

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Duke Energy)
Ohio for Authority to Establish a Standard Service)
Offer Pursuant to Section 4928.143, Revised)
Code, in the Form of an Electric Security Plan,) Case No. 14-841-EL-SSO
Accounting Modifications and Tariffs for)
Generation Service.

In the Matter of the Application of Duke Energy) Case No. 14-842-EL-ATA
Ohio for Authority to Amend its Certified)
Supplier Tariff, P.U.C.O. No. 20.)

REBUTTAL TESTIMONY OF

DR. ROGER A. MORIN

ON BEHALF OF

DUKE ENERGY OHIO, INC.

NOVEMBER 17, 2014

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Exhibits:

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I. INTRODUCTION AND SUMMARY

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

2 A. My name is Dr. Roger A. Morin. My business address is Georgia State
3 University, Robinson College of Business, University Plaza, Atlanta, Georgia,
4 30303. I am Emeritus Professor of Finance at the Robinson College of Business,
5 Georgia State University and Professor of Finance for Regulated Industry at the
6 Center for the Study of Regulated Industry at Georgia State University. I am
7 also a principal in Utility Research International, an enterprise engaged in
8 regulatory finance and economics consulting to business and government. I am
9 testifying on behalf of Duke Energy Ohio, Inc. (Duke Energy Ohio or
10 Company).

11 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.**

12 A. I hold a Bachelor of Engineering degree and an MBA in Finance from McGill
13 University, Montreal, Canada. I received my Ph.D. in Finance and
14 Econometrics at the Wharton School of Finance, University of Pennsylvania.

15 **Q. PLEASE SUMMARIZE YOUR ACADEMIC AND BUSINESS CAREER.**

16 A. I have taught at the Wharton School of Finance, University of Pennsylvania,
17 Amos Tuck School of Business at Dartmouth College, Drexel University,
18 University of Montreal, McGill University, and Georgia State University. I was
19 a faculty member of Advanced Management Research International, and I am
20 currently a faculty member of The Management Exchange Inc. and Exnet, Inc.

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1 (now SNL Center for Financial Education LLC or SNL), where I continue to
2 conduct frequent national executive-level education seminars throughout the
3 United States and Canada. In the last 30 years, I have conducted numerous
4 national seminars on "Utility Finance," "Utility Cost of Capital," "Alternative
5 Regulatory Frameworks," and "Utility Capital Allocation," which I have
6 developed on behalf of The Management Exchange Inc. and the SNL Center for
7 Financial Education.

8 I have authored or co-authored several books, monographs, and articles
9 in academic scientific journals on the subject of finance. They have appeared in
10 a variety of journals, including The Journal of Finance, The Journal of Business
11 Administration, International Management Review, and Public Utilities
12 Fortnightly. I published a widely-used treatise on regulatory finance, Utilities'
13 Cost of Capital, Public Utilities Reports, Inc., Arlington, Va. 1984. In late 1994,
14 the same publisher released my book, Regulatory Finance, a voluminous treatise
15 on the application of finance to regulated utilities. A revised and expanded
16 edition of this book, The New Regulatory Finance, was published in 2006. I
17 have been engaged in extensive consulting activities on behalf of numerous
18 corporations, legal firms, and regulatory bodies in matters of financial
19 management and corporate litigation. Exhibit RAM-1 describes my professional
20 credentials in more detail.

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1 **Q. HAVE YOU PREVIOUSLY TESTIFIED ON COST OF CAPITAL**
2 **BEFORE UTILITY REGULATORY COMMISSIONS?**

3 A. Yes, I have been a cost of capital witness before nearly 50 regulatory bodies in
4 North America, including the Public Utilities Commission of Ohio (the
5 Commission, PUCO), Federal Energy Regulatory Commission, and the Federal
6 Communications Commission. I have also testified before the following state,
7 provincial, and other local regulatory commissions:

Alabama	Florida	Missouri	Ontario
Alaska	Georgia	Montana	Oregon
Alberta	Hawaii	Nevada	Pennsylvania
Arizona	Illinois	New Brunswick	Quebec
Arkansas	Indiana	New Hampshire	South Carolina
British Columbia	Iowa	New Jersey	South Dakota
California	Kentucky	New Mexico	Tennessee
City of New Orleans	Louisiana	New York	Texas
Colorado	Maine	Newfoundland	Utah
CRTC	Manitoba	North Carolina	Vermont
Delaware	Maryland	North Dakota	Virginia
District of Columbia	Michigan	Nova Scotia	Washington
FCC	Minnesota	Ohio	West Virginia
FERC	Mississippi	Oklahoma	Nebraska

8 The details of my participation in regulatory proceedings are provided in Exhibit
9 RAM-1.

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

12 A. The purpose of my testimony in this proceeding is to rebut the direct testimony
13 of Matthew I. Kahal and to explain that the 9.84% Return on Equity (ROE)

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1 agreed to in a stipulation and adopted and approved by the Public Utilities
2 Commission of Ohio (Commission) in Case No. 12-1682-EL-AIR, May 1, 2013,
3 remains fair and reasonable under current capital market conditions for the
4 purposes of calculating Duke Energy Ohio's Distribution Capital Investment
5 Rider (DCI). Additionally, throughout my testimony, and in response to cross
6 examination of several witnesses in this proceeding, including but not limited to,
7 Company witnesses William Don Wathen Jr.,¹ Peggy Laub,² and James
8 Ziolkowski,³ as well as, staff witnesses Turkenton⁴ and McCarter⁵ I further
9 discuss and rebut the notions that the proposed Rider DCI results in reduced
10 business risk for the Company due to accelerated cost recovery (i.e., reducing
11 regulatory lag) and therefore an ROE lower than 9.84% is somehow justified. I
12 have formed my professional judgment as to whether a ROE of 9.84%: (1)
13 remains fair to ratepayers, (2) allows the Company to attract capital on
14 reasonable terms, (3) maintains the Company's financial integrity, and (4)
15 remains comparable to returns offered on comparable risk investments. I will
16 testify in this proceeding as to that opinion.

¹ Hearing Transcript Vol. II, p392-394 and 517-518.

² Hearing Transcript Vol. III, p784-787, and 827-832.

³ Hearing Transcript Vol. VI, p1549-1551.

⁴ Hearing Transcript Vol. XIII, p3768-3775.

⁵ Hearing Transcript Vol. XIV, p 3914-3916.

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1 **Q. PLEASE BRIEFLY SUMMARIZE MR. KAHAL'S CONCERNS WITH**
2 **THE COMPANY'S PROPOSAL TO USE 9.84% TO CALCULATE THE**
3 **RIDER.**

4 A. Mr. Kahal's testimony, on pages 10-12, identifies what he believes are two main
5 concerns regarding the aforementioned ROE established in Case No. 12-1682-
6 EL-AIR.⁶ First, Mr. Kahal states his belief that rate setting through a quarterly
7 DCI would materially change (improve) Duke Energy Ohio's business risk
8 profile for providing distribution service. Second, Mr. Kahal poses that if 9.84 is
9 an appropriate ROE for a standard distribution rate case, that it must be too high
10 a return for the Rider DCI.

11 **Q. DO YOU AGREE WITH MR. KAHAL'S RISK ASSESSMENT?**

12 A. No. First, Mr. Kahal performed no studies or analysis to support his claims that a
13 reduction in the Company's ROE is necessary for Rider DCI or that the
14 Company's risk profile is reduced. Based upon my reading of the transcript of
15 the hearing in this proceeding, Mr. Kahal conceded this point under cross
16 examination.⁷ Mr. Kahal presented no recommendations as to what he believes
17 the ROE should be. His only recommendation in this regard is that 9.84%, which

⁶ Direct Testimony of Matthew I. Kahal, p 10-12, filed September 26, 2014.

⁷ Hearing Transcript Vol. VII, p1786-1788.

1 was established through a settlement, is simply too high.⁸ Second, as I explain
2 throughout the remainder of my testimony, empirical evidence actually supports
3 an ROE for the Company that is higher than 9.84% using current market
4 information. As such, the Company's proposal to continue the ROE established
5 in the most recent distribution rate case is more than reasonable.

6 **Q. PLEASE BRIEFLY IDENTIFY THE EXHIBITS AND APPENDICES**
7 **ACCOMPANYING YOUR TESTIMONY.**

8 A. I have attached to my testimony Exhibit RAM-1 through Exhibit RAM-8, and
9 Appendices A and B. These exhibits and appendices relate directly to points in
10 my testimony, and are described in further detail in connection with the
11 discussion of those points in my testimony.

12 **Q. PLEASE SUMMARIZE YOUR FINDINGS CONCERNING DUKE**
13 **ENERGY OHIO'S COST OF COMMON EQUITY.**

14 A. Based on the results of various methodologies, current capital market conditions,
15 and current economic industry conditions, a reasonable ROE range applicable to
16 Duke Energy Ohio's electricity distribution operations is 9.6% to 11.0% with a
17 midpoint of 10.3%.

⁸ *Id.*

1 In short, the 9.84% ROE established by the Commission in 2013 remains
2 within the reasonable range under current capital market conditions, albeit near
3 the bottom of what I consider a reasonable range.

4 My ROE range is derived from cost of capital studies that I performed
5 using the financial models available to me and from the application of my
6 professional judgment to the results. I applied various cost of capital
7 methodologies, including the Discounted Cash Flow (DCF), Risk Premium, and
8 Capital Asset Pricing Model (CAPM), to a group of investment-grade dividend-
9 paying combination gas and electric utilities which are covered in Value Line's
10 Electric Utility Composite. The companies were required to have the majority of
11 their revenues from regulated utility operations.

12 My ROE results reflect the application of my professional judgment to
13 the results in light of the indicated returns from my Risk Premium, CAPM, and
14 DCF analyses, taking into consideration business and financial risks faced by the
15 Company.

16 **Q. WOULD IT BE IN THE BEST INTERESTS OF RATEPAYERS FOR**
17 **THE COMMISSION TO RETAIN THE 9.84% ROE ESTABLISHED IN**
18 **2013 FOR DUKE ENERGY OHIO'S ELECTRICITY DISTRIBUTION**
19 **OPERATIONS?**

20 **A.** Yes. My analysis shows that the ROE of 9.84% authorized by the Commission
21 in 2013 fairly, but barely, compensates investors, maintains the Company's

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1 credit strength, and attracts the capital needed for utility infrastructure and
2 reliability capital investments. Adopting a lower ROE would increase costs for
3 ratepayers.

4 **Q. PLEASE EXPLAIN HOW LOW ALLOWED ROES CAN INCREASE**
5 **BOTH THE FUTURE COST OF EQUITY AND DEBT FINANCING.**

6 A. If a utility is authorized a ROE below the level required by equity investors, the
7 utility will find it difficult to access the equity market through common stock
8 issuance at its current market price. Investors will not provide equity capital at
9 the current market price if the earnable return on equity is below the level they
10 require given the risks of an equity investment in the utility. The equity market
11 corrects this by generating a stock price in equilibrium that reflects the valuation
12 of the potential earnings stream from an equity investment at the risk-adjusted
13 return equity investors require. In the case of a utility that has been authorized a
14 return below the level investors believe is appropriate for the risk they bear, the
15 result is a decrease in the utility's market price per share of common stock. This
16 reduces the financial viability of equity financing in two ways. First, because the
17 utility's price per share of common stock decreases, the net proceeds from
18 issuing common stock are reduced. Second, since the utility's market to book
19 ratio decreases with the decrease in the share price of common stock, the
20 potential risk from dilution of equity investments reduces investors' inclination

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1 to purchase new issues of common stock. The ultimate effect is the utility will
2 have to rely more on debt financing to meet its capital needs.

3 As the company relies more on debt financing, its capital structure
4 becomes more leveraged. Because debt payments are a fixed financial
5 obligation to the utility, and income available to common equity is subordinate
6 to fixed charges, this decreases the operating income available for dividend and
7 earnings growth. Consequently, equity investors face greater uncertainty about
8 future dividends and earnings from the firm. As a result, the firm's equity
9 becomes a riskier investment. The risk of default on the company's bonds also
10 increases, making the utility's debt a riskier investment. This increases the cost
11 to the utility from both debt and equity financing and increases the possibility
12 the company will not have access to the capital markets for its outside financing
13 needs. Ultimately, to ensure that Duke Energy Ohio has access to capital
14 markets for its capital needs, a fair and reasonable authorized ROE in the range
15 of 9.6 - 11.0% is required.

16 The Company must secure outside funds from capital markets to finance
17 required utility plant and equipment investments irrespective of capital market
18 conditions, interest rate conditions and the quality consciousness of market
19 participants. Thus, rate relief requirements and supportive regulatory treatment,
20 including approval of my recommended ROE, are essential requirements.

