BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

IN THE MATTER OF THE APPLICATION OF VECTREN ENERGY DELIVERY OF OHIO, INC. FOR APPROVAL OF AN ALTERNATIVE RATE PLAN	**Case No. 18-0049-GA-ALT**
IN THE MATTER OF THE APPLICATION OF VECTREN ENERGY DELIVERY OF OHIO, INC. FOR APPROVAL OF AN INCREASE IN GAS RATES	**Case No. 18-0298-GA-AIR**
IN THE MATTER OF THE APPLICATION OF VECTREN ENERGY DELIVERY OF OHIO, INC. FOR APPROVAL OF AN ALTERNATIVE RATE PLAN.	**Case No. 18-0299-GA-ALT**

Direct Testimony and Exhibits of

Michael P. Gorman

On behalf of

The Federal Executive Agencies

November 7, 2018

BRUBAKER & ASSOCIATES, INC.

Project 10640

CERTIFICATE OF SERVICE

I hereby certify that on November 7, 2018 a true copy of the foregoing was served via electronic mail on the following Parties of Record:

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Direct Testimony of Michael P. Gorman

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A Michael P. Gorman. My business address is 16690 Swingley Ridge Road, Suite 140, Chesterfield, MO 63017.

Q WHAT IS YOUR OCCUPATION?

A I am a consultant in the field of public utility regulation and a Managing Principal of Brubaker & Associates, Inc., energy, economic and regulatory consultants.

Q PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A This information is included in Appendix A to my testimony.

Q ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A I am appearing on behalf of the Federal Executive Agencies ("FEA"), who have facilities, including Wright-Patterson Air Force Base, in the service territory of Vectren Energy Delivery of Ohio, Inc. ("VEDO" or "Company").

Q WHAT IS THE SUBJECT MATTER OF YOUR TESTIMONY?

A My testimony will address the current market cost of equity, and overall rate of return, for VEDO. In my analyses, I consider the results of several market models and the current economic environment and outlook for the regulated utility industry as well as the financial integrity of VEDO given my recommended return on equity, the Company's proposed capital structure, and my recommended overall rate of return.

My silence in regard to any issue should not be construed as an endorsement of VEDO's position.

I. SUMMARY

Q PLEASE SUMMARIZE YOUR RECOMMENDATIONS AND CONCLUSIONS ON RATE OF RETURN.

A I recommend the Public Utilities Commission of Ohio ("Commission") award VEDO a return on common equity of 9.30%, which is the midpoint of my recommended range of 9.00% to 9.60%. My recommended return on equity will fairly compensate VEDO for its current market cost of common equity, and it will mitigate the claimed revenue deficiency in this proceeding by fairly balancing the interests of all stakeholders.

The overall rate of return produced by my recommended return on common equity, and VEDO's proposed capital structure produces an overall rate of return of 7.23%, as shown on my Exhibit MPG-1.

Finally, I will show that VEDO witness Dr. Michael Vilbert's recommended range of 10.00% to 11.00%, and his point estimate of 10.75% is an excessive and unreasonable return on equity and will require unjustified increases to retail rates.

II. RATE OF RETURN

Q PLEASE DESCRIBE THIS SECTION OF YOUR TESTIMONY.

A In this section of my testimony, I will explain the analysis I performed to determine the reasonable rate of return in this proceeding and present the results of my analysis. I begin my estimate of a fair return on equity by reviewing the authorized returns approved by the regulatory commissions in various jurisdictions, and the market assessment of the regulated utility industry investment risk, credit standing, and stock price performance. I used this information to get a sense of the market's perception of the risk characteristics of regulated utility investments in general, which is then used to

