase in capital cost

6 in the U.S. These factors include: number one, a

7 recognition of the effects of the Tax Cut and Jobs Act

8 in 2017 on public utilities; number two, an increased

9 concern over inflation, which has led to greater market

10 volatility; and number three, an increase in interest

11 rates, as well as a decline in public utility stock

12 prices. The 30-year treasury yield has increased about

13 40 basis points, from the 2.8 percent to 3.2 percent.

14 And utility stock prices, as measured by the Dow Jones

15 Utility Average, have declined from 750 to about 675,

16 which is about 10 percent.

17   In my new ROE recommendation, I've updated my

18 DCF results using only stock prices over the past

19 30 days. Investors are well aware of the recent tax

20 law and interest rate changes and have reacted to the

21 current economic environment and market developments.

22 Their return requirements are reflected in utility

23 stock prices. I have not updated my CAPM results since

24 I use a normalized 30-year treasury yield of 4 percent,.

1   which is 80 basis points above the current yield of

2   3.2 percent. My updated ROE and rate of return

3   recommendations, which are provided in Supplemental

4   Exhibit JRW-1, are 8.75 percent and 6.62 percent,

5   respectively.

6   With respect to the settlement, the settling

7   parties have agreed to a 48 percent long-term debt and

8   52 percent common equity capital structure and a

9   9.9 percent ROE for DEC. With respect to the

10   testimonies of both Mr. Hevert and Mr. Parcell, it is

11   important to note that the vast majority of equity cost

12   rate results do not support the 9.9 percent ROE.

13   Specifically, only 8 of 38 of Mr. Hevert's ROE results

14   from his rebuttal testimony are as high as 9.9 percent.

15   Most of these results come from his CAPM model, which

16   the Commission rejected in accepting the Duke Energy

17   Progress settlement. None of his DCF results are as

18   high as 9.9 percent.

19   Likewise, in my opinion, Staff Witness

20   Parcell's results do not support the 9.9 percent ROE.

21   First, Mr. Parcell reports a DCF range of

22   8.4 percent to 9.2 percent by only using his high DCF

23   growth rates for each proxy company. His DCF range

24   using the mean growth rates in his study are

1   7.7 percent to 7.9 percent. Therefore, his actual DCF

2   results point to a much lower ROE for Duke Carolinas

3   than 9.9 percent. Second, Mr. Parcell's CAPM results

4   in a range of 6.3 percent to 6.5 percent, which points,

5   obviously, to a much, much lower ROE for DEC.

6   Third, while Mr. Parcell's comparable

7   earnings or CE approach produces higher ROE results at

8   the top end of the range, it is a model of his own

9   creation and interpretation, and unlike the DCF and

10   CAPM models, it is not a recognized approach to

11   estimating the cost of equity capital.

12   MS. FORCE: Dr. Woolridge is available

13   for cross examination.

14   CHAIRMAN FINLEY: Cross examination?

15   Let's make it cross, please.

16   CROSS EXAMINATION BY MR. RUNKLE:

17   Q.   Mr. Woolridge, in your initial testimony, you

18   recommended an overall rate of return of 6.7 percent?

19   A.   Yes.

20   Q.   Have you changed it in your supplemental

21   testimony?

22   A.   I have.

23   Q.   And what have you changed it to?

24   A.   It is -- in the supplemental, I have used the

1   updated DEC cost rate for the Company, and I believe

2   it's 6.67 percent.

3   Q.   Okay.   So fairly close to your original

4   recommendation?

5   A.   Yes.

6   MR. RUNKLE: No further questions.

7   CROSS EXAMINATION BY MR. GRANTMYRE:

8   Q.   Good morning.   Bill Grantmyre, Public Staff

9   legal.

10   You are a professor at Penn State University?

11   A.   I am.

12   Q.   And I notice your tie has your Penn State

13   colors on it.   Does it have the colors of your

14   undergraduate university?

15   A.   Well, I think the colors are kind of both

16   Penn State and North Carolina.

17   Q.   That is Chapel Hill?

18   A.   Yes.

19   Q.   Is that the same university that thrashed

20   that institution from Durham last Friday?

21   A.   I think it is.

22   UNIDENTIFIED MALE: Objection.

23   BY MR. GRANTMYRE:

24   Q.   And also the same university --

1   CHAIRMAN FINLEY: Overruled.

2   BY MR. GRANTMYRE:

3   Q.   The same university that's the defending

4   national champion?

5   A.   That is.

6   Q.   Okay. Now, I turn you to your Supplemental

7   Testimony JRW Exhibit 2, which is page 2 of 6 of your

8   DCF, which is approximately seven pages from the back

9   of his supplemental testimony.

10   Now, this is a dividend summary for your DCF

11   report; is that correct?