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1 **Q. PLEASE DESCRIBE HOW YOUR TESTIMONY IS ORGANIZED.**

2 A. The remainder of my testimony is divided into five sections:

3 (1) Regulatory Framework and Rate of Return;

4 (2) Cost of Equity Estimates:

5 (3) Summary of Results

6 (4) Impact of Riders; and;

7 (5) Conclusion

8 The first section discusses the rudiments of rate of return regulation and
9 the basic notions underlying rate of return. The second section contains the
10 application of DCF, Risk Premium, and CAPM tests. The third section
11 summarizes the results. The last section concludes the analysis.

II. REGULATORY FRAMEWORK AND RATE OF RETURN

12 **Q. PLEASE EXPLAIN HOW A REGULATED COMPANY'S RATES**
13 **SHOULD BE SET UNDER TRADITIONAL COST OF SERVICE**
14 **REGULATION.**

15 A. Under the traditional regulatory process, a regulated company's rates should be
16 set so that the company recovers its costs, including taxes and depreciation, plus
17 a fair and reasonable return on its invested capital. The allowed rate of return
18 must necessarily reflect the cost of the funds obtained, that is, investors' return
19 requirements. In determining a company's required rate of return, the starting
20 point is investors' return requirements in financial markets. A rate of return can

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1 then be set at a level sufficient to enable the company to earn a return
2 commensurate with the cost of those funds.

3 Funds can be obtained in two general forms, debt capital and equity
4 capital. The cost of debt funds can be easily ascertained from an examination of
5 the contractual interest payments. The cost of common equity funds, that is,
6 investors' required rate of return, is more difficult to estimate. It is the purpose
7 of the next section of my testimony to estimate a fair and reasonable ROE range
8 for Duke Energy Ohio's cost of common equity capital.

9 **Q. WHAT FUNDAMENTAL PRINCIPLES UNDERLIE THE**
10 **DETERMINATION OF A FAIR AND REASONABLE ROE?**

11 **A.** The heart of utility regulation is the setting of just and reasonable rates by way of
12 a fair and reasonable return. There are two landmark United States Supreme
13 Court cases that define the legal principles underlying the regulation of a public
14 utility's rate of return and provide the foundations for the notion of a fair return:

15 1. *Bluefield Water Works & Improvement Co. v. Pub. Serv.*

16 *Comm'n of W. Va.*, 262 U.S. 679 (1923), and

17 2. *Fed. Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591
18 (1944).

19 The *Bluefield* case set the standard against which just and reasonable
20 rates of return are measured:

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1 *A public utility is entitled to such rates as will permit it to earn a*
2 *return on the value of the property which it employs for the*
3 *convenience of the public equal to that generally being made at the*
4 *same time and in the same general part of the country on*
5 *investments in other business undertakings which are attended by*
6 *corresponding risks and uncertainties ... The return should be*
7 *reasonable, sufficient to assure confidence in the financial*
8 *soundness of the utility, and should be adequate, under efficient and*
9 *economical management, to maintain and support its credit and*
10 *enable it to raise money necessary for the proper discharge of its*
11 *public duties.*

12 *Bluefield Water Works & Improvement Co., 262 U.S. at 692 (emphasis*
13 *added).*

14 The *Hope* case expanded on the guidelines to be used to assess the
15 reasonableness of the allowed return. The Court reemphasized its statements in
16 the *Bluefield* case and recognized that revenues must cover “capital costs.” The
17 Court stated:

18 *From the investor or company point of view it is important that*
19 *there be enough revenue not only for operating expenses but also*
20 *for the capital costs of the business. These include service on the*
21 *debt and dividends on the stock ... By that standard the return to the*

1 equity owner should be commensurate with returns on investments
2 in other enterprises having corresponding risks. That return,
3 moreover, should be sufficient to assure confidence in the financial
4 integrity of the enterprise, so as to maintain its credit and attract
5 capital.

6 *Hope Natural Gas Co.*, 320 U.S. at 603 (emphasis added).

7 The United States Supreme Court reiterated the criteria set forth in *Hope*
8 in *Fed. Power Comm'n v. Memphis Light, Gas & Water Div.*, 411 U.S. 458
9 (1973), in *Permian Basin Rate Cases*, 390 U.S. 747 (1968), and most recently in
10 *Duquesne Light Co. v. Barasch*, 488 U.S. 299 (1989). In the *Permian Basin*
11 *Rate Cases*, the Supreme Court stressed that a regulatory agency's rate of return
12 order should --

13 *reasonably be expected to maintain financial integrity, attract*
14 *necessary capital, and fairly compensate investors for the risks*
15 *they have assumed.*

16 *Permian Basin Rate Cases*, 390 U.S. at 792.

17 Therefore, the "end result" of this Commission's decision should be to
18 allow Duke Energy Ohio the opportunity to earn a return on equity that is: (1)
19 commensurate with returns on investments in other firms having corresponding
20 risks, (2) sufficient to assure confidence in the Company's financial integrity,

1 and (3) sufficient to maintain the Company's creditworthiness and ability to
2 attract capital on reasonable terms.

3 **Q. HOW IS THE FAIR RATE OF RETURN DETERMINED?**

4 A. The aggregate return required by investors is called the "cost of capital." The
5 cost of capital is the opportunity cost, expressed in percentage terms, of the total
6 pool of capital employed by the Company. It is the composite weighted cost of
7 the various classes of capital (*e.g.*, bonds, preferred stock, common stock) used
8 by the utility, with the weights reflecting the proportions of the total capital that
9 each class of capital represents. The fair return in dollars is obtained by
10 multiplying the rate of return set by the regulator by the utility's "rate base."
11 The rate base is essentially the net book value of the utility's plant and other
12 assets used to provide utility service in a particular jurisdiction.

13 While utilities like Duke Energy Ohio enjoy varying degrees of
14 monopoly in the sale of public utility services, they, or their parent companies,
15 must compete with everyone else in the free, open market for the input factors of
16 production, whether labor, materials, machines, or capital, including the capital
17 investments required to support the electricity network. The prices of these
18 inputs are set in the competitive marketplace by supply and demand, and it is
19 these input prices that are incorporated in the cost of service computation. This
20 is just as true for capital as for any other factor of production. Since utilities and
21 other investor-owned businesses must go to the open capital market and sell their

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1 securities in competition with every other issuer, there is obviously a market
2 price to pay for the capital they require, for example, the interest on debt capital,
3 or the expected return on equity. In order to attract the necessary capital, electric
4 utility facilities must compete with alternative uses of capital and offer a return
5 commensurate with the associated risks.

6 **Q. HOW DOES THE CONCEPT OF A FAIR RETURN RELATE TO THE**
7 **CONCEPT OF OPPORTUNITY COST?**

8 A. The concept of a fair return is intimately related to the economic concept of
9 “opportunity cost.” When investors supply funds to a utility by buying its stocks
10 or bonds, they are not only postponing consumption, giving up the alternative of
11 spending their dollars in some other way, they are also exposing their funds to
12 risk and forgoing returns from investing their money in alternative comparable
13 risk investments. The compensation they require is the price of capital. If there
14 are differences in the risk of the investments, competition among firms for a
15 limited supply of capital will bring different prices. The capital markets translate
16 these differences in risk into differences in required return, in much the same
17 way that differences in the characteristics of commodities are reflected in
18 different prices.

19 The important point is that the required return on capital is set by supply
20 and demand, and is influenced by the relationship between the risk and return

1 expected for those securities and the risks expected from the overall menu of
2 available securities.

3 **Q. WHAT ECONOMIC AND FINANCIAL CONCEPTS HAVE GUIDED**
4 **YOUR ASSESSMENT OF THE COMPANY'S COST OF COMMON**
5 **EQUITY?**

6 A. Two fundamental economic principles underlie the appraisal of the Company's
7 cost of equity, one relating to the supply side of capital markets, the other to the
8 demand side.

9 On the supply side, the first principle asserts that rational investors
10 maximize the performance of their portfolios only if they expect the returns on
11 investments of comparable risk to be the same. If not, rational investors will
12 switch out of those investments yielding lower returns at a given risk level in
13 favor of those investment activities offering higher returns for the same degree
14 of risk. This principle implies that a company will be unable to attract capital
15 funds unless it can offer returns to capital suppliers that are comparable to those
16 achieved on competing investments of similar risk.

17 On the demand side, the second principle asserts that a company will
18 continue to invest in real physical assets if the return on these investments
19 equals, or exceeds, the company's cost of capital. This principle suggests that a
20 regulatory board should set rates at a level sufficient to create equality between
21 the return on physical asset investments and the company's cost of capital.

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1 **Q. HOW DOES THE COMPANY OBTAIN ITS CAPITAL AND HOW IS ITS**
2 **OVERALL COST OF CAPITAL DETERMINED?**

3 A. The funds employed by the Company are obtained in two general forms, debt
4 capital and equity capital. The cost of debt funds can be ascertained easily from
5 an examination of the contractual interest payments. The cost of common equity
6 funds, that is, equity investors' required rate of return, is more difficult to
7 estimate because the dividend payments received from common stock are not
8 contractual or guaranteed in nature. They are uneven and risky, unlike interest
9 payments.

10 Once a cost of common equity estimate has been developed, it can then
11 easily be combined with the embedded cost of debt based on the utility's capital
12 structure, in order to arrive at the overall cost of capital (overall rate of return).

13 **Q. WHAT IS THE MARKET REQUIRED RATE OF RETURN ON EQUITY**
14 **CAPITAL?**

15 A. The market required rate of return on common equity, or cost of equity, is the
16 return demanded by the equity investor. Investors establish the price for equity
17 capital through their buying and selling decisions in capital markets. Investors
18 set return requirements according to their perception of the risks inherent in the
19 investment, recognizing the opportunity cost of forgone investments in other
20 companies, and the returns available from other investments of comparable risk.

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1 **Q. WHAT MUST BE CONSIDERED IN ESTIMATING A FAIR ROE?**

2 A. The basic premise is that the allowable ROE should be commensurate with
3 returns on investments in other firms having corresponding risks. The allowed
4 return should be sufficient to assure confidence in the financial integrity of the
5 firm, in order to maintain creditworthiness and ability to attract capital on
6 reasonable terms. The “attraction of capital” standard focuses on investors’
7 return requirements that are generally determined using market value methods,
8 such as the Risk Premium, CAPM, or DCF methods. These market value tests
9 define “fair return” as the return investors anticipate when they purchase equity
10 shares of comparable risk in the financial marketplace. This is a market rate of
11 return, defined in terms of anticipated dividends and capital gains as determined
12 by expected changes in stock prices, and reflects the opportunity cost of capital.
13 The economic basis for market value tests is that new capital will be attracted to
14 a firm only if the return expected by the suppliers of funds is commensurate with
15 that available from alternative investments of comparable risk.

III. COST OF EQUITY CAPITAL ESTIMATES 2014

16 **Q. DR. MORIN, HOW DID YOU ESTIMATE THE FAIR ROE FOR DUKE**
17 **ENERGY OHIO UNDER CURRENT CAPITAL MARKET**
18 **CONDITIONS?**

19 A. I employed three methodologies: (1) the DCF methodologies, (2) the Risk
20 Premium, and (3) the CAPM. All three are market-based methodologies and are

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1 designed to estimate the return required by investors on the common equity
2 capital committed to Duke Energy Ohio. I applied the aforementioned
3 methodologies to a group of combination gas and electric utilities as a reference
4 group for Duke Energy Ohio.

5 **Q. WHY DID YOU USE MORE THAN ONE APPROACH FOR**
6 **ESTIMATING THE COST OF EQUITY?**

7 A. No one single method provides the necessary level of precision for determining a
8 fair return, but each method provides useful evidence to facilitate the exercise of
9 an informed judgment. Reliance on any single method or preset formula is
10 inappropriate when dealing with investor expectations because of possible
11 measurement difficulties and vagaries in individual companies' market data.
12 Examples of such vagaries include dividend suspension, insufficient or
13 unrepresentative historical data due a recent merger, impending merger or
14 acquisition, and a new corporate identity due to restructuring activities. The
15 advantage of using several different approaches is that the results of each one
16 can be used to check the others.

17 As a general proposition, it is extremely dangerous to rely on only one
18 generic methodology to estimate equity costs. The difficulty is compounded
19 when only one variant of that methodology is employed. It is compounded even
20 further when that one methodology is applied to a single company. Hence,

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1 several methodologies applied to several comparable risk companies should be
2 employed to estimate the cost of common equity.

3 As I have stated, there are three broad generic methods available to
4 measure the cost of equity: DCF, Risk Premium, and CAPM. All three of these
5 methods are accepted and used by the financial community and firmly supported
6 in the financial literature. The weight accorded to any one method may very
7 well vary depending on unusual circumstances in capital market conditions.