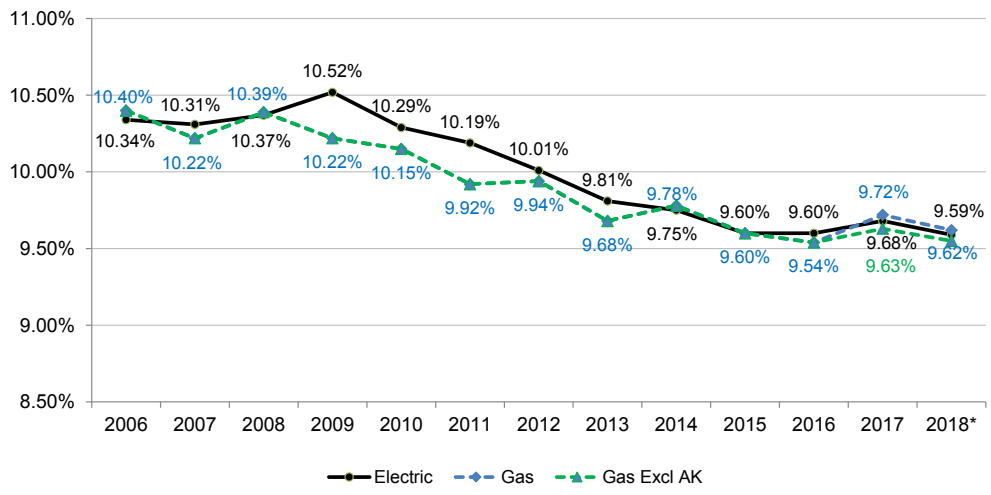
produce a refined estimate of the market's return requirement for assuming investment risk similar to VEDO's utility operations.

II.A. Utility Industry Authorized Returns on Equity, Access to Capital, and Credit Strength

Q PLEASE DESCRIBE THE OBSERVABLE EVIDENCE ON TRENDS IN AUTHORIZED RETURNS ON EQUITY FOR REGULATED UTILITIES, UTILITIES' CREDIT STANDING, AND UTILITIES' ACCESS TO CAPITAL USED TO FUND INFRASTRUCTURE INVESTMENT.

A Authorized returns on equity for both electric and gas utilities have declined over the last ten years, as illustrated in Figure 1 below. Most authorized returns over the last several years have stayed around 9.6%.

FIGURE 1



Source and Notes:
S&P Global Market Intelligence, RRA Regulatory Focus, Major Rate Case Decisions -- January - September 2018, October 11, 2018 at pages 8 and 9.
* Data includes January - June, 2018.
* Electric Returns exclude Limited Issue Riders.
* RRA excludes the 2017 Alaska ENSTAR decision from its calculations.

Q HOW HAS THE CREDIT RATING OF THE REGULATED UTILITY INDUSTRY CHANGED WITH THE REGULATORY AWARDS?

A The natural gas utility industry credit rating changes are shown in Table 1 below. In 2009, 42% of the gas industry had a credit rating in the BBB category with 28% below BBB+. In 2018, after the change in federal tax law change, all utilities remained above BBB.

TABLE 1

S&P Ratings by Category
Natural Gas Utilities
(Year End)

Description	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
A or higher	57%	57%	50%	50%	38%	33%	33%	44%	56%	38%
A-	0%	0%	0%	0%	38%	33%	33%	22%	11%	13%
BBB+	14%	14%	38%	38%	13%	22%	33%	33%	33%	38%
BBB	14%	14%	0%	0%	0%	0%	0%	0%	0%	13%
BBB-	14%	14%	13%	13%	13%	11%	0%	0%	0%	0%
Below BBB-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: S&P CAPITAL IQ, downloaded 10/24/18.
Note: Subsidiary rating is used if parent not rated.

Q HAVE UTILITIES BEEN ABLE TO ACCESS EXTERNAL CAPITAL TO SUPPORT INFRASTRUCTURE CAPITAL PROGRAMS?

A Yes. In its April 20, 2018 Capital Expenditure Update report, *RRA Financial Focus*, a division of S&P Global Market Intelligence, made several relevant comments about utility investments generally:

- Forecasted 2018 capital expenditures for the 52 electric and gas utilities in the RRA universe climbed to an all-time high of $131.1 billion, up from utilities' prior forecast of $111.7 billion that was tallied last fall.