12   A.   Yes.

13   Q.   Now, in it you do list, about seven down,

14   Duke Energy Corp; is that correct?

15   A.   Yes.

16   Q.   Now, these are all holding companies, not the

17   actual operating utilities; is that correct?

18   A.   They are.

19   Q.   Now, with respect to the annual dividend, the

20   yield is the result of dividing the annual dividend by

21   the then current stock market price; is that correct?

22   A.   Yeah. It's the annualized dividend. Current

23   quarterly dividend multiplied by 4, divided by the

24   average stock price by 30, 90, and 180 days.

1   Q.   Now, with respect to the dividend yield

2 30 days, that's a 30-day average?

3   A.   Yes, it is.

4   Q.   Now, could you read into the record what Duke

5 Energy Corporation was for the 30-day?

6   A.   They are paying an annualized dividend of

7 $3.56. Their 30-day annualized dividend yield was

8 4.64 percent.

9   Q.   And at the bottom, you have the mean, and

10 could you read what the mean was?

11   A.   The mean was 3.6 percent, the median was

12 3.4 percent.

13   Q.   So for the -- with respect to the mean,

14 Duke's dividend yield would be 104 basis points over

15 the average or mean; is that correct?

16   A.   Yes.

17   Q.   And above the median, there would be 124

18 basis points?

19   MR. MEHTA: Mr. Chairman, I think we are

20   straying well into the realm of friendly cross.

21   CHAIRMAN FINLEY: Make it quick,

22   Mr. Grantmyre, please, and please make it cross, to

23   the extent you are able.

24   MR. GRANTMYRE: I will stop there.

1   CHAIRMAN FINLEY: Redirect?

2   MR. MEHTA: Cross from the Company,

3   Mr. Chairman.

4   CHAIRMAN FINLEY: Excuse me, cross

5   examination.

6   MR. MEHTA: Real cross.

7 CROSS EXAMINATION BY MR. MEHTA:

8   Q.   Good morning, Dr. Woolridge. You would

9 agree, would you not, Dr. Woolridge, that, as a result

10 of the enactment of the Tax Cut and Jobs Act of 2017,

11 the cost of equity capital for Duke Energy Carolinas

12 has gone up?

13   A.   I don't know if it's exactly because of the

14 Tax Act. I mean, clearly from mid to late December

15 until the present, utility stock prices have gone up.

16 The date that I collected data was early in December.

17 Since that time, I would say it has gone up, and there

18 is a number of factors. I don't know if you could

19 disentangle all of them, but one of them clearly is,

20 obviously, the increase in interest rates, the decline

21 in utility stock prices. So kind of -- and the

22 increase in market volatility. So those factors, I

23 believe, has contributed since the time that I prepared

24 my testimony.

1   Q.   Okay. And in your testimony -- I'm talking

2 about your supplemental testimony at this point -- you

3 mention, specifically, the -- I will just call it the

4 Tax Act. Is that --

5   A.   Yeah. I think, at the time -- yeah, I mean,

6 obviously, Moody's has reacted to it, others have

7 reacted to it for certain utilities and the potential

8 cash flow implications. Mr. Hevert hasn't changed his

9 recommendation because of it. And actually, his

10 numbers in his rebuttal testimony are a little below

11 what he initially filed, but he prepared that, like,

12 last summer, I believe. So there is a contributing

13 factor, but I would say yes, since I filed my --

14 collected my data and filed my testimony.

15   Q.   You would agree that a contributing factor to

16 the rise in the cost of equity capital for Duke Energy

17 Carolinas since the enactment of the Tax Act is the

18 enactment of the Tax Act?

19   A.   It's one of the contributing factors. And

20 again, that's since I filed my testimony. But I would

21 also say, that's from where my base was at the time,

22 was 8.4 percent. So I would say, from that base, it

23 has, and disentangling the different factors, I haven't

24 done that.

1   Q.   It's one among other factors?

2   A.   Yes.

3   Q.   And, of course, a rise in the cost of equity

4   capital means a rise in the return on equity, ROE?

5   A.   Yes.

6   Q.   And you mentioned, specifically, the -- I

7   think -- well, let me just look at your supplemental

8   testimony, page 3, lines 16 through 18 -- that your

9   opinion with respect to Duke Energy Carolinas' ROE

10   reflects, quote, a recognition of the effects of the

11   Tax Cut and Jobs Act of 2017 on public utilities,

12   including concerns expressed by credit rating agencies

13   of the potential cash flow impacts of lower tax rates

14   and the loss of bonus depreciation, correct?

15   A.   Yes. And as I said, obviously, subsequent to

16   this, Moody's came out with a report for a number of

17   utilities. They didn't downgrade utilities, but the

18   outlook went from stable to negative. Now, it wasn't

19   for DEC, but it was for other utilities, including Duke

20   Energy, as it turns out. So there are contributing

21   factors here. Again, Mr. Hevert hasn't changed his

22   recommendation, but I think from the time I filed my

23   testimony to when I updated it, these were the

24   contributing factors.