8 Each methodology requires the exercise of considerable judgment on the
9 reasonableness of the assumptions underlying the method and on the
10 reasonableness of the proxies used to validate the theory and apply the method.
11 Each method has its own way of examining investor behavior, its own premises,
12 and its own set of simplifications of reality. Investors do not necessarily
13 subscribe to any one method, nor does the stock price reflect the application of
14 any one single method by the price-setting investor. There is no guarantee that a
15 single DCF result is necessarily the ideal predictor of the stock price and of the
16 cost of equity reflected in that price, just as there is no guarantee that a single
17 CAPM or Risk Premium result constitutes the perfect explanation of a stock's
18 price or the cost of equity.

1 **Q. ARE THERE ANY PRACTICAL DIFFICULTIES IN APPLYING COST**
2 **OF CAPITAL METHODOLOGIES IN THE CURRENT ENVIRONMENT**
3 **OF VOLATILITY IN CAPITAL MARKETS AND ECONOMIC**
4 **UNCERTAINTY?**

5 A. Yes, there are. The traditional cost of equity estimation methodologies are
6 difficult to implement when you are dealing with the instability and volatility in
7 the capital markets and the highly uncertain economy both in the U.S. and
8 abroad. This is not only because stock prices are extremely volatile at this time,
9 but also because utility company historical data have become less meaningful for
10 an industry experiencing substantial change, for example, the transition to
11 stringent renewable standards and the need to secure vast amounts of external
12 capital over the next decade, regardless of capital market conditions. Past
13 earnings and dividend trends may simply not be indicative of the future. For
14 example, historical growth rates of earnings and dividends have been depressed
15 by eroding margins due to a variety of factors, including the sluggish economy,
16 restructuring, and falling margins. As a result, this historical data may not be
17 representative of the future long-term earning power of these companies.
18 Moreover, historical growth rates may not be necessarily representative of future
19 trends for several electric utilities involved in mergers and acquisitions, as these

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1 companies going forward are not the same companies for which historical data
2 are available.

A. DCF Estimates

3 **Q. PLEASE DESCRIBE THE DCF APPROACH TO ESTIMATING THE**
4 **COST OF EQUITY CAPITAL.**

5 A. According to DCF theory, the value of any security to an investor is the expected
6 discounted value of the future stream of dividends or other benefits. One widely
7 used method to measure these anticipated benefits in the case of a non-static
8 company is to examine the current dividend plus the increases in future dividend
9 payments expected by investors. This valuation process can be represented by
10 the following formula, which is the traditional DCF model:

$$K_e = D_1/P_0 + g$$

12 where: K_e = investors' expected return on equity

13 D_1 = expected dividend at the end of the coming year

14 P_0 = current stock price

15 g = expected growth rate of dividends, earnings, stock price, and
16 book value

17 The traditional DCF formula states that under certain assumptions, which
18 are described in the next paragraph, the equity investor's expected return, K_e ,
19 can be viewed as the sum of an expected dividend yield, D_1/P_0 , plus the expected
20 growth rate of future dividends and stock price, g . The returns anticipated at a

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1 given market price are not directly observable and must be estimated from
2 statistical market information. The idea of the market value approach is to infer
3 'K_e' from the observed share price, the observed dividend, and an estimate of
4 investors' expected future growth.

5 The assumptions underlying this valuation formulation are well known,
6 and are discussed in detail in Chapter 4 of my reference book, Regulatory
7 Finance, and Chapter 8 of my new reference text, The New Regulatory Finance.

8 The standard DCF model requires the following main assumptions: (1) a
9 constant average growth trend for both dividends and earnings, (2) a stable
10 dividend payout policy, (3) a discount rate in excess of the expected growth rate,
11 and (4) a constant price-earnings multiple, which implies that growth in price is
12 synonymous with growth in earnings and dividends. The standard DCF model
13 also assumes that dividends are paid at the end of each year when in fact
14 dividend payments are normally made on a quarterly basis.

15 **Q. HOW DID YOU ESTIMATE DUKE ENERGY OHIO'S COST OF**
16 **EQUITY WITH THE DCF MODEL?**

17 A. I applied the DCF model to a group of investment-grade, dividend-paying,
18 combination gas and electric utilities with the majority of their revenues from
19 regulated operations that are covered in the Value Line database.

20 In order to apply the DCF model, two components are required: the
21 expected dividend yield (D_1/P_0), and the expected long-term growth (g). The

1 expected dividend (D_1) in the annual DCF model can be obtained by multiplying
2 the current indicated annual dividend rate by the growth factor $(1 + g)$.

3 **Q. HOW DID YOU ESTIMATE THE DIVIDEND YIELD COMPONENT OF**
4 **THE DCF MODEL?**

5 A. From a conceptual viewpoint, the stock price to employ in calculating the
6 dividend yield is the current price of the security at the time of estimating the
7 cost of equity. This is because the current stock prices provide a better
8 indication of expected future prices than any other price in an efficient market.
9 An efficient market implies that prices adjust rapidly to the arrival of new
10 information. Therefore, current prices reflect the fundamental economic value
11 of a security. A considerable body of empirical evidence indicates that capital
12 markets are efficient with respect to a broad set of information. This implies that
13 observed current prices represent the fundamental value of a security, and that a
14 cost of capital estimate should be based on current prices.

15 In implementing the DCF model, I have used the dividend yields
16 reported in the Value Line Investment Analyzer (VLIA) on-line database.
17 Basing dividend yields on average results from a large group of companies
18 reduces the concern that the vagaries of individual company stock prices will
19 result in an unrepresentative dividend yield.

20 **Q. WHY DID YOU MULTIPLY THE SPOT DIVIDEND YIELD BY $(1 + g)$**
21 **RATHER THAN BY $(1 + 0.5g)$?**

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1 A. Some analysts multiply the spot dividend yield by one plus one half the expected
2 growth rate $(1 + 0.5g)$ rather than the conventional one plus the expected growth
3 rate $(1 + g)$. This procedure understates the return expected by the investor.

4 The fundamental assumption of the basic annual DCF model is that
5 dividends are received annually at the end of each year and that the first dividend
6 is to be received one year from now. Thus the appropriate dividend to use in a
7 DCF model is the full prospective dividend to be received at the end of the year.
8 Since the appropriate dividend to use in a DCF model is the prospective
9 dividend one year from now rather than the dividend one-half year from now,
10 multiplying the spot dividend yield by $(1 + 0.5g)$ understates the proper dividend
11 yield.

12 Moreover, the basic annual DCF model ignores the time value of
13 quarterly dividend payments and assumes dividends are paid once a year at the
14 end of the year. Multiplying the spot dividend yield by $(1 + g)$ is actually a
15 conservative attempt to capture the reality of quarterly dividend payments. Use
16 of this method is conservative in the sense that the annual DCF model fully
17 ignores the more frequent compounding of quarterly dividends.

18 **Q. HOW DID YOU ESTIMATE THE GROWTH COMPONENT OF THE**
19 **DCF MODEL?**

1 A. The principal difficulty in calculating the required return by the DCF approach is
2 in ascertaining the growth rate that investors currently expect. Since no explicit
3 estimate of expected growth is observable, proxies must be employed.

4 As proxies for expected growth, I examined the consensus growth
5 estimate developed by professional analysts. Projected long-term growth rates
6 actually used by institutional investors to determine the desirability of investing
7 in different securities influence investors' growth anticipations. These forecasts
8 are made by large reputable organizations, and the data are readily available and
9 are representative of the consensus view of investors. Because of the dominance
10 of institutional investors in investment management and security selection, and
11 their influence on individual investment decisions, analysts' growth forecasts
12 influence investor growth expectations and provide a sound basis for estimating
13 the cost of equity with the DCF model.

14 Growth rate forecasts of several analysts are available from published
15 investment newsletters and from systematic compilations of analysts' forecasts,
16 such as those tabulated by Zacks Investment Research Inc. and Yahoo Finance.
17 I used analysts' long-term growth forecasts contained in Yahoo Finance as
18 proxies for investors' growth expectations in applying the DCF model. I also
19 used Value Line's growth forecasts as additional proxies.

20 **Q. WHY DID YOU REJECT THE USE OF HISTORICAL GROWTH**
21 **RATES IN APPLYING THE DCF MODEL TO ELECTRIC UTILITIES?**

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A. I have rejected historical growth rates as proxies for expected growth in the DCF calculation for two reasons. First, historical growth patterns are already incorporated in analysts' growth forecasts that should be used in the DCF model, and are therefore redundant. Second, published studies in the academic literature demonstrate that growth forecasts made by security analysts are reasonable indicators of investor expectations, and that investors rely on analysts' forecasts. This considerable literature is summarized in Chapter 9 of my most recent textbook, The New Regulatory Finance.

Q. DID YOU CONSIDER ANY OTHER METHOD OF ESTIMATING EXPECTED GROWTH TO APPLY THE DCF MODEL?

A. Yes, I did. I considered using the so-called “sustainable growth” method, also referred to as the “retention growth” method. According to this method, future growth is estimated by multiplying the fraction of earnings expected to be retained by the company, ‘b’, by the expected return on book equity, ROE, as follows:

$$g = b \times ROE$$

where: g = expected growth rate in earnings/dividends

b = expected retention ratio

ROE = expected return on book equity

Q. DO YOU HAVE ANY RESERVATIONS IN REGARDS TO THE SUSTAINABLE GROWTH METHOD?

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1 A. Yes, I do. First, the sustainable method of predicting growth contains a logic
2 trap: the method requires an estimate of expected return on book equity to be
3 implemented. But if the expected return on book equity input required by the
4 model differs from the recommended return on equity, a fundamental
5 contradiction in logic follows. Second, the empirical finance literature
6 demonstrates that the sustainable growth method of determining growth is not as
7 significantly correlated to measures of value, such as stock prices and
8 price/earnings ratios, as analysts' growth forecasts. I therefore chose not to rely
9 on this method.

10 **Q. DID YOU CONSIDER DIVIDEND GROWTH IN APPLYING THE DCF**
11 **MODEL?**

12 A. No, not at this time. The reason is that as a practical matter, while there is an
13 abundance of earnings growth forecasts, there are very few forecasts of dividend
14 growth. Moreover, it is widely expected that some utilities will continue to
15 lower their dividend payout ratios over the next several years in response to
16 heightened business risk and the need to fund very large construction programs
17 over the next decade. Dividend growth has remained largely stagnant in past
18 years as utilities are increasingly conserving financial resources in order to hedge
19 against rising business risks and finance large infrastructure investments. As a
20 result, investors' attention has shifted from dividends to earnings. Therefore,
21 earnings growth provides a more meaningful guide to investors' long-term

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1 growth expectations. Indeed, it is growth in earnings that will support future
2 dividends and share prices.

3 **Q. IS THERE ANY EMPIRICAL EVIDENCE DOCUMENTING THE**
4 **IMPORTANCE OF EARNINGS IN EVALUATING INVESTORS'**
5 **EXPECTATIONS?**

6 A. Yes, there is an abundance of evidence attesting to the importance of earnings in
7 assessing investors' expectations. First, the sheer volume of earnings forecasts
8 available from the investment community relative to the scarcity of dividend
9 forecasts attests to their importance. To illustrate, Value Line, Yahoo Finance,
10 Zacks Investment, First Call Thompson, Reuters, and Multex provide
11 comprehensive compilations of investors' earnings forecasts. The fact that these
12 investment information providers focus on growth in earnings rather than growth
13 in dividends indicates that the investment community regards earnings growth as
14 a superior indicator of future long-term growth. Second, Value Line's principal
15 investment rating assigned to individual stocks, Timeliness Rank, is based
16 primarily on earnings, which accounts for 65% of the ranking.

17 **Q. DR. MORIN, HOW DID YOU APPROACH THE COMPOSITION OF**
18 **COMPARABLE GROUPS IN ORDER TO ESTIMATE DUKE ENERGY**
19 **OHIO'S COST OF EQUITY WITH THE DCF METHOD?**

1 A. Because Duke Energy Ohio is not publicly traded, the DCF model cannot be
2 applied to Duke Energy Ohio and proxies must be used. There are two possible
3 approaches in forming proxy groups of companies.

4 The first approach is to apply cost of capital estimation techniques to a
5 select group of companies directly comparable in risk to Duke Energy Ohio.
6 These companies are chosen by the application of stringent screening criteria to
7 a universe of electric utility stocks in an attempt to identify companies with the
8 same investment risk as Duke Energy Ohio. Examples of screening criteria
9 include bond rating, beta risk, size, percentage of revenues from electric utility
10 operations, and common equity ratio. The end result is a small sample of
11 companies with a risk profile similar to that of Duke Energy Ohio, provided the
12 screening criteria are defined and applied correctly.

13 The second approach is to apply cost of capital estimation techniques to a
14 large group of electric utilities representative of the electric utility industry
15 average and then make adjustments to account for any difference in investment
16 risk between the company and the industry average, if any. As explained below,
17 in view of substantial changes in circumstances in the electric utility industry, I
18 have chosen the latter approach.