- A sizeable chunk of the increase involves $9.45 billion in merger consideration paid by Sempra Energy for Energy Future Holdings, which Sempra acquired in March 2018. Absent the Oncor acquisition expense, forecasted 2018 capital expenditures are still 10% higher than actual 2017 expenditures.

- CapEx projections for 2019 increased 10% from our October 2017 analysis, rising to $112.9 billion for the year from $102.3 billion, as companies' plans for future projects solidified and new opportunities arose. Our latest report provides a new capital expenditure forecast of $93.3 billion for 2020.

* * *

The nation's electric and gas utilities are investing in infrastructure to upgrade aging transmission and distribution systems, build new natural gas, solar and wind generation and implement new technologies. We expect considerable levels of spending to serve as the basis for solid profit expansion for the foreseeable future.

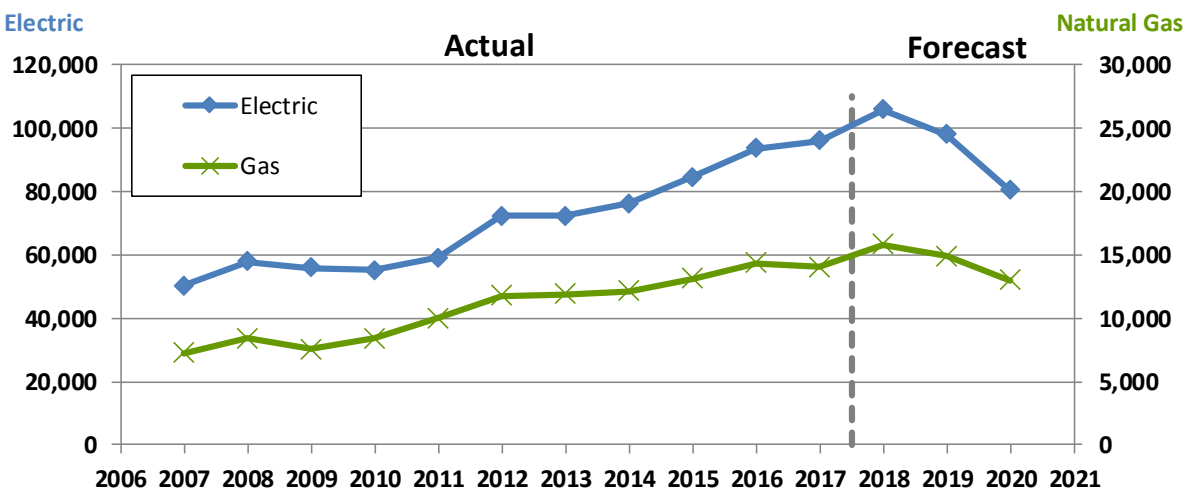
* * *

From a natural gas perspective, many utilities are participating in the sizable and ongoing expansion of the nation's gas midstream network. In addition, replacement of mature gas distribution infrastructure has gained widespread momentum and is likely to continue at material levels for many years, considering state and federal mandates to address safety.[1]

Historical versus projected outlooks for the electric and gas industries' capital investments are shown in Figure 2 below. As shown in this graph, regulated industry investment outlooks are expected to be higher in the near-term forecast (2017-2019), relative to the last ten-year historical period. As noted by S&P Global Market Intelligence, this capital investment is exceeding internal sources of funds for the regulated utilities, requiring them to seek external capital to fund capital investments.

[1]S&P Global Market Intelligence, RRA Financial Focus: "Utility Capital Expenditures," April 2018, Table 1.

FIGURE 2



Source: *S&P Global Market Intelligence, RRA Financial Focus*, Utility Capital Expenditures, April 20, 2018, Table 1.

As shown in Figure 2 above, the capital investments for the electric utility industry are significantly higher than the capital investments for the gas industry but they follow the same trend over the historical and forecasted period.

