

**BEFORE  
THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Application of Duke )  
Energy Ohio, Inc., for an Increase in Gas ) Case No. 12-1685-GA-AIR  
Rates. )

In the Matter of the Application of Duke ) Case No. 12-1686-GA-ATA  
Energy Ohio, Inc., for Tariff Approval )

In the Matter of the Application of Duke )  
Energy Ohio, Inc., for Approval of an ) Case No. 12-1687-GA-ALT  
Alternative Rate Plan for Gas Distribution )  
Service. )

In the Matter of the Application of Duke )  
Energy Ohio, Inc., for Approval to Change ) Case No. 12-1688-GA-AAM  
Accounting Methods. )

**DIRECT TESTIMONY  
OF  
DANIEL J. DUANN, Ph.D.**

**On Behalf of  
The Office of the Ohio Consumers' Counsel**  
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***February 25, 2013***

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## ATTACHMENTS

DJD-1	List of Testimonies Filed Before the PUCO
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1    **I.        INTRODUCTION**

2

3    ***Q1.    PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND JOB TITLE.***

4    ***A1.***    My name is Daniel J. Duann. My business address is 10 West Broad Street, Suite  
5            1800, Columbus, Ohio, 43215-3485. I am a Principal Regulatory Analyst with  
6            the Office of the Ohio Consumers' Counsel ("OCC").

7

8    ***Q2.    PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND***  
9            ***PROFESSIONAL EXPERIENCE.***

10   ***A2.***    I received my Ph.D. degree in public policy analysis from the Wharton School,  
11            University of Pennsylvania. I also have a M.S. degree in energy management and  
12            policy from the University of Pennsylvania and a M.A. degree in economics from  
13            the University of Kansas. I completed my undergraduate studies in business  
14            administration at the National Taiwan University, Taiwan, Republic of China. I  
15            was conferred by the Society of Utility and Regulatory Financial Analysts as a  
16            Certified Rate of Return Analyst in April 2011.

17

18            I was a Utility Examiner II in the Forecasting Section of the Ohio Division of  
19            Energy, Ohio Department of Development, from 1983 to 1985. From 1985 to  
20            1986, I was an Economist with the Center of Health Policy Research at the  
21            American Medical Association in Chicago. In 1986, I joined the Illinois  
22            Commerce Commission as a Senior Economist in its Policy Analysis and  
23            Research Division. I was employed as a Senior Institute Economist at the

1 National Regulatory Research Institute (“NRRI”) at The Ohio State University  
2 from 1987 to 1995. My work at NRRI involved many areas of utility regulation  
3 and energy policy. From 1996 to 2007, I was an independent business consultant.  
4

5 I joined the OCC in January 2008 as a Senior Regulatory Analyst. I was  
6 promoted to my current position in November 2011. My responsibilities are to  
7 assist the OCC in participating in various regulatory proceedings that include rate  
8 cases, Standard Service Offer, alternative regulation, cost recovery filings, and  
9 service reliability by Ohio’s electric, gas and water utilities.  
10

11 ***Q3. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY TO THE PUBLIC***  
12 ***UTILITIES COMMISSION OF OHIO OR ANY OTHER AGENCY OR***  
13 ***GOVERNMENTAL ENTITY?***

14 ***A3.*** Yes. I have submitted expert testimony on behalf of OCC to the Public Utilities  
15 Commission of Ohio (“PUCO” or “Commission”) in a number of cases involving  
16 Ohio’s electric, gas, and water utilities. A list of these cases is included in  
17 Attachment DJD-1. I have also testified before the Ohio Division of Energy, the  
18 Illinois Commerce Commission, and the Senate Committee on Energy and Public  
19 Utilities of the California Legislature.  
20

**Q4. WHAT DOCUMENTS HAVE YOU REVIEWED IN THE PREPARATION OF YOUR TESTIMONY?**

**A4.** I have reviewed the Application of Duke Energy Ohio, Inc. ("Duke") to increase its rates filed on July 9, 2012 ("Application"), and relevant supporting testimonies. I have also reviewed *A report by the Staff of the Public Utilities Commission of Ohio* ("Staff Report") filed on January 4, 2013, and associated workpapers. In addition, I have reviewed relevant discovery and responses by all parties in this case. I have also reviewed relevant Commission Opinions and Orders and Entries, as well as Staff reports and testimonies of several recent rate cases as mentioned in my testimony.

**Q5. PLEASE SUMMARIZE YOUR QUALIFICATIONS SPECIFIC TO YOUR TESTIMONY IN THIS PROCEEDING.**

**A5.** I am a trained economist with over twenty-five years of experience in studying and analyzing the regulation of electric, gas and water utilities in the United States. A list of my professional publications is included in Attachment DJD-2. I am familiar with the regulatory principles related to setting a reasonable rate of return in a rate case proceeding. Specifically, I have filed testimony regarding rate of return in four water rate cases (PUCO Case Nos. 09-391-WS-AIR, 09-560-WW-AIR, 09-1044-WW-AIR, and 11-4161-WS-AIR). I also testified on issues related to the Significantly Excessive Earnings Test ("SEET") in the 2012 FirstEnergy Electric Security Plan case (PUCO Case No. 12-1230-EL-SSO). In addition, I assisted in OCC's participation in the most recent rate cases of

1 Columbia Gas of Ohio, Dominion East Ohio, and AEP Ohio, as well as all of the  
2 SEET filings by Ohio's electric utilities.

3  
4 **II. PURPOSE OF TESTIMONY**

5  
6 ***Q6. WHAT IS THE PURPOSE OF YOUR TESTIMONY?***

7 ***A6.*** The purpose of my testimony is to support OCC's objections regarding the rate of  
8 return ("ROR") and cost of common equity or return on equity ("ROE") proposed  
9 in the Staff Report (OCC Objections 17, 18 and 19). Based on these objections, I  
10 recommend three adjustments to the Staff-proposed ROE and ROR.

11  
12 ***Q7. WHAT IS YOUR RECOMMENDATION REGARDING DUKE'S RATE OF***  
13 ***RETURN AND COST OF COMMON EQUITY IN THIS PROCEEDING?***

14 ***A7.*** I recommend that the Commission accept the three adjustments proposed by OCC  
15 and reduce the ROE and ROR in the Staff Report accordingly. I recommend that  
16 the Commission approve a cost of common equity no higher than 7.84%, and a  
17 rate of return no higher than 6.66% for Duke in this proceeding. My  
18 recommended ROE and ROR will result in just and reasonable rates for Duke and  
19 its customers.