19 In the current unstable capital market environment, it is important to
20 select relatively large sample sizes representative of the electric utility industry
21 as a whole, as opposed to small sample sizes consisting of a handful of

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1 companies. This is because the equity market as a whole and electric utility
2 industry capital market data is volatile at this time. As a result of this volatility,
3 the composition of small groups of companies is very fluid, with companies
4 exiting the sample due to dividend suspensions or reductions, insufficient or
5 unrepresentative historical data due to recent mergers, impending merger or
6 acquisition, and changing corporate identities due to restructuring activities.

7 From a statistical standpoint, confidence in the reliability of the DCF
8 model result is considerably enhanced when applying the DCF model to a large
9 group of companies. Any distortions introduced by measurement errors in the
10 two DCF components of equity return for individual companies, namely
11 dividend yield and growth are mitigated. Utilizing a large portfolio of
12 companies reduces the influence of either overestimating or underestimating the
13 cost of equity for any one individual company. For example, in a large group of
14 companies, positive and negative deviations from the expected growth will tend
15 to cancel out owing to the law of large numbers, provided that the errors are
16 independent.⁹ The average growth rate of several companies is less likely to

⁹ If σ_i^2 represents the average variance of the errors in a group of N companies, and σ_{ij} the average covariance between the errors, then the variance of the error for the group of N companies, σ_N^2 is:

$$\sigma_N^2 = \frac{1}{N} \sigma_i^2 + \frac{N-1}{N} \sigma_{ij}$$

If the errors are independent, the covariance between them (σ_{ij}) is zero, and the variance of the error for the group is reduced to:

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1 diverge from expected growth than is the estimate of growth for a single firm.
2 More generally, the assumptions of the DCF model are more likely to be
3 fulfilled for a large group of companies than for any single firm or for a small
4 group of companies.

5 Moreover, small samples are subject to measurement error, and in
6 violation of the Central Limit Theorem of statistics.¹⁰ From a statistical
7 standpoint, reliance on robust sample sizes mitigates the impact of possible
8 measurement errors and vagaries in individual companies' market data.
9 Examples of such vagaries include dividend suspension, insufficient or
10 unrepresentative historical data due to a recent merger, impending merger or
11 acquisition, and a new corporate identity due to restructuring.

12 The point of all this is that the use of a handful of companies in a highly
13 fluid and unstable industry produces fragile and statistically unreliable results.

$$\sigma_N^2 = \frac{1}{N} \sigma_i^2$$

As N gets progressively larger, the variance gets smaller and smaller.

¹⁰ The Central Limit Theorem describes the characteristics of the distribution of values we would obtain if we were able to draw an infinite number of random samples of a given size from a given population and we calculated the mean of each sample. The Central Limit Theorem asserts: [1] The mean of the sampling distribution of means is equal to the mean of the population from which the samples were drawn. [2] The variance of the sampling distribution of means is equal to the variance of the population from which the samples were drawn divided by the size of the samples. [3] If the original population is distributed normally, the sampling distribution of means will also be normal. If the original population is not normally distributed, the sampling distribution of means will increasingly approximate a normal distribution as sample size increases.

1 A far safer procedure is to employ large sample sizes representative of the
2 industry as a whole and apply subsequent risk adjustments to the extent that the
3 company's risk profile differs from that of the industry average.

4 **Q. CAN YOU DESCRIBE YOUR PROXY GROUP FOR DUKE ENERGY**
5 **OHIO'S UTILITY BUSINESS?**

6 A. As a proxy for Duke Energy Ohio, I examined a group of investment-grade
7 dividend-paying combination gas and electric utilities covered in Value Line's
8 Electric Utility industry group, meaning that these companies all possess utility
9 assets similar to Duke Energy Ohio's. I began with all the companies designated
10 as electric utilities by Value Line, that is, with Standard Industrial Classification
11 codes 4911 to 4913. Foreign companies, private partnerships, private
12 companies, non-dividend-paying companies, and companies below investment-
13 grade (with a Moody's bond rating below Baa3 as reported in AUS Utility
14 Reports September 2014) were eliminated, as well as those companies whose
15 market capitalization was less than \$1 billion, in order to minimize any stock
16 price anomalies due to thin trading¹¹. The final group of companies, shown on
17 Exhibit RAM-2, only includes those companies with at least 50% of their
18 revenues from regulated utility operations.

¹¹ This is necessary in order to minimize the well-known thin trading bias in measuring beta.

1 I stress that this proxy group must be viewed as a portfolio of comparable
2 risk. It would be inappropriate to select any particular company or subset of
3 companies from this group and infer the cost of common equity from that
4 company or subset alone.

5 **Q. WHAT DCF RESULTS DID YOU OBTAIN USING VALUE LINE**
6 **GROWTH PROJECTIONS?**

7 A. Page 1 of Exhibit RAM-2 shows the raw dividend yield and growth input data
8 for the 26 companies, while page 2 displays the DCF analysis. Exelon was
9 eliminated since less than 50% of its revenues are subject to regulation. As
10 shown on Column 3, line 37 of page 2 of Exhibit RAM-2, the average long-term
11 earnings per share growth forecast obtained from Value Line is 5.38% for this
12 group. Combining this growth rate with the average expected dividend yield of
13 4.05% shown in Column 4 produces an estimate of equity costs of 9.43% for the
14 group shown in Column 5. Recognition of flotation costs brings the cost of
15 equity estimate to 9.64% for the group, shown in Column 6. The need for a
16 flotation cost allowance is discussed at length later in my testimony.

17 **Q. WHAT DCF RESULTS DID YOU OBTAIN USING THE ANALYSTS'**
18 **CONSENSUS GROWTH FORECAST?**

19 A. From the original sample of 26 companies shown on page 1 of Exhibit RAM-3,
20 Exelon was eliminated since less than 50% of its revenues are subject to
21 regulation. For the remaining 25 companies shown on page 2 of Exhibit RAM-

1 3, using the consensus analysts' earnings growth forecast of 5.51% instead of the
2 Value Line forecast, the cost of equity for the group is 9.57%, unadjusted for
3 flotation cost. Recognition of flotation costs brings the cost of equity estimate to
4 9.79%, shown in Column 6, line 27.

5 **Q. PLEASE SUMMARIZE YOUR DCF ESTIMATES.**

6 A. The table below summarizes the DCF estimates:

<u>DCF STUDY</u>	<u>ROE</u>
Electric Utilities Value Line Growth	9.6%
Electric Utilities Analysts Growth	9.8%

7 **Q. DR. MORIN, PLEASE PROVIDE AN OVERVIEW OF YOUR RISK**
8 **PREMIUM ANALYSES.**

9 A. In order to quantify the risk premium for Duke Energy Ohio, I have performed
10 four risk premium studies. The first two studies deal with aggregate stock
11 market risk premium evidence using two versions of the CAPM methodology
12 and the other two studies deal with the electric utility industry.

B. CAPM Estimates

13 **Q. PLEASE DESCRIBE YOUR APPLICATION OF THE CAPM RISK**
14 **PREMIUM APPROACH.**

15 A. My first two risk premium estimates are based on the CAPM and on an
16 empirical approximation to the CAPM (ECAPM). The CAPM is a fundamental
17 paradigm of finance. Simply put, the fundamental idea underlying the CAPM is

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1 that risk-averse investors demand higher returns for assuming additional risk,
2 and higher-risk securities are priced to yield higher expected returns than lower-
3 risk securities. The CAPM quantifies the additional return, or risk premium,
4 required for bearing incremental risk. It provides a formal risk-return
5 relationship anchored on the basic idea that only market risk matters, as
6 measured by beta. According to the CAPM, securities are priced such that:

7
$$\text{EXPECTED RETURN} = \text{RISK-FREE RATE} + \text{RISK PREMIUM}$$

8 Denoting the risk-free rate by R_F and the return on the market as a whole
9 by R_M , the CAPM is stated as follows:

10
$$K = R_F + \beta(R_M - R_F)$$

11 This is the seminal CAPM expression, which states that the return
12 required by investors is made up of a risk-free component, R_F , plus a risk
13 premium determined by $\beta(R_M - R_F)$. The bracketed expression ($R_M - R_F$)
14 expression is known as the market risk premium (MRP). To derive the CAPM
15 risk premium estimate, three quantities are required: the risk-free rate (R_F), beta
16 (β), and the MRP, ($R_M - R_F$). For the risk-free rate, I used 5.0%, based on
17 forecast interest rates on long-term U.S. Treasury bonds. For beta, I used 0.74
18 based on Value Line estimates, and for the MRP, I used 7.2% based on both
19 historical and prospective studies. These inputs to the CAPM are explained
20 below.

1 **Q. HOW DID YOU ARRIVE AT YOUR RISK-FREE RATE ESTIMATE OF**
2 **5.0% IN YOUR CAPM AND RISK PREMIUM ANALYSES?**

3 A. To implement the CAPM and Risk Premium methods, an estimate of the risk-
4 free return is required as a benchmark. I relied on noted economic forecasts
5 which call for a rising trend in interest rates in response to the recovering
6 economy, renewed inflation, and record high federal deficits.

7 **Q. WHY DID YOU RELY ON LONG-TERM BONDS INSTEAD OF SHORT-**
8 **TERM BONDS?**

9 A. The appropriate proxy for the risk-free rate in the CAPM is the return on the
10 longest term Treasury bond possible. This is because common stocks are very
11 long-term instruments more akin to very long-term bonds rather than to short-
12 term Treasury bills or intermediate-term Treasury notes. In a risk premium
13 model, the ideal estimate for the risk-free rate has a term to maturity equal to the
14 security being analyzed. Since common stock is a very long-term investment
15 because the cash flows to investors in the form of dividends last indefinitely, the
16 yield on the longest-term possible government bonds, that is the yield on 30-year
17 Treasury bonds, is the best measure of the risk-free rate for use in the CAPM.
18 The expected common stock return is based on very long-term cash flows,
19 regardless of an individual's holding time period. Moreover, utility asset
20 investments generally have very long-term useful lives and should
21 correspondingly be matched with very long-term maturity financing instruments.

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1 While long-term Treasury bonds are potentially subject to interest rate
2 risk, this is only true if the bonds are sold prior to maturity. A substantial
3 fraction of bond market participants, usually institutional investors with long-
4 term liabilities (*e.g.*, pension funds and insurance companies), in fact hold bonds
5 until they mature, and therefore are not subject to interest rate risk. Moreover,
6 institutional bondholders neutralize the impact of interest rate changes by
7 matching the maturity of a bond portfolio with the investment planning period,
8 or by engaging in hedging transactions in the financial futures markets. The
9 merits and mechanics of such immunization strategies are well documented by
10 both academicians and practitioners.

11 Another reason for utilizing the longest maturity Treasury bond possible
12 is that common equity has an infinite life span, and the inflation expectations
13 embodied in its market-required rate of return will therefore be equal to the
14 inflation rate anticipated to prevail over the very long term. The same
15 expectation should be embodied in the risk-free rate used in applying the CAPM
16 model. It stands to reason that the yields on 30-year Treasury bonds will more
17 closely incorporate within their yields the inflation expectations that influence
18 the prices of common stocks than do short-term Treasury bills or
19 intermediate-term U.S. Treasury notes.

20 Among U.S. Treasury securities, 30-year Treasury bonds have the
21 longest term to maturity and the yields on such securities should be used as

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1 proxies for the risk-free rate in applying the CAPM. Therefore, I have relied on
2 the yield on 30-year Treasury bonds in implementing the CAPM and risk
3 premium methods.

4 **Q. DR. MORIN, ARE THERE OTHER REASONS WHY YOU REJECT**
5 **SHORT-TERM INTEREST RATES AS PROXIES FOR THE RISK-FREE**
6 **RATE IN IMPLEMENTING THE CAPM?**

7 A. Yes. Short-term rates are volatile, fluctuate widely, and are subject to more
8 random disturbances than are long-term rates. Short-term rates are largely
9 administered rates. For example, Treasury bills are used by the Federal Reserve
10 as a policy vehicle to stimulate the economy and to control the money supply,
11 and are used by foreign governments, companies, and individuals as a temporary
12 safe-house for money.

13 As a practical matter, it makes no sense to match the return on common
14 stock to the yield on 90-day Treasury Bills. This is because short-term rates,
15 such as the yield on 90-day Treasury Bills, fluctuate widely, leading to volatile
16 and unreliable equity return estimates. Moreover, yields on 90-day Treasury
17 Bills typically do not match the equity investor's planning horizon. Equity
18 investors generally have an investment horizon far in excess of 90 days.

19 As a conceptual matter, short-term Treasury Bill yields reflect the impact
20 of factors different from those influencing the yields on long-term securities such
21 as common stock. For example, the premium for expected inflation embedded

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1 into 90-day Treasury Bills is likely to be far different than the inflationary
2 premium embedded into long-term securities yields. On grounds of stability and
3 consistency, the yields on long-term Treasury bonds match more closely with
4 common stock returns.