1   Q.   Now, you mentioned -- let me just switch

2   topics on you. On -- still on page 3, up at the top of

3   the page, lines 4 through 6, you criticize Mr. Hevert's

4   DCF analysis, but for relying excessively on overly

5   optimistic and upwardly biased EPS growth rate forecast

6   of Wall Street analysts; do you see that?

7   A.   Yes.

8   Q.   Dr. Woolridge, in your direct testimony, you

9   gave -- you, yourself, gave primary weight to the

10   projected EPS growth rate of Wall Street analysts; did

11   you not?

12   A.   I did. And again, I give primary weight.

13   Studies, including those done by myself and others,

14   have shown, for overall, they are overly optimistic

15   relative to actual earnings. So -- and they are not as

16   bad for utilities as they are for companies, in

17   general. So I don't rely solely on them. I look at

18   other measures of growth, but I give primary weight to

19   them.

20   Q.   In fact, you ignored the historical growth

21   rates in your analysis?

22   A.   I did. Yes, I did. And I think it's

23   important to look at historical, because 95 percent of

24   the information investors are given is historical. So

1   unless they just ignore 95 percent of the information,

2   I think it provides some base, some idea of where we

3   have been in the past. I haven't relied on it. I just

4   present that for -- so -- because so much of the

5   information is historical.

6   Q.   Dr. Woolridge, your overall recommendation of

7   ROE today, after the effects of the Tax Cut and -- the

8   Tax Act and the other effects that you testified about

9   in your supplemental testimony, is -- the ROE for Duke

10   Energy Carolinas is 8.75 percent, right?

11   A.   Yes.

12   Q.   You are not aware of any state public utility

13   commission, since at least January 1, 2014, anywhere in

14   the country, Dr. Woolridge, having awarded a vertically

15   integrated electric utility a return on equity of 8.75

16   or less, are you?

17   A.   I'm not aware of any vertically integrated

18   utilities. Now, as I mentioned in testimony, there are

19   ROEs in, like, Illinois of 8.4 percent. Those are

20   distribution-only utilities. But as I say, if you look

21   at credit ratings, they -- I mean, credit ratings take

22   all vertically versus distribution, but you are

23   correct. I am not aware of any vertically integrated

24   utility with an ROE of 8.75 percent. Now, that doesn't

1   mean they don't -- that 8.75 percent doesn't meet Hope

2   and Bluefield standards, but utility commissions

3   haven't really come to that level yet.

4   Q.   Okay.   Why don't we try that again with a

5   shorter answer, Dr. Woolridge.   Yes or no --

6   CHAIRMAN FINLEY: He answered it yes.

7   He answered it no.

8   MR. MEHTA: Well, depending on which way

9   it's phrased, but I think we got the point.   I have

10   no further questions.

11   CHAIRMAN FINLEY: We've got the point.

12   Questions on the -- redirect, excuse me.

13   REDIRECT EXAMINATION BY MS. FORCE:

14   Q.   Dr. Woolridge, I noticed, when you answered a

15   question from Mr. Runkle, that you referred to your

16   Supplemental Exhibit JRW-1 and said that the overall

17   rate of return should be 6.67 percent?

18   A.   Yes.

19   Q.   Looks to me that that adds up.   But I notice

20   that on page 3 -- excuse me, page 4 of your summary

21   that the number is different in that.

22   I think you said 6.62 percent in the summary?

23   A.   It should be 6.67.

24   MS. FORCE: Okay.   I just wanted to

1   correct that. I don't have any other questions.

2   Thank you.

3   CHAIRMAN FINLEY: Questions on the

4   Commission? Anyone? All right. Thank you,

5   Dr. Woolridge, and we will receive your exhibits

6   into evidence, and you may be excused.

7   THE WITNESS: Thank you.

8   (Whereupon, Exhibit JRW Exhibit Nos. 1

9   through 15 and Supplemental Exhibit JRW

10   Exhibit Nos. 1 through 3 were admitted

11   into evidence.)

12   MS. TOWNSEND: The Attorney General's

13   Office would call Dan Wittliff to the stand,

14   please.

15   DAN J. WITTLIFF,

16   having first been duly sworn, was examined

17   and testified as follows:

18   DIRECT EXAMINATION BY MS. TOWNSEND:

19   Q.   Would you please state your name for the

20   record?

21   A.   My name is Dan Wittliff.

22   Q.   And your business address, Mr. Wittliff?

23   A.   Is 919 Congress, Suite 1110, Austin, Texas.

24   Q.   Did you cause to be prefiled in this case, on