**III. OCC'S RECOMMENDATION FOR THE RATE OF RETURN AND COST  
OF COMMON EQUITY**

***Q8. PLEASE SUMMARIZE YOUR METHODOLOGY IN ESTIMATING DUKE'S  
COST OF COMMON EQUITY AND RATE OF RETURN.***

**A8.** I accepted Duke's proposed capital structure and embedded cost of long-term debt. I then applied two commonly-used financial models, Capital Asset Pricing Model ("CAPM") and Discounted Cash Flow Model ("DCF"), in estimating the cost of common equity. Next, I proposed a baseline ROE based on the average of the ROEs derived from these two financial models. Finally, I calculated Duke's rate of return (or the weighted cost of capital) based on its stand-alone capital structure, embedded cost of long-term debts, and OCC's proposed cost of common equity. A summary of the capital structure, the cost rates, and the weighted cost of capital recommended by OCC, the PUCO Staff, and Duke is shown in Table 1 below:

**TABLE 1: A SUMMARY OF PROPOSED CAPITAL STRUCTURE,  
COST RATES AND RATE OF RETURN**

	<u>% of Total</u>	<u>Cost Rates (%)</u>			<u>Weighted Cost (%)</u>		
		OCC	Staff <sup>1</sup>	Duke	OCC	Staff	Duke
Long Term Debt	46.70%	5.32%	5.32%	5.32%	2.48%	2.48%	2.48%
Common Equity	53.30%	7.84%	8.82% - 9.84%	10.60%	4.18%	4.70% -5.24%	5.65%
Total Capital	100.00%				6.66%	7.19% -7.73%	8.13%

***Q9. PLEASE EXPLAIN THE CAPITAL STRUCTURE AND THE COST OF LONG-TERM DEBT USED IN YOUR ANALYSIS.***

***A9.*** I used Duke's stand-alone capital structure (with long-term debt at 46.70% and equity at 53.30% of total capital), rather than its parent company's (Duke Energy Corporation) consolidated capital structure. This is the same capital structure proposed by Duke<sup>2</sup> and accepted by the Staff.<sup>3</sup> The use of Duke's capital structure on a stand-alone basis is reasonable for the purpose of estimating Duke's cost of equity in this proceeding.

<sup>1</sup> The midpoint of the range of ROE recommended by the Staff is 9.33% and the midpoint of the ROR is 7.46%. See, Staff Report at 16-18.

<sup>2</sup> See, Application, Schedule D-1A.

<sup>3</sup> See, Staff Report at 16.



1 As for the embedded cost of long-term debt, I used a cost rate of 5.32% as  
2 proposed by Duke.<sup>4</sup> Using the embedded cost of long-term debt to calculate the  
3 cost of capital is reasonable in this proceeding. To this end, the Staff has  
4 consistently used the embedded cost of long-term debt in estimating the cost of  
5 capital in many previous electric, gas and water rate cases.<sup>5</sup>  
6

7 ***Q10. PLEASE EXPLAIN YOUR SELECTION OF A COMPARABLE GROUP OF***  
8 ***COMPANIES FOR THE PURPOSE OF ESTIMATING THE COST OF***  
9 ***COMMON EQUITY.***

10 ***A10.*** The first task in estimating the cost of common equity of a regulated utility such  
11 as Duke is to select a group of companies with comparable business and financial  
12 risks. However, Duke is not a publicly-traded company. It relies solely on its  
13 parent company (Duke Energy Corporation) for equity financing because all of its  
14 common stock is owned by the parent company. No relevant observable financial  
15 market data, such as the stock price, for Duke is available. Under this  
16 circumstance, and for the purpose of estimating the cost of common equity, it is  
17 reasonable to select a comparable group of companies for Duke based on the  
18 observed business and financial characteristics comparable to Duke's parent  
19 company (Duke Energy Corporation).  
20

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<sup>4</sup> See, Application, Schedule D-3A.

<sup>5</sup> See, e.g., PUCO Case No. 08-709-EL-AIR et al., Staff Report at 14 (January 27, 2009), and PUCO Case No. 11-0351-EL-AIR et al., Staff Report at 14 (September 15, 2011).

1 In choosing the comparable group, I reviewed the operational and financial  
2 information of the combined electric and gas utilities grouped and covered in the  
3 Value Line Investment Survey. I paid particular attention to the following  
4 operational and financial factors: (1) market capitalization (over \$10 billion), (2)  
5 Standard & Poor's bond rating (BBB+ and higher), (3) percentage of electric and  
6 gas revenues and percentage of regulated revenue, and (4) "beta" (the variability  
7 of the stock price of the utility in comparison to the variability of the entire equity  
8 market). I also reviewed the comparable group selected by the Staff and Duke.  
9 Ultimately, I accepted the five combination electric and gas utilities proposed by  
10 the Staff as the comparable group. The relevant operational and financial data of  
11 the five utilities are shown in Table 2. This data indicates a high degree of  
12 similarity in terms of certain operational and financial characteristics among  
13 them.

**TABLE 2: SELECTED DATA OF  
THE COMPARABLE GROUP OF UTILITIES<sup>6</sup>**

Company <sup>7</sup>	D	DUK	ED	NU	XEL
Market Capitalization (\$million)*	28,799	42,572	16,216	11,958	12,688
2011 Sales Revenue (\$million)*	14,379	14,236	12,938	4,466	10,655
% of Regulated Electric Rev.**	49	73	69	89	82
% of Regulated Gas Rev.**	12	4	13	10	17
2011 Long-Term Debt Ratio (%)*	60.7	45.1	47.5	54.7	51.1
2011 Common Equity Ratio (%)*	39.3	54.9	52.5	45.3	48.9
S&P Bond Rating*	A-	BBB+	A-	A-	A-
S&P Beta*	0.47	0.32	0.22	0.48	0.34
Value Line Beta***	0.7	0.6	0.6	0.7	0.65

***Q11. PLEASE SUMMARIZE YOUR ANALYSIS REGARDING DUKE'S COST OF COMMON EQUITY.***

***A11.*** I used two financial models, the CAPM and the DCF, in my analysis of the cost of common equity for Duke. After obtaining the results of these two models, I gave equal weight to the estimated costs of common equity and used the average as the baseline cost of common equity. I did not make any additional adjustments to the estimated cost of common equity.