5 **Q. WHAT IS YOUR ESTIMATE OF THE RISK-FREE RATE IN**
6 **APPLYING THE CAPM?**

7 A. All the noted interest rate forecasts that I am aware of point to significantly
8 higher interest rates over the next several years. The table below reports the
9 forecast yields on 30-year US Treasury bonds from various prominent sources,
10 including Global Insight, Value Line, Congressional Business Office (CBO), and
11 EIA Energy Outlook. The forecasts are remarkably consistent, pointing to a
12 5.0% yield on US Treasury Bonds in the next several years. It is also
13 noteworthy that the historical return on long-term Treasury bonds has averaged
14 5.1% over the long period 1926-2013.

30-YEAR TREASURY BOND YIELD FORECASTS

	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2020</u>	<u>long-term</u>
Global Insight	4.2	4.5	4.6	4.6	4.6	4.6
Value Line	3.8	4.3	4.8	4.8	N/A	N/A
CBO	4.2	4.8	5.2	5.5	5.5	5.5
EIA Energy Outlook	3.4	4.4	5.1	5.4	4.6	5.0
AVERAGE	3.9	4.5	4.9	5.1	4.9	5.0

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1 Global Insight forecasts a yield of 4.2% in 2015, 4.5% in 2016, 4.6% in
2 2017 and 2018, and leveling to 4.6% thereafter. Value Line's quarterly economic
3 review of August 2014 forecasts a yield of 3.8% in 2015, 4.3% in 2016, 4.8% in
4 2017, and 4.8% in 2018. The CBO February 2014 edition forecasts a yield of
5 5.5% in the next several years.¹² The EIA Annual Outlook 2014 forecasts
6 steadily rising yields to 5.0% for the long-term. The average 30-year long-term
7 bond yield forecast for the next several years from the four sources is 5.0%. The
8 rising yield forecasts are also quite consistent with the sharply upward-sloping
9 yield curve observed at this time. Based on this consistent evidence, a long-term
10 bond yield forecast of 5.0% is a reasonable estimate of the expected risk-free
11 rate for purposes of forward-looking CAPM/ECAPM and Risk Premium
12 analyses in the current economic environment.

13 **Q. DR. MORIN, WHY DID YOU IGNORE THE CURRENT LEVEL OF**
14 **INTEREST RATES IN DEVELOPING YOUR PROXY FOR THE RISK-**
15 **FREE RATE IN A CAPM ANALYSIS?**

16 **A.** The CAPM is a forward-looking model based on expectations of the future. As
17 a result, in order to produce a meaningful estimate of investors' required rate of
18 return, the CAPM must be applied using data that reflects the expectations of

¹² Global Insight forecasts are for 30-year bonds, while both Value Line, EIA, and CBO forecasts are for 10-year bonds. 50 basis points were added to the 10-year forecasts based on the historical 50 basis points spread between 10 and 30-year yields.

1 actual investors in the market. While investors examine history as a guide to the
2 future, it is the expectations of future events that influence security values and
3 the cost of capital.

4 **Q. HOW DID YOU SELECT THE BETA FOR YOUR CAPM ANALYSIS?**

5 A. A major thrust of modern financial theory as embodied in the CAPM is that
6 perfectly diversified investors can eliminate the company-specific component of
7 risk, and that only market risk remains. The latter is technically known as “beta”
8 (β), or “systematic risk.” The beta coefficient measures change in a security’s
9 return relative to that of the market. The beta coefficient states the extent and
10 direction of movement in the rate of return on a stock relative to the movement
11 in the rate of return on the market as a whole. It indicates the change in the rate
12 of return on a stock associated with a one percentage point change in the rate of
13 return on the market, and thus measures the degree to which a particular stock
14 shares the risk of the market as a whole. Modern financial theory has established
15 that beta incorporates several economic characteristics of a corporation that are
16 reflected in investors’ return requirements.

17 Duke Energy Ohio is not publicly traded, and therefore, proxies must be
18 used. In the discussion of DCF estimates of the cost of common equity earlier, I
19 examined a sample of widely traded investment-grade dividend-paying
20 combination gas and electric utilities covered by Value Line. The average beta

1 for this group is 0.74, as shown on Exhibit RAM-4. Based on this result, I shall
2 use 0.74 in the CAPM and ECAPM analyses.

3 **Q. WHAT MRP DID YOU USE IN YOUR CAPM ANALYSIS?**

4 A. For the MRP, I used 7.2%. This estimate was based on the results of both
5 forward-looking and historical studies of long-term risk premiums.

6 **Q. CAN YOU DESCRIBE THE HISTORICAL MRP STUDY USED IN**
7 **YOUR CAPM ANALYSIS?**

8 A. Yes. The historical MRP estimate is based on the results obtained in the
9 Morningstar (formerly Ibbotson Associates) study, *Ibbotson SBBI 2014 Classic*
10 *Yearbook*, which compiles historical returns from 1926 to 2013. This well-
11 known study shows that a very broad market sample of common stocks
12 outperformed long-term U.S. Government bonds by 6.2%. The historical MRP
13 over the income component of long-term Government bonds rather than over the
14 total return is 7.0%. Morningstar recommends the use of the latter as a more
15 reliable estimate of the historical MRP, and I concur with this viewpoint. The
16 historical MRP should be computed using the income component of bond
17 returns because the intent, even using historical data, is to identify an expected
18 MRP. This is because the income component of total bond return (*i.e.*, the
19 coupon rate) is a far better estimate of expected return than the total return (*i.e.*,
20 the coupon rate + capital gain), because both realized capital gains and realized
21 losses are largely unanticipated by bond investors. The long-horizon (1926-

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1 2013) MRP (based on income returns, as required) is specifically calculated to
2 be 7.0% rather than 6.2%.

3 **Q. ON WHAT MATURITY BOND DOES THE MORNINGSTAR**
4 **HISTORICAL RISK PREMIUM DATA RELY?**

5 A. Because 30-year bonds were not always traded or even available throughout the
6 entire 1926-2013 period covered in the Morningstar Study of historical returns,
7 the latter study relied on bond return data based on 20-year Treasury bonds.
8 Given that the normal yield curve is virtually flat above maturities of 20 years
9 over most of the period covered in the Morningstar study, the difference in yield
10 is not material.

11 **Q. WHY DID YOU USE LONG TIME PERIODS IN ARRIVING AT YOUR**
12 **HISTORICAL MRP ESTIMATE?**

13 A. Because realized returns can be substantially different from prospective returns
14 anticipated by investors when measured over short time periods, it is important
15 to employ returns realized over long time periods rather than returns realized
16 over more recent time periods when estimating the MRP with historical returns.
17 Therefore, a risk premium study should consider the longest possible period for
18 which data are available. Short-run periods during which investors earned a
19 lower risk premium than they expected are offset by short-run periods during
20 which investors earned a higher risk premium than they expected. Only over
21 long time periods will investor return expectations and realizations converge.

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1 I have therefore ignored realized risk premiums measured over short time
2 periods. Instead, I relied on results over periods of enough length to smooth out
3 short-term aberrations, and to encompass several business and interest rate
4 cycles. The use of the entire study period in estimating the appropriate MRP
5 minimizes subjective judgment and encompasses many diverse regimes of
6 inflation, interest rate cycles, and economic cycles.

7 To the extent that the estimated historical equity risk premium follows
8 what is known in statistics as a random walk, one should expect the equity risk
9 premium to remain at its historical mean. Since I found no evidence that the
10 MRP in common stocks has changed over time, that is, no significant serial
11 correlation in the Morningstar study prior to that time, it is reasonable to assume
12 that these quantities will remain stable in the future.

13 **Q. SHOULD STUDIES OF HISTORICAL RISK PREMIUMS RELY ON**
14 **ARITHMETIC AVERAGE RETURNS OR ON GEOMETRIC AVERAGE**
15 **RETURNS?**

16 A. Whenever relying on historical risk premiums, only arithmetic average returns
17 over long periods are appropriate for forecasting and estimating the cost of
18 capital, and geometric average returns are not.¹³

¹³See Roger A. Morin, *Regulatory Finance: Utilities' Cost of Capital*, chapter 11 (1994); Roger A. Morin, *The New Regulatory Finance: Utilities' Cost of Capital*, chapter 4 (2006); Richard A. Brealey, *et al.*, *Principles of Corporate Finance* (8th ed. 2006).

1 **Q. PLEASE EXPLAIN HOW THE ISSUE OF WHAT IS THE PROPER**
2 **“MEAN” ARISES IN THE CONTEXT OF ANALYZING THE COST OF**
3 **EQUITY?**

4 **A.** The issue arises in applying methods that derive estimates of a utility’s cost of
5 equity from historical relationships between bond yields and earned returns on
6 equity for individual companies or portfolios of several companies. Those
7 methods produce series of numbers representing the annual difference between
8 bond yields and stock returns over long historical periods. The question is how
9 to translate those series into a single number that can be added to a current bond
10 yield to estimate the current cost of equity for a stock or a portfolio. Calculating
11 geometric and arithmetic means are two ways of converting series of numbers to
12 a single, representative figure.

13 **Q. IF BOTH ARE “REPRESENTATIVE” OF THE SERIES, WHAT IS THE**
14 **DIFFERENCE BETWEEN THE TWO?**

15 **A.** Each represents different information about the series. The geometric mean of a
16 series of numbers is the value which, if compounded over the period examined,
17 would have made the starting value to grow to the ending value. The arithmetic
18 mean is simply the average of the numbers in the series. Where there is any
19 annual variation (volatility) in a series of numbers, the arithmetic mean of the
20 series, which reflects volatility, will always exceed the geometric mean, which
21 ignores volatility. Because investors require higher expected returns to invest in

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1 a company whose earnings are volatile than one whose earnings are stable, the
2 geometric mean is not useful in estimating the expected rate of return which
3 investors require to make an investment.

4 **Q. CAN YOU PROVIDE A NUMERICAL EXAMPLE TO ILLUSTRATE**
5 **THIS DIFFERENCE BETWEEN GEOMETRIC AND ARITHMETIC**
6 **MEANS?**

7 A. Yes. The following table compares the geometric and arithmetic mean returns of
8 a hypothetical Stock A, whose yearly returns over a ten-year period are very
9 volatile, with those of a hypothetical Stock B, whose yearly returns are perfectly
10 stable during that period. Consistent with the point that geometric returns ignore
11 volatility, the geometric mean returns for the two series are identical (11.6% in
12 both cases), whereas the arithmetic mean return of the volatile stock (26.7%) is
13 much higher than the arithmetic mean return of the stable stock (11.6%):

GEOMETRIC VS. ARITHMETIC RETURNS

YEAR	STOCK A	STOCK B
2004	50.0%	11.6%
2005	-54.7%	11.6%
2006	98.5%	11.6%
2007	42.2%	11.6%
2008	-32.3%	11.6%
2009	-39.2%	11.6%
2010	153.2%	11.6%
2011	-10.0%	11.6%
2012	38.9%	11.6%
2013	20.0%	11.6%
Arithmetic Mean Return	26.7%	11.6%

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Geometric Mean Return	11.6%	11.6%
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If relying on geometric means, investors would require the same expected return to invest in both of these stocks, even though the volatility of returns in Stock A is very high while Stock B exhibits perfectly stable returns. That is clearly contrary to the most basic financial theory, that is, the higher the risk the higher the expected return.

Chapter 4 Appendix A of my book *The New Regulatory Finance* contains a detailed and rigorous discussion of the impropriety of using geometric averages in estimating the cost of capital. Briefly, the disparity between the arithmetic average return and the geometric average return raises the question as to what purposes should these different return measures be used. The answer is that the geometric average return should be used for measuring historical returns that are compounded over multiple time periods. The arithmetic average return should be used for future-oriented analysis, where the use of expected values is appropriate. It is inappropriate to average the arithmetic and geometric average return; they measure different quantities in different ways.

Q. CAN YOU DESCRIBE THE PROSPECTIVE MRP STUDY USED IN YOUR CAPM ANALYSIS?

A. Yes. I applied a prospective DCF analysis to the aggregate equity market. The computations are shown in Exhibit RAM-5. The dividend yield on the S&P 500

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1 Index is currently 2.1%, and the average projected long-term analyst growth rate
2 is 10.1%, obtained from Yahoo Finance. Adding the expected dividend yield to
3 the growth component produces an expected market return on aggregate equities
4 of 12.4%. Subtracting the risk-free rate of 5.0% from the latter, the implied risk
5 premium is 7.4% over long-term U.S. Treasury bonds. This estimate is slightly
6 higher than the historical estimate of 7.0%. This is not surprising given the
7 repricing of risk in the investment community that followed the financial crisis
8 of 2008-2009, and the continuing volatility in financial markets that have caused
9 an upward shift in investors' risk aversion.

10 The average of the historical MRP of 7.0% and the prospective MRP of
11 7.4% is 7.2%, which is my final estimate of the MRP for purposes of
12 implementing the CAPM.