<sup>6</sup> Data with an asterisk (\*) is from Standard & Poor's Stock Reports (November 24, 2012), data with a double asterisk (\*\*) is from AUS Utility Reports (April 2012), and data with a triple asterisk (\*\*\*) is from Value Line Investment Survey (November 2, 2012 and November 23, 2012).

<sup>7</sup> The five companies and their stock tickers are: Dominion Resources (D), Duke Energy (DUK), Consolidated Edison (ED), Northeast Utilities (NU), and Xcel Energy (XEL). See, Staff Report at 16.

1 Under the CAPM, the cost of common equity for a regulated utility (or any  
2 public-traded company) is assumed to be determined by the perceived relative  
3 risk of the company to the whole equity market and the general level of return  
4 associated with risk-free investments. Stated differently, the more risk an  
5 investment has relative to the entire equity market (or a large portion of the equity  
6 market), the higher the return investors of that particular investment will require.

7  
8 The CAPM is typically expressed as the following:<sup>8</sup>

$$r = r_f + \beta(r_m - r_f)$$

10 where “r” is the cost of common equity of a particular investment, “β” is beta,  
11 “r<sub>m</sub>” is the market return and “r<sub>f</sub>” is the return on risk-free investments.

12  
13 As for the DCF model, its theoretical underpinning is that the current stock price  
14 of a particular company is equal to the discounted value of future dividends that  
15 the shareholders of that particular company expect to receive over the life of the  
16 company. The internal discount rate associated with this stream of expected  
17 dividends is interpreted as the required return (or cost) on common equity.

18  
19 Assuming a constant rate of dividend growth, a basic DCF formula that can be  
20 used in estimating the cost of equity is expressed as the following:<sup>9</sup>

$$K = D_0 / P_0 + g$$

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<sup>8</sup> See, e.g., Richard A. Brealey and Stewart C. Myers, *Principles of Corporate Finance, Third Edition*, New York, McGraw-Hill Book Company (1988).

<sup>9</sup> See, David C. Parcell, *The Cost of Capital – A Practitioner’s Guide, 1997 Edition* (1997) at 8-7.

1 where “K” is the cost of common equity, “D<sub>0</sub>” is the current dividend per share,  
2 “P<sub>0</sub>” is the current stock price and “g” is the constant growth rate of dividend per  
3 share.

4  
5 I have reviewed other financial models for estimating the cost of common equity,  
6 including the Risk Premium Model proposed by Duke in this proceeding. In my  
7 opinion, the Risk Premium Model is essentially a variation of the CAPM. I have  
8 also reviewed other testimony addressing the cost of common equity filed in prior  
9 water, gas and electric rate cases before the PUCO. Based on the Rate of Return  
10 analyses in the testimonies that I have reviewed, it is my opinion that all the  
11 analysts used the CAPM and DCF as the primary, if not the exclusive, models for  
12 setting the cost of common equity.<sup>10</sup> In addition, the PUCO Staff has also relied  
13 almost exclusively on the CAPM and DCF models in its estimation of the cost of  
14 common equity in all recent rate case proceedings for Ohio’s major utilities.<sup>11</sup>

15 Therefore, I concluded that the results obtained through the proper application of  
16 the CAPM and DCF models are sufficient for the purpose of estimating the cost  
17 of common equity for Duke.

<sup>10</sup> See, e.g., the direct testimony of J. Randall Woolridge in Case No. 07-829-GA-AIR et al. (June 23, 2008); the direct testimony of David C. Parcell in Case No. 07-1080-GA-AIR et al (June 23, 2008); and the pre-filed testimony of Aster R. Adams in Case No. 06-433-WS-AIR (October 23, 2006).

<sup>11</sup> See, e.g., PUCO Case No. 08-709-EL-AIR et al., Staff Report at 14-16 (January 27, 2009); PUCO Case No. 11-0351-EL-AIR et al., Staff Report at 14-16 (September 15, 2011); and PUCO Case No. 07-551-EL-AIR et al., Staff Report at 15-17 (December 4, 2007).

1       The results of the DCF and the CAPM are complementary to each other. The  
2       result of the DCF can essentially be considered an “absolute” measurement of the  
3       cost (or required return) of common equity in the sense that it depends largely on  
4       the expected dividend growth of one specific company. On the other hand, the  
5       result obtained through the CAPM reflects a “relative” measurement of the cost of  
6       common equity that depends largely on the relative risk of the underlying  
7       business to the entire equity market. In this regard, the costs of common equity  
8       obtained from these two financial models can serve as a “reference point” for  
9       each other. In this proceeding, it is my opinion that the average of the results  
10      obtained from these two models can provide a reasonable estimate of the cost of  
11      common equity for Duke, especially in light of the significant difference of the  
12      results of these two financial models.

13  
14    ***Q12. PLEASE EXPLAIN YOUR APPLICATION OF THE DISCOUNTED CASH***  
15    ***FLOW MODEL IN ESTIMATING DUKE’S COST OF COMMON EQUITY.***

16    ***A12.*** As discussed earlier, there are three main components in the application of the  
17      DCF model: the stock price; the current annual dividend per share; and the  
18      expected annual growth rate of dividend per share. The expected growth rate of  
19      dividend per share is typically the most difficult to determine in a DCF analysis.  
20      In this proceeding, the PUCO Staff applied the same DCF methodology that it has  
21      consistently used in prior rate case proceedings. Even though I do not totally  
22      agree with every aspect of the Staff’s application of the DCF methodology, for  
23      this proceeding I have accepted the DCF results presented in the Staff Report as a

1 valid component in estimating Duke's cost of common equity. However, the  
2 result of the DCF analysis is just one component in estimating the cost of  
3 common equity. The result of the DCF model should be used in combination  
4 with the results obtained through the CAPM or other financial models. This view  
5 of not relying on one single approach, such as the DCF model, is shared by the  
6 PUCO Staff and Duke's witness Roger A. Morin.<sup>12</sup>

7  
8 ***Q13. PLEASE EXPLAIN YOUR APPLICATION OF THE CAPITAL ASSET***  
9 ***PRICING MODEL IN ESTIMATING DUKE'S COST OF COMMON***  
10 ***EQUITY.***

11 ***A13.*** There are three main components in the application of a CAPM: (1) the return on  
12 risk-free investments; (2) the beta; and (3) the expected risk premium of the entire  
13 equity market over risk-free investments. In my CAPM analysis, I accepted the  
14 Staff's choice of the return on risk-free investment as detailed in the Staff Report.  
15 The Staff uses "the weighted average of 10 year and 30 year daily closing  
16 Treasury yields for the period from September 30, 2011, through September 28,  
17 2012."<sup>13</sup> This approach is reasonable as it relies on actual market data over an  
18 extended period of time. It is stable and less subjective than estimated returns on  
19 risk-free investment based on various economic or market forecasts. The current  
20 and recent actual data on Treasury yields have fully reflected investors'  
21 expectations into the future, and they fairly represent the return on risk-free

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<sup>12</sup> See, Direct Testimony of Roger A. Morin at 58 (July 20, 2013).

<sup>13</sup> See, Staff Report at 17.

1 investments expected in the near future. The use of the average yields from the  
2 bonds of different maturity (10 years and 30 years) is also a better approach than  
3 using the yield estimation that relies solely on forecasted or actual yields of 30-  
4 year bonds. The average yield of 10-year and 30-year bonds is a more stable and  
5 representative measurement of the various maturities of long-term US  
6 government bonds. As stated in the Staff Report, the weighted average yield of  
7 the 10-year Treasury bonds was 1.76% and the weighted average yield of the 30-  
8 year bonds was 2.75%. The estimated return on risk-free investments is the  
9 average of the two, 2.255%.<sup>14</sup>

10  
11 The second component of a CAPM is “beta.” It represents the relative risk of a  
12 particular investment (such as the common stock of an electric utility) to the  
13 entire equity market. By definition, the entire equity market, or a large portion of  
14 it, has a beta of 1.0. A stock with a price movement (measured in terms of the  
15 change in percentage) that is greater than the price movement of the entire equity  
16 market is considered riskier than the entire equity market, and thus has a beta  
17 greater than 1.0. On the other hand, the stock price of a regulated utility tends to  
18 have a price movement that is smaller than the price movement of the entire  
19 equity market. Thus, over a specific period of time, a regulated utility usually, but  
20 not always, has a beta less than 1.0 and is considered less risky than the entire  
21 equity market. There are several sources providing the estimated betas of  
22 individual publicly-traded companies. They include Value Line Investment

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<sup>14</sup> Id.



1 Survey and the Standard & Poor's Stock Reports. The betas reported by different  
2 sources are based on different estimation methodologies and the results can vary  
3 significantly.

4  
5 In my analysis, I chose the "beta" published by the Value Line Investment Survey  
6 in November 2012. My objective is to use the betas comparable and consistent to  
7 the betas used by the PUCO Staff in its CAPM analysis in this proceeding as well  
8 as the CAPM analysis in many prior rate cases.<sup>15</sup> The values of the "beta" of the  
9 five combination electric and gas utilities in the comparable group are: 0.70 for  
10 Dominion Resources, 0.60 for Duke Energy, 0.60 for Consolidated Edison, 0.70  
11 for Northeast Utilities, and 0.65 for Xcel Energy.<sup>16</sup> The average "beta" of the five  
12 combination electric and gas utilities in the comparable group is 0.65, which is  
13 slightly higher than the one (0.64) used in the Staff Report.<sup>17</sup>

14  
15 The third component of a CAPM is the "equity risk premium." The "equity risk  
16 premium" can be defined as the difference between the expected total returns  
17 (stock price appreciation plus dividends) of investing in common equity versus  
18 investing in "risk-free" assets such as long-term government bonds. As discussed  
19 above, the estimation of the expected return on "risk-free" investments is

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<sup>15</sup> See, e.g., PUCO Case No. 08-709-EL-AIR et al., Staff Report at 14-16 (January 27, 2009); PUCO Case No. 11-0351-EL-AIR et al., Staff Report at 14-16 (September 15, 2011); and PUCO Case No. 07-551-EL-AIR et al., Staff Report at 15-17 (December 4, 2007).

<sup>16</sup> See, Value Line Investment Survey on November 23, 2012 for the "betas" first four companies, and on November 2, 2012 for the "beta" of Xcel Energy.

<sup>17</sup> See, Staff Report at 17.

1 relatively straightforward. The more challenging part in ascertaining the  
2 “expected risk premium of equity” is how to derive an estimate of the expected  
3 total return for the entire equity market.

4  
5 Based on the annual total returns reported in the *Ibbotson SBBI 2012 Valuation*  
6 *Yearbook*, two measures of the “equity risk premiums” can be derived. One is  
7 derived from the difference of the arithmetic means of total returns between  
8 common equity and risk-free investments. Another measure of equity risk  
9 premium is derived from the difference of the geometric means of total returns  
10 between common equity and long-term government bonds. According to the  
11 *Ibbotson SBBI 2012 Valuation Yearbook*, the arithmetic mean return is “a simple  
12 average of a series of returns,” and the geometric mean return is “a compound rate  
13 of return” or “a measure of the actual average performance of a portfolio over a  
14 given time period.”<sup>18</sup>

15  
16 There is disagreement among financial analysts whether an arithmetic mean or a  
17 geometric mean of total returns can provide a more “accurate” estimate of the  
18 total return to the entire equity market, and consequently a better measure of the  
19 expected equity risk premium. Some financial analysts indicate that the use of the  
20 arithmetic mean definitely “overstates the return experienced by investors.”<sup>19</sup> It

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<sup>18</sup> See, *Ibbotson SBBI 2012 Valuation Yearbook*, Chicago, IL: Morningstar, Inc. 2012 at 205.

<sup>19</sup> See, e.g., direct testimony of J. Randall Woolridge in Case No. 07-829-GA-AIR et al. at 82-83 (June 23, 2008).

1       has also been argued by some that a better measure of the historical total return  
2       would not necessarily lead to a better estimation of the cost of capital.<sup>20</sup>

3  
4       In my opinion, the issue of which average of returns (arithmetic mean or  
5       geometric mean) accurately gives investors the right basis for their investment  
6       decisions has not been completely resolved to date. Generally, in the context of  
7       utility regulation, and more specifically in the estimation of the cost of common  
8       equity, the question at hand may not be which of these two measurements of  
9       equity risk premium is more accurate. Rather, the more important question is  
10      which measurement can better protect utility customers and at the same time  
11      provide a just and reasonable return to investors in the utility business. I use the  
12      average of these two measurements of equity risk premiums as the expected  
13      equity risk premium for my CAPM analysis.<sup>21</sup> I believe this approach will better  
14      protect consumers from unreasonable rates and should be adopted by the  
15      Commission.