13 **Q. DR. MORIN, IS YOUR MRP ESTIMATE OF 7.2% CONSISTENT WITH**
14 **THE ACADEMIC LITERATURE ON THE SUBJECT?**

15 **A.** Yes, it is, although in the upper portion of the range. In their authoritative
16 corporate finance textbook, Professors Brealey, Myers, and Allen¹⁴ conclude
17 from their review of the fertile literature on the MRP that a range of 5% to 8% is
18 reasonable for the MRP in the United States. My own survey of the MRP

¹⁴ Richard A. Brealey, Stewart C. Myers, and Paul Allen, Principles of Corporate Finance, 8th Edition, Irwin McGraw-Hill, 2006.

1 literature, which appears in Chapter 5 of my latest textbook, The New
2 Regulatory Finance, is also quite consistent with this range.

3 **Q. WHAT IS YOUR RISK PREMIUM ESTIMATE OF DUKE ENERGY**
4 **OHIO'S COST OF EQUITY USING THE CAPM APPROACH?**

5 A. Inserting those input values into the CAPM equation, namely a risk-free rate of
6 5.0%, a beta of 0.74, and a MRP of 7.2%, the CAPM estimate of the cost of
7 common equity is: $5.0\% + 0.74 \times 7.2\% = 10.3\%$. This estimate becomes 10.5%
8 with flotation costs, discussed later in my testimony.

9 **Q. CAN YOU DESCRIBE YOUR APPLICATION OF THE EMPIRICAL**
10 **VERSION OF THE CAPM?**

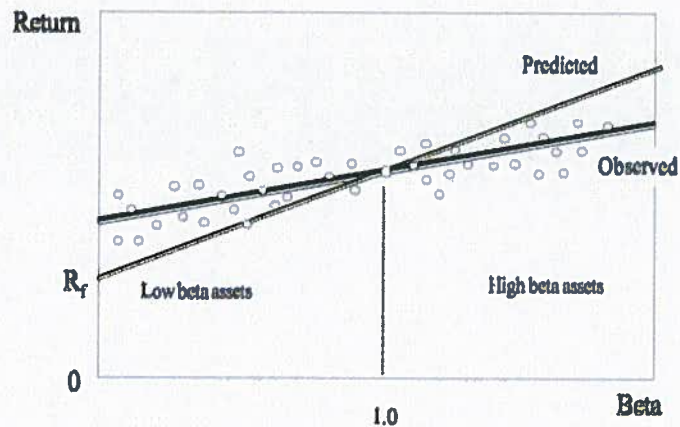
11 A. There have been countless empirical tests of the CAPM to determine to what
12 extent security returns and betas are related in the manner predicted by the
13 CAPM. This literature is summarized in Chapter 6 of my latest book, The New
14 Regulatory Finance. The results of the tests support the idea that beta is related
15 to security returns, that the risk-return tradeoff is positive, and that the
16 relationship is linear. The contradictory finding is that the risk-return tradeoff is
17 not as steeply sloped as the predicted CAPM. That is, empirical research has
18 long shown that low-beta securities earn returns somewhat higher than the
19 CAPM would predict, and high-beta securities earn less than predicted.

20 A CAPM-based estimate of cost of capital underestimates the return
21 required from low-beta securities and overstates the return required from

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1 high-beta securities, based on the empirical evidence. This is one of the most
2 well-known results in finance, and it is displayed graphically below.

CAPM: Predicted vs Observed Returns



3 A number of variations on the original CAPM theory have been
4 proposed to explain this finding. The ECAPM makes use of these empirical
5 findings. The ECAPM estimates the cost of capital with the equation:

6
$$K = R_F + \alpha + \beta \times (MRP - \alpha)$$

7 where the symbol alpha, α , represents the “constant” of the risk-return line,
8 MRP is the market risk premium ($R_M - R_F$), and the other symbols are defined
9 as usual.

10 Inserting the long-term risk-free rate as a proxy for the risk-free rate, an
11 alpha in the range of 1% - 2%, and reasonable values of beta and the MRP in

1 the above equation produces results that are indistinguishable from the
2 following more tractable ECAPM expression:

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

4 An alpha range of 1% - 2% is somewhat lower than that estimated
5 empirically. The use of a lower value for alpha leads to a lower estimate of
6 the cost of capital for low-beta stocks such as regulated utilities. This is
7 because the use of a long-term risk-free rate rather than a short-term risk-free
8 rate already incorporates some of the desired effect of using the ECAPM. In
9 other words, the long-term risk-free rate version of the CAPM has a higher
10 intercept and a flatter slope than the short-term risk-free version which has
11 been tested. This is also because the use of adjusted betas rather than the use
12 of raw betas also incorporates some of the desired effect of using the
13 ECAPM.¹⁵ Thus, it is reasonable to apply a conservative alpha adjustment.

14 Appendix A contains a full discussion of the ECAPM, including its
15 theoretical and empirical underpinnings. In short, the following equation

¹⁵ The regression tendency of betas to converge to 1.0 over time is very well known and widely discussed in the financial literature. As a result of this beta drift, several commercial beta producers adjust their forecasted betas toward 1.00 in an effort to improve their forecasts. Value Line, Bloomberg, and Merrill Lynch betas are adjusted for their long-term tendency to regress toward 1.0 by giving approximately 66% weight to the measured raw beta and approximately 33% weight to the prior value of 1.0 for each stock:

$$\beta_{\text{adjusted}} = 0.33 + 0.66 \beta_{\text{raw}}$$

1 provides a viable approximation to the observed relationship between risk and
2 return, and provides the following cost of equity capital estimate:

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

4 Inserting 5.0% for the risk-free rate R_F , a MRP of 7.2% for $(R_M - R_F)$ and
5 a beta of 0.74 in the above equation, the return on common equity is 10.8%.
6 This estimate becomes 11.0% with flotation costs, discussed later in my
7 testimony.

8 **Q. IS THE USE OF THE ECAPM CONSISTENT WITH THE USE OF**
9 **ADJUSTED BETAS?**

10 **A.** Yes, it is. Some have argued that the use of the ECAPM is inconsistent with the
11 use of adjusted betas, such as those supplied by Value Line, Bloomberg, and
12 Morningstar. This is because the reason for using the ECAPM is to allow for the
13 tendency of betas to regress toward the mean value of 1.00 over time, and, since
14 Value Line betas are already adjusted for such trend, an ECAPM analysis results
15 in double-counting. This argument is erroneous. Fundamentally, the ECAPM is
16 not an adjustment, increase or decrease in beta. The observed return on high
17 beta securities is actually lower than that produced by the CAPM estimate. The
18 ECAPM is a formal recognition that the observed risk-return tradeoff is flatter
19 than predicted by the CAPM based on myriad empirical evidence. The ECAPM
20 and the use of adjusted betas comprise two separate features of asset pricing.
21 Even if a company's beta is estimated accurately, the CAPM still understates the

1 return for low-beta stocks. Even if the ECAPM is used, the return for low-beta
2 securities is understated if the betas are understated. Referring back to the
3 previous graph, the ECAPM is a return (vertical axis) adjustment and not a beta
4 (horizontal axis) adjustment. Both adjustments are necessary. Moreover, the
5 use of adjusted betas compensates for interest rate sensitivity of utility stocks not
6 captured by unadjusted betas.

7 **Q. PLEASE SUMMARIZE YOUR CAPM ESTIMATES.**

8 A. The table below summarizes the common equity estimates obtained from the
9 CAPM studies.

<u>CAPM Method</u>	<u>ROE</u>
Traditional CAPM	10.5%
Empirical CAPM	11.0%

C. Historical Risk Premium Estimate

10 **Q. PLEASE DESCRIBE YOUR HISTORICAL RISK PREMIUM ANALYSIS**
11 **OF THE ELECTRIC UTILITY INDUSTRY USING TREASURY BOND**
12 **YIELDS.**

13 A. A historical risk premium for the electric utility industry was estimated with an
14 annual time series analysis applied to the utility industry as a whole over the
15 1930-2013 period, using *Standard and Poor's Utility Index* as an industry proxy.
16 The analysis is depicted on Exhibit RAM-6. The risk premium was estimated by

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1 computing the actual realized return on equity capital for the S&P Utility Index
2 for each year, using the actual stock prices and dividends of the index, and then
3 subtracting the long-term Treasury bond return for that year.

4 As shown on Exhibit RAM-6, the average risk premium over the period
5 was 5.5% over long-term Treasury bond yields. Given the risk-free rate of 5.0%,
6 and using the historical estimate of 5.5%, the implied cost of equity is $5.0\% +$
7 $5.5\% = 10.5\%$ without flotation costs and 10.7% with the flotation cost
8 allowance.

9 **Q. DR. MORIN, ARE RISK PREMIUM STUDIES WIDELY USED?**

10 A. Yes, they are. Risk Premium analyses are widely used by analysts, investors,
11 economists, and expert witnesses. Most college-level corporate finance and/or
12 investment management texts, including Investments by Bodie, Kane, and
13 Marcus¹⁶, which is a recommended textbook for CFA (Chartered Financial
14 Analyst) certification and examination, contain detailed conceptual and
15 empirical discussion of the risk premium approach. Risk Premium analysis is
16 typically recommended as one of the three leading methods of estimating the
17 cost of capital. Professor Brigham's best-selling corporate finance textbook, for
18 example, Corporate Finance: A Focused Approach¹⁷, recommends the use of risk

¹⁶ McGraw-Hill Irwin, 2002.

¹⁷ Fourth edition, South-Western, 2011.

1 premium studies, among others. Techniques of risk premium analysis are
2 widespread in investment community reports. Professional certified financial
3 analysts are certainly well versed in the use of this method. The only difference
4 is that I rely on long-term Treasury yields instead of the yields on A-rated utility
5 bonds.

6 **Q. ARE YOU CONCERNED ABOUT THE REALISM OF THE**
7 **ASSUMPTIONS THAT UNDERLIE THE HISTORICAL RISK**
8 **PREMIUM METHOD?**

9 A. No, I am not, for they are no more restrictive than the assumptions that underlie
10 the DCF model or the CAPM. While it is true that the method looks backward
11 in time and assumes that the risk premium is constant over time, these
12 assumptions are not necessarily restrictive. By employing returns realized over
13 long time periods rather than returns realized over more recent time periods,
14 investor return expectations and realizations converge. Realized returns can be
15 substantially different from prospective returns anticipated by investors,
16 especially when measured over short time periods. By ensuring that the risk
17 premium study encompasses the longest possible period for which data are
18 available, short-run periods during which investors earned a lower risk premium
19 than they expected are offset by short-run periods during which investors earned
20 a higher risk premium than they expected. Only over long time periods will

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1 investor return expectations and realizations converge, or else, investors would
2 be reluctant to invest money.

D. Allowed Risk Premiums

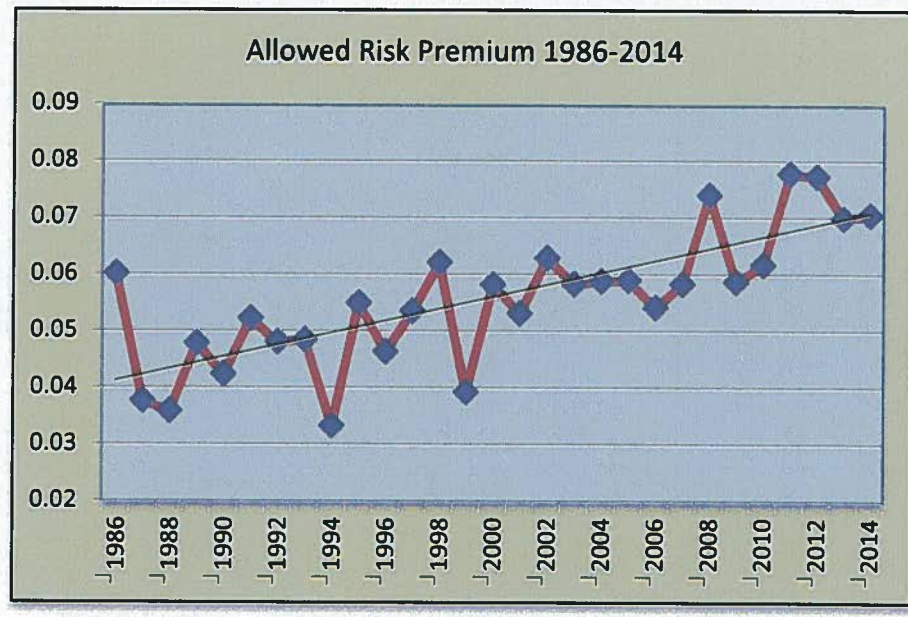
3 **Q. PLEASE DESCRIBE YOUR ANALYSIS OF ALLOWED RISK**
4 **PREMIUMS IN THE ELECTRIC UTILITY INDUSTRY.**

5 A. To estimate Duke Energy Ohio's cost of common equity, I also examined the
6 historical risk premiums implied in the ROEs allowed by regulatory
7 commissions for electric utilities over the 1986-2014 period for which data were
8 available, relative to the contemporaneous level of the long-term Treasury bond
9 yield. The analysis is shown on Exhibit RAM-7. This variation of the risk
10 premium approach is reasonable because allowed risk premiums are presumably
11 based on the results of market-based methodologies (DCF, Risk Premium,
12 CAPM, etc.) presented to regulators in rate hearings and on the actions of
13 objective unbiased investors in a competitive marketplace. Historical allowed
14 ROE data are readily available over long periods on a quarterly basis from
15 Regulatory Research Associates (now SNL) and easily verifiable from SNL
16 publications and past commission decision archives.