16  
17      According to the *Ibbotson SBBI 2012 Valuation Yearbook*, the expected equity  
18      risk premium based on arithmetic means is 5.70%, and the expected equity risk  
19      premium based on geometric means is 4.10%.<sup>22</sup> The expected equity risk

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<sup>20</sup> See, Roger A. Morin, *New Regulatory Finance*, Arlington, VA, Public Utilities Reports, Inc. at 133-143 (2006).

<sup>21</sup> This “averaging” approach has been used by other analysts. See, e.g., direct testimony of David C. Purcell in Case No. 07-1080-GA-AIR at 47 (July 23, 2008).

<sup>22</sup> See, *Ibbotson SBBI 2012 Valuation Yearbook* at 23, Table 2-1.

1 premium used in my analysis, as calculated by averaging the two risk premiums,  
2 is 4.90%.

3  
4 Based on a “beta” of 0.65, a “risk-free” return of 2.255%, and an “expected equity  
5 risk premium” of 4.90%, I calculated Duke’s cost of equity to be 5.44% under the  
6 CAPM.<sup>23</sup>

7  
8 ***Q14. PLEASE EXPLAIN YOUR ESTIMATION OF DUKE’S COST OF COMMON***  
9 ***EQUITY AND OVERALL RATE OF RETURN.***

10 ***A14.*** My estimates of the cost of common equity for Duke are 5.44% under the CAPM  
11 and 10.24% under the DCF Model. The baseline cost of common equity for Duke  
12 is the average of the above two estimates. I gave no preference to either one of  
13 these two financial models. It is my opinion that the average of the estimated  
14 costs of common equity from these two models that are complementary to each  
15 other can fairly and reasonably represent Duke’s cost of common equity. There is  
16 no need for any additional adjustment to this baseline cost of common equity.  
17 Accordingly, my recommended cost of common equity for Duke is 7.84%.

18  
19 By using the same capital structure (46.70% debt and 53.30% equity) and the cost  
20 of long-term debt (5.32%) proposed by Duke and the PUCO Staff, I then

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<sup>23</sup> Specifically, CAPM Cost of Equity = 2.255% + (0.65 \* 4.90%) = 5.44%.

1       calculated the weighted cost of capital, or the overall rate of return. My  
2       recommendation for the overall rate of return for Duke is 6.66%.<sup>24</sup>

3  
4       **IV.    COMMENTS ON THE STAFF'S PROPOSED COST OF COMMON**  
5       **EQUITY AND RATE OF RETURN**

6  
7       ***Q15.   WHAT IS YOUR OVERALL ASSESSMENT OF THE STAFF'S***  
8       ***RECOMMENDED COST OF COMMON EQUITY AND RATE OF RETURN***  
9       ***IN THIS PROCEEDING?***

10      ***A15.*** It is my opinion that the methodologies and financial input data used by the Staff  
11       in its rate of return analysis are, in most aspects, reasonable, consistent, and  
12       transparent. The PUCO Staff's analysis, as presented in the Staff Report, has  
13       adequately reflected the decline in the cost of long-term debt and "beta" for  
14       regulated utilities as well as the significant decline in the cost of funds in the U.S.  
15       over the last four years. Nevertheless, as detailed later in my testimony, some  
16       adjustments to the Staff's methodology and results are required. I am especially  
17       concerned about the effects of the Staff's proposed weighting of the results of the  
18       CAPM and DCF models on Duke's estimated cost of common equity. To my  
19       knowledge, the particular weighting proposed in the Staff Report in this  
20       proceeding has never been used by the Staff in any other proceeding that I have  
21       reviewed. This particular weighting proposed by the Staff in this proceeding has  
22       never been adopted by the Commission. This particular weighting of the results

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<sup>24</sup> Specifically, the Rate of Return = (5.32% \* 0.4670) + (7.84% \* 0.5330) = 6.66%.

1 of the CAPM and DCF as proposed by the Staff, if adopted by the Commission,  
2 will overstate Duke's cost of common equity and will increase the rates paid by  
3 Duke's customers. It may also set a bad precedent regarding the determination of  
4 a reasonable cost of common equity and rate of return in Ohio. Thus, this  
5 particular weighting proposed by the Staff is not justified or supported.  
6

7 ***Q16. PLEASE DESCRIBE YOUR UNDERSTANDING OF THE PUCO STAFF'S***  
8 ***METHODOLOGY AND RESULTS REGARDING DUKE'S COST OF***  
9 ***COMMON EQUITY AND RATE OF RETURN.***

10 ***A16.*** The methodology used by the Staff to estimate the cost of common equity and  
11 rate of return in this proceeding is similar to the methodology employed by the  
12 Staff in many previous utility base rate cases. The Staff accepted the capital  
13 structure and the cost rate of long-term debt proposed by Duke.<sup>25</sup> Then the Staff  
14 selected a comparable group consisting of five publicly-traded companies having  
15 a Value Line Financial strength rating of between B++ and A+, with a market  
16 capitalization over \$10 billion, and which are categorized as electric utilities with  
17 gas operations by Value Line.<sup>26</sup> In estimating Duke's cost of common equity, the  
18 Staff applied both the CAPM and the DCF models to the five comparable electric  
19 utilities with gas operations. The Staff estimates the cost of common equity using  
20

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<sup>25</sup> See, Staff Report at 16.

<sup>26</sup> Id.

1       the CAPM to be 5.90%.<sup>27</sup> Using the DCF model, the Staff calculates Duke's cost  
2       of common equity to be 10.24%.<sup>28</sup>

3  
4       In the past, in almost all base rate case proceedings I have reviewed, the Staff's  
5       baseline cost of common equity has been the average of the costs of common  
6       equity derived from the CAPM and the DCF models.<sup>29</sup> But, in this proceeding,  
7       the Staff applied a much different weighting to the results of the CAPM and the  
8       DCF models: a 25% weight to the CAPM estimate, and a 75% weight to the DCF  
9       estimate.<sup>30</sup> The Staff provided no credible explanation or support for this  
10      modification to its previous methodology. It should be noted that in the Staff  
11      Report, a 6.09% CAPM-estimated cost of equity was indicated (but the correct

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<sup>27</sup> For the CAPM, the PUCO Staff used the average of the betas (0.64) of the five electric utilities reported in the Value Line Investment Survey. The return on risk-free investments (2.255%) was based on the weighted average of 10-year and 30-year daily closing Treasury yields for the period from September 30, 2011, to September 28, 2012. The proposed equity risk premium (5.7%) was the spread of arithmetic means of total returns between equity and risk-free investment published in the *Ibbotson S&P 2012 Valuation Yearbook*.

<sup>28</sup> For the DCF model, the PUCO Staff calculated the internal rate of return (cost of common equity) for each of the five comparable electric utilities, and used the average of the group as the cost of common equity for Duke. The internal rate of return of an individual electric utility is calculated based on the formula that the current average stock price equates to the current value of an expected stream of annual dividends. The PUCO Staff used the average daily closing stock price for the period from September 30, 2011, through September 28, 2012. The PUCO Staff adopted a non-constant growth rate for estimating future dividends. The growth rates of the first five years of per share dividends are the average of estimates from various investor news services such as Yahoo, MSN, Reuters and Value Line. From the twenty-fifth year on, the growth rates are assumed to be equal to the long-term growth rate of Gross National Product for 1929 through 2011 as reported by the U.S. Department of Commerce. Regarding the growth rate of dividends per share for the sixth through twenty-fourth years, the PUCO Staff assumed that the annual dividends vary between the two rates in a linear fashion.

<sup>29</sup> See, e.g., PUCO Case No. 08-709-EL-AIR et al., Staff Report at 14-16 (January 27, 2009); PUCO Case No. 11-0351-EL-AIR et al., Staff Report at 14-16 (September 15, 2011); PUCO Case No. 07-551-EL-AIR et al., Staff Report at 15-17 (December 4, 2007); PUCO Case No. 07-589-GA-AIR et al., Staff Report at 15 (December 20, 2007); PUCO Case No. 07-829-GA-AIR et al., Staff Report at 22 (May 23, 2008); PUCO Case No. 08-72-GA-AIR et al., Staff Report at 12 (August 21, 2008); PUCO Case No. 11-4161-WS-AIR, Staff Report at 14 (January 31, 2012); and PUCO Case No. 09-1044-WW-AIR, Staff Report at 16 (May 21, 2010).

<sup>30</sup> See, Staff Report at 18.

number, 5.90%, was actually used) in the calculation of the cost of common equity. Based on this particular weighting, the Staff then proposed a range for Duke's baseline cost of common equity, 8.66% to 9.66%, assuming a one hundred basis point range of uncertainty.<sup>31</sup> The Staff makes an additional allowance for equity issuance and other costs, using an adjustment factor of 1.019. The Staff's final recommended range of cost of common equity is 8.82% to 9.84%. Based on the embedded cost of long-term debt (5.32%), the estimated range of the cost of common equity, and the proposed capital structure (46.7% debt and 53.3% equity), the PUCO Staff recommends a range for the overall rate of return to be 7.19% to 7.73%.

***Q17. DO YOU HAVE ANY CONCERNS REGARDING THE STAFF'S  
PROPOSED COST OF COMMON EQUITY AND RATE OF RETURN IN  
THIS PROCEEDING?***

***A17.*** Yes.

***Q18. PLEASE IDENTIFY THE CONCERNS YOU HAVE REGARDING THE  
STAFF'S PROPOSED COST OF COMMON EQUITY AND RATE OF  
RETURN.***

***A18.*** My first concern is the equity risk premium used by the Staff in its CAPM analysis. The Staff's proposed equity risk premium of 5.70% should be reduced because it was based exclusively on the difference between the arithmetic mean

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<sup>31</sup> Id.



1 total returns of large companies' stocks and long-term government bonds. The  
2 exclusive use of arithmetic mean total returns, as proposed by the Staff, tends to  
3 inflate the historical annualized total rate of return, and thus, increases the  
4 expected risk premium in most instances. A higher risk premium will always lead  
5 to a higher estimated cost of common equity under the CAPM. This approach  
6 will invariably increase Duke's estimated cost of common equity, which in turn  
7 will increase Duke's revenue requirement and the distribution rates paid by  
8 Duke's electric customers.

9  
10 My second concern is the Staff's weighting of the estimated costs of common  
11 equity derived from the CAPM and the DCF models. As stated earlier, the  
12 weighting (0.25 for CAPM results and 0.75 for DCF results) used by the Staff in  
13 this proceeding is a departure from the Staff's long-standing methodology of  
14 weighting the results of the CAPM and DCF equally, and has never been accepted  
15 by the Commission.<sup>32</sup>

16  
17 This particular weighting may indicate a perception by the Staff that a lower  
18 Treasury Yield will make the CAPM result less reliable or less relevant in  
19 estimating Duke's cost of common equity. However, there is no basis for this  
20 perception. Based on my understanding of the theoretical basis of the CAPM and

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<sup>32</sup> The only explanation for this change in weighting as provided by the Staff seems to be the Staff's perception of current Treasury Yields as "historically lower." See, Staff Report at 18. But there is no explanation or support why the Staff believes that the current Treasury Yields are at a historical low or the Treasury Yields are at such a low level (if it is indeed the case) that will require the DCF result to be weighted more heavily than the CAPM result.

1 DCF models, a lower yield on risk-free investment (such as the Treasury Yield) is  
2 likely to affect the CAPM and the DCF models in similar directions. All things  
3 being equal, a lower Treasury Yield is likely to lower the cost of common equity  
4 estimated under both the CAPM and the DCF financial models. The magnitudes  
5 of the reduction, as a result of a lower yield of a risk-free investment, may be  
6 different between the CAPM and the DCF, but the directions of change are likely  
7 to be the same. Consequently, a low Treasury Yield is not a valid reason to give  
8 greater or lesser weight to the results of either the CAPM or the DCF financial  
9 models. Furthermore, there is no evidence provided by the Staff that the current  
10 Treasury Yields are indeed at a historically low level or that the Treasury Yields  
11 will increase significantly in the next few years. Given the current projections of  
12 moderate economic growth for the next few years, I am inclined to believe that  
13 the Treasury Yields over the next few years will not vary significantly from its  
14 current level.