17 The average ROE spread over long-term Treasury yields was 5.6% over
18 the entire 1986-2014 period for which data were available from SNL. It is
19 interesting to note that this estimate is nearly identical to the previous estimate of
20 5.5% obtained from the historical risk premium analysis. The graph below

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1 shows the year-by-year allowed risk premium. The escalating trend of the risk
2 premium in response to lower interest rates and rising competition is noteworthy.



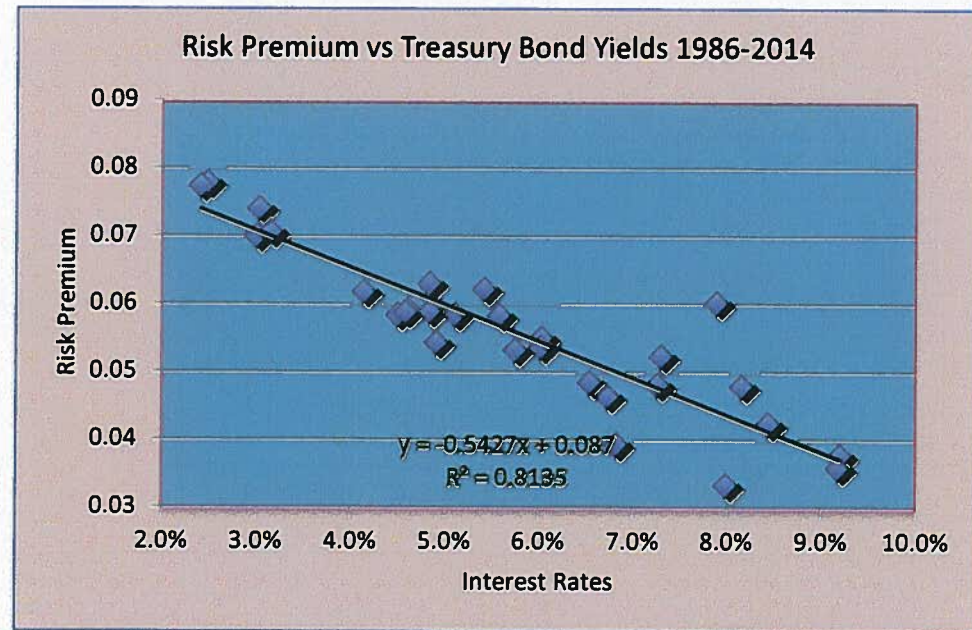
3 A careful review of these ROE decisions relative to interest rate trends
4 reveals a narrowing of the risk premium in times of rising interest rates, and a
5 widening of the premium as interest rates fall. The following statistical
6 relationship between the risk premium (RP) and interest rates (YIELD) emerges
7 over the 1986-2014 period:

8
$$RP = 8.700 - 0.5427 \text{ YIELD} \quad R^2 = 0.81$$

9 The relationship is highly statistically significant¹⁸ as indicated by the very high

¹⁸ The coefficient of determination R^2 , sometimes called the “goodness of fit measure,” is a measure of the degree of explanatory power of a statistical relationship. It is simply the ratio of the explained portion

- 1 R^2 . The graph below shows a clear inverse relationship between the allowed risk
2 premium and interest rates as revealed in past ROE decisions.



- 3 Inserting the current long-term Treasury bond yield of 5.0% in the above
4 equation suggests a risk premium estimate of 6.0%, implying a cost of equity of
5 11.0%.

6 **Q. DO INVESTORS TAKE INTO ACCOUNT ALLOWED RETURNS IN**
7 **FORMULATING THEIR RETURN EXPECTATIONS?**

- 8 A. Yes, they do. Investors do indeed take into account returns granted by various
9 regulators in formulating their risk and return expectations, as evidenced by the

to the total sum of squares. The higher R^2 the higher is the degree of the overall fit of the estimated regression equation to the sample data.

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1 availability of commercial publications disseminating such data, including Value
2 Line and SNL (formerly Regulatory Research Associates). Allowed returns,
3 while certainly not a precise indication of a particular company's cost of equity
4 capital, are nevertheless important determinants of investor growth perceptions
5 and investor expected returns.

6 **Q. PLEASE SUMMARIZE YOUR RISK PREMIUM ESTIMATES.**

7 A. The table below summarizes the ROE estimates obtained from the two risk
8 premium studies.

Risk Premium Method	ROE
Historical Risk Premium Electric	10.7%
Allowed Risk Premium	11.0%

E. Need for Flotation Cost Adjustment

9 **Q. PLEASE DESCRIBE THE NEED FOR A FLOTATION COST**
10 **ALLOWANCE.**

11 A. All the market-based estimates reported above include an adjustment for
12 flotation costs. The simple fact of the matter is that issuing common equity
13 capital is not free. Flotation costs associated with stock issues are similar to the
14 flotation costs associated with bonds and preferred stocks. Flotation costs are
15 not expensed at the time of issue, and therefore must be recovered via a rate of
16 return adjustment. This is done routinely for bond and preferred stock issues by

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1 most regulatory commissions, including FERC. Clearly, the common equity
2 capital accumulated by the Company is not cost-free. The flotation cost
3 allowance to the cost of common equity capital is discussed and applied in most
4 corporate finance textbooks; it is unreasonable to ignore the need for such an
5 adjustment.

6 Flotation costs are very similar to the closing costs on a home mortgage.
7 In the case of issues of new equity, flotation costs represent the discounts that
8 must be provided to place the new securities. Flotation costs have a direct and
9 an indirect component. The direct component is the compensation to the
10 security underwriter for his marketing/consulting services, for the risks involved
11 in distributing the issue, and for any operating expenses associated with the issue
12 (e.g., printing, legal, prospectus). The indirect component represents the
13 downward pressure on the stock price as a result of the increased supply of stock
14 from the new issue. The latter component is frequently referred to as "market
15 pressure."

16 Investors must be compensated for flotation costs on an ongoing basis to
17 the extent that such costs have not been expensed in the past, and therefore the
18 adjustment must continue for the entire time that these initial funds are retained
19 in the firm. Appendix B to my testimony discusses flotation costs in detail, and
20 shows: (1) why it is necessary to apply an allowance of 5% to the dividend yield
21 component of equity cost by dividing that yield by 0.95 (100% - 5%) to obtain

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1 the fair return on equity capital; (2) why the flotation adjustment is permanently
2 required to avoid confiscation even if no further stock issues are contemplated;
3 and (3) that flotation costs are only recovered if the rate of return is applied to
4 total equity, including retained earnings, in all future years.

5 By analogy, in the case of a bond issue, flotation costs are not expensed
6 but are amortized over the life of the bond, and the annual amortization charge is
7 embedded in the cost of service. The flotation adjustment is also analogous to
8 the process of depreciation, which allows the recovery of funds invested in
9 utility plant. The recovery of bond flotation expense continues year after year,
10 irrespective of whether the Company issues new debt capital in the future, until
11 recovery is complete, in the same way that the recovery of past investments in
12 plant and equipment through depreciation allowances continues in the future
13 even if no new construction is contemplated. In the case of common stock that
14 has no finite life, flotation costs are not amortized. Thus, the recovery of
15 flotation costs requires an upward adjustment to the allowed return on equity.

16 A simple example will illustrate the concept. A stock is sold for \$100,
17 and investors require a 10% return, that is, \$10 of earnings. But if flotation costs
18 are 5%, the Company nets \$95 from the issue, and its common equity account is
19 credited by \$95. In order to generate the same \$10 of earnings to the
20 shareholders, from a reduced equity base, it is clear that a return in excess of
21 10% must be allowed on this reduced equity base, here 10.53%.

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1 According to the empirical finance literature discussed in Appendix B,
2 total flotation costs amount to 4% for the direct component and 1% for the
3 market pressure component, for a total of 5% of gross proceeds. This in turn
4 amounts to approximately 20 basis points, depending on the magnitude of the
5 dividend yield component. To illustrate, dividing the average expected dividend
6 yield of around 4.0% for utility stocks by 0.95 yields 4.2%, which is 20 basis
7 points higher.

8 Sometimes, the argument is made that flotation costs are real and should
9 be recognized in calculating the fair return on equity, but only at the time when
10 the expenses are incurred. In other words, as the argument goes, the flotation
11 cost allowance should not continue indefinitely, but should be made in the year
12 in which the sale of securities occurs, with no need for continuing compensation
13 in future years. This argument is valid only if the Company has already been
14 compensated for these costs. If not, the argument is without merit. My own
15 recommendation is that investors be compensated for flotation costs on an on-
16 going basis rather than through expensing, and that the flotation cost adjustment
17 continue for the entire time that these initial funds are retained in the firm.

18 In theory, flotation costs could be expensed and recovered through rates as
19 they are incurred. This procedure, although simple in implementation, is not
20 considered appropriate, however, because the equity capital raised in a given stock
21 issue remains on the utility's common equity account and continues to provide

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1 benefits to ratepayers indefinitely. It would be unfair to burden the current
2 generation of ratepayers with the full costs of raising capital when the benefits of
3 that capital extend indefinitely. The common practice of capitalizing rather than
4 expensing eliminates the intergenerational transfers that would prevail if today's
5 ratepayers were asked to bear the full burden of flotation costs of bond/stock issues
6 in order to finance capital projects designed to serve future as well as current
7 generations. Moreover, expensing flotation costs requires an estimate of the
8 market pressure effect for each individual issue, which is likely to prove unreliable.
9 A more reliable approach is to estimate market pressure for a large sample of stock
10 offerings rather than for one individual issue.

11 There are several sources of equity capital available to a firm including:
12 common equity issues, conversions of convertible preferred stock, dividend
13 reinvestment plans, employees' savings plans, warrants, and stock dividend
14 programs. Each carries its own set of administrative costs and flotation cost
15 components, including discounts, commissions, corporate expenses, offering
16 spread, and market pressure. The flotation cost allowance is a composite factor
17 that reflects the historical mix of sources of equity. The allowance factor is a
18 build-up of historical flotation cost adjustments associated with and traceable to
19 each component of equity at its source. It is impractical and prohibitively costly
20 to start from the inception of a company and determine the source of all present
21 equity. A practical solution is to identify general categories and assign one

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1 factor to each category. My recommended flotation cost allowance is a weighted
2 average cost factor designed to capture the average cost of various equity
3 vintages and types of equity capital raised by the Company.

4 **Q. DR. MORIN, CAN YOU PLEASE ELABORATE ON THE MARKET**
5 **PRESSURE COMPONENT OF FLOTATION COST?**

6 A. The indirect component, or market pressure component of flotation costs
7 represents the downward pressure on the stock price as a result of the increased
8 supply of stock from the new issue, reflecting the basic economic fact that when
9 the supply of securities is increased following a stock or bond issue, the price
10 falls. The market pressure effect is real, tangible, measurable, and negative.
11 According to the empirical finance literature cited in Appendix B, the market
12 pressure component of the flotation cost adjustment is approximately 1% of the
13 gross proceeds of an issuance. The announcement of the sale of large blocks of
14 stock produces a decline in a company's stock price, as one would expect given
15 the increased supply of common stock.

16 **Q. IS A FLOTATION COST ADJUSTMENT REQUIRED FOR AN**
17 **OPERATING SUBSIDIARY LIKE DUKE ENERGY OHIO THAT DOES**
18 **NOT TRADE PUBLICLY?**

19 A. Yes, it is. It is sometimes alleged that a flotation cost allowance is inappropriate
20 if the utility is a subsidiary whose equity capital is obtained from its owners, in
21 this case, Duke Energy. This objection is unfounded since the parent-subsidary

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1 relationship does not eliminate the costs of a new issue, but merely transfers
2 them to the parent. It would be unfair and discriminatory to subject parent
3 shareholders to dilution while individual shareholders are absolved from such
4 dilution. Fair treatment must consider that, if the utility-subsiidiary had gone to
5 the capital markets directly, flotation costs would have been incurred.