15  
16 The 0.25/0.75 weighting proposed in the Staff Report for the CAPM and the DCF  
17 results, respectively, is not a minor adjustment. It values the result of the DCF  
18 model three times as much as the result of the CAPM model. To put it another  
19 way, assuming the 0.50/0.50 weighting is still applicable, the baseline cost of  
20 common equity of 9.16%, as proposed in the Staff Report, essentially requires the  
21

1 CAPM-estimated cost of common equity to be adjusted upward to 8.08%.<sup>33</sup> Such  
2 a huge “after-the-fact” adjustment to the CAPM results (from 5.90% to 8.08%) is  
3 not justified or supported in the Staff Report. This implicit “revision” of the  
4 estimated CAPM result through a change in weighting will be costly to Duke’s  
5 customers. Furthermore, I am concerned that this “after-the-fact revision” of the  
6 CAPM results by the Staff in this proceeding will establish a precedent that can  
7 undermine the credibility of the Staff’s analysis of the cost of common equity and  
8 the rate of return in future rate case proceedings.

9  
10 My third concern is the Staff’s adoption of an adjustment factor of 1.019 for the  
11 allowance of issuance and other costs.<sup>34</sup> This adjustment factor is not based on  
12 the actual financial data (retained earnings and common equity at the date certain)  
13 in this proceeding. Rather, this adjustment factor is the same number the Staff  
14 recommended in Duke’s last electric rate case (PUCO Case No. 08-709-EL-AIR).  
15 According to the Staff, this number was used because Duke currently has negative  
16 retained earnings.<sup>35</sup> I do not support the use of an adjustment factor for the  
17 allowance of issuance and other costs in this proceeding. In its Application and  
18 testimony, Duke provided only a general discussion related to the recognition of  
19

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<sup>33</sup> Specifically, the implicit (or after-the-fact) CAPM Cost of Equity =  $(9.16\% - (0.5 * 10.24\%)) / 0.5 = 8.08\%$ .

<sup>34</sup> See, Staff Report at 18.

<sup>35</sup> Id.

1 flotation costs in the allowed common equity cost rate.<sup>36</sup> Duke did not provide  
2 any documentation or proof that it indeed incurred any issuance costs, that it  
3 would incur such costs in the reasonably near future or that it has not fully  
4 recovered any issuance costs. This issuance cost adjustment, as proposed in the  
5 Staff Report, is not justified and would inappropriately increase the cost of natural  
6 gas distribution services to Duke's customers.

7  
8 ***Q19. PLEASE EXPLAIN YOUR PROPOSED ADJUSTMENTS TO THE STAFF'S***  
9 ***RECOMMENDED COST OF COMMON EQUITY.***

10 ***A19.*** I propose three adjustments to the Staff's recommended cost of common equity.  
11 First, the expected risk premium used in the CAPM should be the average (4.9%)  
12 of the arithmetic mean total returns (5.7%) as well as geometric mean total returns  
13 (4.1%) between large companies and government bonds.<sup>37</sup> This OCC-proposed  
14 adjustment will in turn lower the CAPM-derived cost of common equity from  
15 5.90% to 5.44%.<sup>38</sup>

16  
17 Second, the estimated costs of common equity from the CAPM and the DCF  
18 models should be weighted equally. By doing so, the baseline cost of common  
19 equity will be the average (7.84%) of the CAPM model (5.44%, as already  
20 modified by the first OCC adjustment) and the DCF model (10.24%) as  
21

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<sup>36</sup> See, Direct Testimony of Morin at 52-57 (July 20, 2012).

<sup>37</sup> See, Ibbotson *SBBi 2012 Valuation Yearbook* at 23, Table 2-1.

<sup>38</sup> Specifically, CAPM Cost of Equity = 2.255% + (0.65 \* 4.90%) = 5.44%.

1 recommended by the Staff. Using the same one hundred basis point range of  
2 uncertainty used in the Staff Report, the range of the baseline cost of equity  
3 estimate should be 7.34% to 8.34% (with a midpoint of 7.84%) instead 8.66% to  
4 9.66% (with a midpoint of 9.16%) proposed in the Staff Report.<sup>39</sup>

5  
6 Third, the adjustment factor of 1.01904 should not be applied to the baseline cost  
7 of common equity to account for unspecified and unsubstantiated issuance and  
8 other costs. This OCC-proposed exclusion will prevent the unjustified increase in  
9 cost of common equity, as proposed by the Staff, from a range of 8.66% to 9.66%  
10 to a range of 8.82% to 9.84%.<sup>40</sup> If OCC's first two adjustments are adopted, this  
11 third adjustment (that is no allowance of issuance and related costs) will maintain  
12 the OCC-proposed baseline cost of common equity, 7.84%.

13  
14 ***Q20. PLEASE EXPLAIN THE REDUCTION OF THE STAFF-PROPOSED***  
15 ***OVERALL RATE OF RETURN IF THESE THREE OCC ADJUSTMENTS***  
16 ***ARE ADOPTED.***

17 ***A20.*** As discussed earlier, I propose no adjustment to the capital structure and costs of  
18 long-term debt recommended in the Staff Report. OCC's three proposed  
19 adjustments will only affect Duke's cost of common equity. If the proposed OCC  
20 adjustments are adopted, it will in turn reduce the rate of return for Duke to

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<sup>39</sup> See, Staff Report at 18.

<sup>40</sup> Id.

6.66%, from the midpoint (7.46%) of the Staff's proposed range, based on the accepted capital structure and cost of long-term debts.<sup>41</sup>

***Q21. WHAT WILL DUKE'S OVERALL RATE OF RETURN AND COST OF COMMON EQUITY BE IF ONLY THE RESULTS OF THE CAPM AND THE DCF ARE GIVEN EQUAL WEIGHT BUT NO OTHER OCC-PROPOSED ADJUSTMENT IS ADOPTED?***

***A21.*** If the Staff's proposed CAPM and DCF results (5.90% and 10.24%, respectively) are adopted, but weighted equally, the cost of common equity will be 8.07%,<sup>42</sup> the midpoint within a range of 7.57% to 8.57%, assuming a one hundred basis point range of uncertainty. With the same adjustment factor of 1.019 for issuance and other costs, the range of ROE will be adjusted upward to 7.71% to 8.73%, with a midpoint of 8.22%. The resulting rate of return, based on the Staff-proposed capital structure and cost of long-term debts, will be 6.86%, the midpoint of the range of 6.59% to 7.16%.<sup>43</sup>

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<sup>41</sup> Specifically, the Rate of Return =  $(5.32\% * 0.4670) + (7.84\% * 0.5330) = 6.66\%$ .

<sup>42</sup> Specifically, the estimated Cost of Equity =  $(5.90\% + 10.24\%) / 2 = 8.07\%$ .

<sup>43</sup> Specifically, the Rate of Return =  $(5.32\% * 0.4670) + (8.22\% * 0.5330) = 6.86\%$ .

1    **IV.    CONCLUSION**

2

3    ***Q22.   DO YOU AGREE THAT IT IS IN THE BEST INTEREST OF CONSUMERS***  
4            ***FOR THE COMMISSION TO ADOPT THE 10.6% ROE AS***  
5            ***RECOMMENDED BY DUKE FOR ITS OHIO UTILITY OPERATIONS?***<sup>44</sup>

6    **A22.**   No. It is clear to me, based on my own analysis and the Staff Report, that the  
7            10.60% ROE proposed by Duke is too high and not justified by the current capital  
8            market's condition and the state of the economy in general. A return on equity  
9            that is higher than a reasonable level will increase the rate of return, which will  
10          invariably increase the total revenue requirement and rates for Duke's gas  
11          distribution service. This, in turn, will add an unjustified financial burden to  
12          Duke's approximately 660,000 residential customers.

13

14   ***Q23.   DOES THIS CONCLUDE YOUR TESTIMONY?***

15   **A23.**   Yes. However, I reserve the right to supplement my testimony in the event that  
16          Duke submits additional testimony or additional information, or if other data in  
17          connection with this proceeding becomes available. I also reserve the right to  
18          supplement my testimony in the event that PUCO Staff submits additional  
19          information or changes any of its positions made in the Staff Report regarding  
20          cost of common equity and rate of return.

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<sup>44</sup> See, Direct Testimony of Morin at 5 (July 20, 2012).

## **CERTIFICATE OF SERVICE**

I hereby certify that a copy of the *Direct Testimony of Daniel J. Duann, Ph.D.*  
*CRRA on Behalf of the Office of the Ohio Consumers' Counsel* was served on the persons  
stated below *via* electronic service this 25<sup>th</sup> day of February 2013.

/s/ Larry S. Sauer

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**Daniel J. Duann, Ph.D.**  
**List of Testimonies Filed Before PUCO**

1. *Application of The Dayton Power and Light Company for Approval of Its Electric Security Plan*, Case No. 08-1094-EL-SSO (January 26, 2009).
2. *Application of Ohio American Water Company to Increase Its Rates for Water and Sewer Service Provided to Its Entire Service Area*, Case No. 09-391-WS-AIR (January 4, 2010).
3. *Application of Aqua Ohio, Inc. for Authority to Increase its Rates and Charges in its Masury Division*, Case No. 09-560-WW-AIR (February 22, 2010).
4. *Application of Aqua Ohio, Inc. for Authority to increase its Rates and Charges in its Lake Erie Division*, Case No. 09-1044-WW-AIR (June 21, 2010).
5. *In the Matter of the Fuel Adjustment Clauses for Columbus Southern Power Company and Ohio Power Company*, Case Nos. 09-872-EL-FAC and 09-873-EL-FAC (August 16, 2010).
6. *In the Matter of the Application of Columbus Southern Power Company for Approval of an Electric Security Plan; an Amendment to its Corporate Separation Plan; and the Sale or Transfer of Certain Generating Asset (Remand)*, Case Nos. 08-917-EL-SSO et al (June 30, 2011).
7. *In the Matter of the Application of The East Ohio Gas Company d/b/a Dominion East Ohio for Approval of Tariffs to Modify and further Accelerate its Pipeline Infrastructure Replacement Program and to Recover the Associated Costs et al.*, Case Nos. 11-2401-GA-ALT and 08-169-GA-ALT (July 15, 2011).
8. *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to 4928.143, Ohio Rev. Code in the Form of an Electric Security Plan (ESP)*, Case Nos. 11-346-EL-SSO, et al (July 25, 2011).
9. *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Merge and Related Approval (ESP Stipulation)*, Case Nos. 10-2376-EL-UNC, et al (September 27, 2011).
10. *In the Matter of the 2010 Annual Filing of Columbus Southern Power Company and Ohio Power Company Required by Rule 4901:1-35-10, Ohio Administrative Code*, Case Nos. 11-4571-EL-UNC and 11-4572-EL-UNC (October 12, 2011).
11. *In the Matter of the Application of Ohio American Water Company to Increase Its Rates for Water and Sewer Service Provided to Its Entire Service Area*, Case No. 11-4161-WS-AIR (March 1, 2012).

12. *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to 4928.143, Ohio Rev. Code in the Form of an Electric Security Plan (Modified ESP), Case Nos. 11-346-EL-SSO, et al (May 4, 2012).*
13. *In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company For Authority to Establish a Standard Service Offer Pursuant to R.C. § 4928.143 in the Form Of an Electric Security Plan, Case No. 12-1230-EL-SSO (May 21, 2012).*

**Daniel J. Duann, Ph.D.**  
**List of Professional Publications**

**Journal Articles**

*Regulation, The Cato Review of Business & Government*, "Turning up the Heat in the Natural Gas Industry," Vol. 19, 1996, (with Kenneth W. Costello).

*Managerial And Decision Economics*, "Designing a Preferred Bidding Procedure for Securing Electric Generating Capacity," Vol. 12, 1991.

*The Journal of Energy and Development*, "Direct Gas Purchases by Local Distribution Companies: Supply Reliability and Cost Implications," Vol. 14, 1989.

*Public Utilities Fortnightly*, "Alternative Searching and Maximum Benefit in Electric Least-Cost Planning," December 21, 1989.

**Research Reports and Presentations**

The National Regulatory Research Institute, *Pricing Local Distribution Services in a Competitive Market*, 1995.

Ninth NARUC Biennial Regulatory Information Conference, Ohio State University, *The Unbundling and Restructuring of Local Distribution Services in the Post-636 Gas Market*, 1994.

The National Regulatory Research Institute, *A Survey of Recent State Initiatives on EPACT and FERC Order 636*, 1994 (with Belle Chen).

The National Regulatory Research Institute, *Restructuring Local Distribution Services: Possibilities and Limitations*, 1994.

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The National Regulatory Research Institute, *Natural Gas Vehicles and the Role of State Public Service Commissions*, 1992 (with Youssef Hegazy).

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Summary: Testimony Direct Testimony of Daniel J. Duann, Ph.D. on Behalf of the Office of the Ohio Consumers' Counsel electronically filed by Patti Mallarnee on behalf of Sauer, Larry S.