IV. SUMMARY: COST OF EQUITY RESULTS

6 **Q. PLEASE SUMMARIZE YOUR RESULTS AND RECOMMENDATION.**

7 **A.** To arrive at my final recommendation, I performed a DCF analysis on a group of
8 investment-grade dividend-paying combination gas and electric utilities using
9 Value Line and analysts' growth forecasts. I also performed four risk premium
10 analyses. For the first two risk premium studies, I applied the CAPM and an
11 empirical approximation of the CAPM using current market data. The other two
12 risk premium analyses were performed on historical and allowed risk premium
13 data from electric utility industry aggregate data, using the current yield on long-
14 term US Treasury bonds. The results are summarized in the table below.

<u>STUDY</u>	<u>ROE</u>
Traditional CAPM	10.5%
Empirical CAPM	11.0%
Hist. Risk Premium Electric Utility Industry	10.7%
Allowed Risk Premium	11.0%
DCF Electric Utilities Value Line Growth	9.6%
DCF Electric Utilities Analyst Growth	9.8%

The results range from 9.6% to 11.0% with a midpoint of 10.3%. The average result is 10.4%.

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1 **Q. WHAT DO YOU CONCLUDE FROM YOUR ANALYSES OF DUKE**
2 **ENERGY OHIO'S COST OF EQUITY?**

3 A. The results range from 9.6% to 11.0% with a midpoint of 10.3%. It is transparent
4 from those results that the 9.84% ROE authorized by the Commission in 2013
5 certainly lies within the reasonable range observed under current market
6 conditions, albeit near the bottom of the range.

7 **Q. ARE THERE ADDITIONAL ROE BENCHMARKS THE COMMISSION**
8 **SHOULD TAKE INTO ACCOUNT?**

9 A. Yes, there are two additional benchmarks the Commission should take into
10 account in assessing the reasonableness of the 9.84% ROE. First, the current
11 issue of AUS Utility Reports publishes the currently outstanding allowed ROEs
12 for the electric utilities in the peer group. As shown in the table below, the
13 average allowed ROE for these companies is 10.2% which is almost identical to
14 the midpoint of my recommended range, 10.3%.

**Value Line Electric Utilities
Allowed Returns**

Company Name	Allowed ROE
Alliant Energy	10.34%
Ameren Corp.	9.49%
Avista Corp.	9.86%
Black Hills	10.72%
CenterPoint Energy	9.96%
CMS Energy Corp.	10.30%
Consol. Edison	9.93%

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Dominion Resources	10.52%
DTE Energy	10.75%
Duke Energy	10.46%
Exelon Corp.	8.72%
Integrus Energy	10.03%
MGE Energy	10.30%
Northeast Utilities	9.38%
NorthWestern Corp.	10.83%
OGE Energy	9.98%
Pepco Holdings	9.74%
PG&E Corp.	10.40%
Public Serv. Enterprise	10.30%
SCANA Corp.	10.72%
Sempra Energy	11.48%
TECO Energy	11.00%
UIL Holdings	9.15%
Vectren Corp.	10.43%
Wisconsin Energy	10.43%
Xcel Energy Inc.	10.48%
AVERAGE	10.22%

1 Second, the current issue of Regulatory Research's quarterly review of
2 allowed ROEs reports the ROE decisions rendered so far in 2014. The average
3 allowed ROE in recent decisions is 10.0% which again is well within my
4 recommended range of 9.6% - 11.0%.

V. IMPACT OF RIDERS

5 Q. DR. MORIN, ARE YOU AWARE OF THE POSITION TAKEN BY SOME
6 OF THE INTERVENING PARTIES TO THIS PROCEEDING THAT
7 DUKE ENERGY OHIO'S BUSINESS RISK WILL BE REDUCED

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1 **THROUGH ITS PROPOSED RIDER DCI BECAUSE IT ALLOWS FOR**
2 **TIMELY RECOVERY OF CAPITAL INVESTMENTS IN THE**
3 **COMPANY'S DISTRIBUTION SYSTEM OUTSIDE OF A BASE RATE**
4 **PROCEEDING?**

5 A. Yes. I have reviewed portions of the hearing transcripts that I previously
6 identified,¹⁹ where that position was raised through the cross examination of
7 Company witnesses Wathen, Laub and Ziolkowski and Staff witnesses
8 Turkenton and McCarter. Intervening parties, primarily the Office of the Ohio
9 Consumers Counsel asked numerous questions regarding Rider DCI providing
10 accelerated cost recovery as opposed to a base distribution rate case and that if
11 approved, the rider would therefore result in a reduction in business risk for the
12 Company.²⁰

13 **Q. DO YOU AGREE WITH THE NOTION THAT RIDER DCI, IF**
14 **APPROVED, SHOULD HAVE A ROE THAT IS LOWER THAN THE**
15 **9.84% APPROVED IN THE COMPANY'S MOST RECENT BASE**
16 **DISTRIBUTION RATE CASE?**

17 A. No.

¹⁹ See *supra* notes 1-5 and 7, and accompanying text.

²⁰ *Id.*

1 **Q. DR. MORIN, IS YOUR ROE RECOMMENDATION IMPACTED BY**
2 **THE COMPANY'S DISTRIBUTION CAPITAL INVESTMENT (DCI)**
3 **RIDER?**

4 **A. No, it is not.**

5 **Q. CAN YOU PLEASE DISCUSS WHY THE DCI MECHANISM DOES**
6 **NOT REDUCE OR IMPACT THE COMPANY'S**
7 **INVESTMENT/BUSINESS RISK?**

8 **A. As I previously stated, the presence of a DCI rider has caused some intervening**
9 parties to raise the question as to whether such a mechanism reduces the
10 Company's business risk, and to what extent its required ROE should be
11 reduced, if at all.

12 I did not adjust my recommended ROE downward in order to account for
13 the impact of DCI on the Company's business risks because my recommended
14 market-derived ROE for Duke Energy Ohio is estimated from market
15 information on the cost of common equity for other comparable electric utilities.
16 To the extent that the market-derived cost of common equity for other utility
17 companies already incorporates the impacts of these or similar mechanisms, no
18 further adjustment is appropriate or reasonable in determining the cost of
19 common equity for Duke Energy Ohio. To do so would constitute double-
20 counting.

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1 Most, if not all, electric utilities in the industry are under some form of
2 rider/adjustment clause/cost recovery/mechanisms. The approval of riders,
3 adjustment clauses, cost recovery mechanisms, and various forms of risk-
4 mitigating mechanisms by regulatory commissions is widespread in the utility
5 business and is already largely embedded in financial data, such as bond ratings,
6 stock prices, and business risk scores. Moreover, it is important to note that
7 investors generally do not associate specific increments to their return
8 requirements with specific rate structures. Rather, investors tend to look at the
9 totality of risk-mitigating mechanisms in place relative to those in place at
10 comparable companies when assessing risk.

11 **Q. HOW PREVALENT ARE RISK-MITIGATING MECHANISMS IN THE**
12 **ELECTRIC UTILITY INDUSTRY?**

13 A. Risk-mitigating mechanisms are becoming the norm for regulated utilities across
14 the U.S. A study by the Edison Foundation reports that a majority of states
15 either have decoupling/revenue adjustment mechanisms in place, or are
16 reviewing or implementing them. A summary of the study is attached as Exhibit
17 RAM-8. The study also reports on the prevalence of direct cost recovery
18 mechanisms in most of the fifty states.

19 The major point of all this is that while risk-mitigating mechanisms such
20 as the DCI rider reduces risk on an absolute basis, they do not necessarily do so
21 on a relative basis, that is, compared to other utilities. For example, a fuel cost

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1 adjustment clause does not reduce relative risk since most electric utilities in the
2 industry are under some form of energy cost adjustment mechanism. The
3 approval of adjustment clauses, ROE incentives riders, trackers, forward test
4 years, and cost recovery mechanisms by regulatory commissions is widespread
5 in the utility business and is already largely embedded in financial data, such as
6 stock prices, bond rating and business risk scores.

7 While adjustment clauses, riders, and cost tracking mechanisms may
8 mitigate (on an absolute basis but not on a relative basis) a portion of the risk
9 and uncertainty related to the day-to-day management of Duke Energy Ohio's
10 operations, there are other significant factors to consider that work in the reverse
11 direction, for example the weakening of the economy, declining customer use,
12 and the Company's dependence on a significant capital spending program
13 requiring external financing.

14 **Q. IS THERE ANY EMPIRICAL EVIDENCE ON THE IMPACT OF RISK**
15 **MITIGATORS?**

16 A. Yes, there is. A recent comprehensive study by the Brattle Group²¹ investigated
17 the impact of a particular risk-mitigating mechanism, namely, revenue

²¹ Wharton, Vilbert, Goldberg & Brown, *The Impact of Decoupling on the Cost of Capital: An Empirical Investigation*, The Brattle Group, February 2011.

1 decoupling, on risk and the cost of capital and found that its effect on risk and
2 cost of capital, if any, is undetectable statistically.

3 **Q. IS THERE A RELATIONSHIP BETWEEN AUTHORIZED ROE AND**
4 **FINANCIAL RISK?**

5 A. There certainly is. A low authorized ROE increases the likelihood the utility
6 will have to rely increasingly on debt financing for its capital needs. This creates
7 the specter of a spiraling cycle that further increases risks to both equity and debt
8 investors; the resulting increase in financing costs is ultimately borne by the
9 utility's customers through higher capital costs and rates of returns.

10 **Q. IS DUKE ENERGY OHIO'S FINANCIAL RISK IMPACTED BY THE**
11 **AUTHORIZED ROE?**

12 A. Yes, very much so. A low ROE increases the likelihood that Duke Energy Ohio
13 will have to rely on debt financing for its capital needs. As the Company relies
14 more on debt financing, its capital structure becomes more leveraged. Since
15 debt payments are a fixed financial obligation to the utility, this decreases the
16 operating income available for dividend growth. Consequently, equity investors
17 face greater uncertainty about the future dividend potential of the firm. As a
18 result, the Company's equity becomes a riskier investment. The risk of default
19 on the Company's bonds also increases, making the utility's debt a riskier
20 investment. This increases the cost to the utility from both debt and equity

1 financing and increases the possibility the Company will not have access to the
2 capital markets for its outside financing needs, or if so, at prohibitive costs.

3 **Q. ARE YOU FAMILIAR WITH OHIO POWER AND THE FIRSTENERGY**
4 **OPERATING COMPANIES (OHIO EDISON, CLEVELAND ELECTRIC**
5 **ILLUMINATING, AND TOLEDO EDISON)?**

6 A. Yes.

7 **Q. IS IT YOUR UNDERSTANDING THAT THESE OTHER OHIO**
8 **UTILITIES HAVE A RISK PROFILE SIMILAR TO DUKE ENERGY**
9 **OHIO?**

10 A. Yes.

11 **Q. ASSUMING THE COMMISSION AUTHORIZED DISTRIBUTION**
12 **RIDERS SIMILAR TO THE ONE BEING PROPOSED BY DUKE**
13 **ENERGY OHIO BUT WITH ROES HIGHER THAN WHAT DUKE**
14 **ENERGY OHIO IS ASKING FOR IN THIS PROCEEDING, DO YOU**
15 **BELIEVE THE COMMISSION SHOULD ACCEPT DUKE ENERGY**
16 **OHIO'S PROPOSED ROE AS A REASONABLE RETURN FOR ITS**
17 **INVESTMENT IN DISTRIBUTION?**

18 A. Yes.

19 **Q. IF CAPITAL MARKET CONDITIONS CHANGE SIGNIFICANTLY**
20 **BETWEEN THE DATE OF FILING YOUR PREPARED TESTIMONY**

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1 **AND THE DATE ORAL TESTIMONY IS PRESENTED, WOULD THIS**
2 **CAUSE YOU TO REVISE YOUR ESTIMATED COST OF EQUITY?**

3 A. Perhaps. Capital market conditions are volatile and uncertain at this time.
4 Interest rates and security prices do change over time, and risk premiums change
5 also, although much more sluggishly. If substantial changes were to occur
6 between the filing date and the time my oral testimony is presented, I would
7 evaluate those changes and their impact on my testimony accordingly.

VI. CONCLUSION

8 **Q. WERE ATTACHMENTS RAM-1 THROUGH RAM-8 AND APPENDICES**
9 **A AND B PREPARED BY YOU AND UNDER YOUR DIRECTION AND**
10 **CONTROL?**

11 A. Yes.

12 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

13 A. Yes, it does.

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Summary: Testimony In the Matter of the Application of Duke Energy Ohio for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code, in the Form of an Electric Security Plan, Accounting Modifications and Tariffs for Generation Service. Duke Energy Ohio for Authority to Amend its Certified Supplier Tarriff, P.U.C.O. No. 20. Rebuttal Testimony of Dr. Roger A. Morin and Exhibits electronically filed by Mrs. Debbie L. Gates on behalf of Duke Energy Ohio Inc. and Spiller, Amy B and Watts, Elizabeth H and Mr. Rocco O. D'Ascenzo