Q IS THERE EVIDENCE OF ROBUST VALUATIONS OF REGULATED UTILITY EQUITY SECURITIES?

A Yes. Robust valuations are an indication that utilities can sell securities at high prices, which is a strong indication that they can access equity capital under reasonable terms and conditions, and at relatively low cost. As shown on Exhibit MPG-2, the historical valuation of gas utilities followed by *Value Line*, based on a price-to-earnings ("P/E") ratio, price-to-cash flow ("P/CF") ratio, and market price-to-book value ("M/B") ratio, indicates utility security valuations today are very strong and robust relative to the last

13 years. These strong valuations of utility stocks indicate that utilities have access to equity capital under reasonable terms and at lower costs.

Q HOW SHOULD THE COMMISSION USE THIS MARKET INFORMATION IN ASSESSING A FAIR RETURN FOR VEDO?

A Market evidence is quite clear that capital market costs are near historically low levels. Authorized returns on equity have fallen to the mid 9.0% range; utilities continue to have access to large amounts of external capital to fund large capital programs; and utilities' investment grade credit standings are stable and have improved, due in part to supportive regulatory treatment. The Commission should carefully weigh all this important observable market evidence in assessing a fair return on equity for VEDO.

II.B. Regulated Utility Industry Market Outlook

Q PLEASE DESCRIBE THE CREDIT RATING OUTLOOK FOR REGULATED UTILITIES.

A Regulated utilities' credit ratings have improved over the last few years. Credit analysts have observed that utilities have strong access to capital at attractive pricing (i.e., low capital costs), which has supported very large capital programs.

Standard & Poor's ("S&P") recently published a report titled "Corporate Industry Credit Research: Industry Top Trends 2018, North America Regulated Utilities." In that report, S&P noted the following:

> **– Ratings Outlook**: Rating trends across regulated utilities in North America remain mostly stable supported by stable regulatory oversight, mostly flat demand for utility services, but tempered by aggressive capital spending and tax reform considerations in the U.S. that will keep credit metrics from improving and weaken some entities depending on individual tax situations and regulatory/management responses. Emerging new technological and regulatory trends in historically stable

> Canada and the U.S. may have far-reaching effect on utilities over time, but we see limited influence from those factors in 2018.
>
> **– Forecasts:** Credit ratios are likely to be stable to slightly lower in 2018 with some downside risk as U.S. utilities grapple with tax reform. Revenue growth will be modest in most areas in keeping with the flat demand growth. Margins across the industry in North America are expected to be flat to improving slightly as operating conditions and favorable fuel cost trends are maintained.
>
> **– Assumptions:** Sales growth at most utilities is loosely tied to the general economic outlook in its service territory, with low demand keeping growth flat or very low for most. We project continued regulatory support for utility earnings and cash flow, with the occasional exception due to specific political or policy issues at the local level. Capital spending will continue to be elevated for most utilities, as infrastructure needs are not abating.
>
> **– Risks:** Transformative risks abound in the Canadian and U.S. utility sector, especially in electric utilities. Corporate transformations (M&A) are an ever-present risk to ratings. Electric generation transformation is ongoing as carbon concerns and other environmental considerations lead utilities to change the mix of fuel sources. Grid transformation is becoming more prominent as utilities react to technological advances and other disruptive forces.
>
> **– Industry Trends:** The utility sector in the U.S. and Canada is stable with some modest downside ratings exposure, consistent with our general ratings outlook and the nature of the essential products and services utilities sell. Tax reform in the U.S. has emerged as a more urgent issue and could on a case-by-case basis result in downgrades. However, the industry as a whole is well positioned to withstand mild shocks, and we see steady growth and stable credit quality overall.[2]

Moody's more recently did place the industry on "Negative" outlook, to reflect the uncertainty and short-term cash flow impacts primarily as a result of the change in federal tax law, but also the large capital program for the industry. Moody's stated:

> Some regulatory commissions have allowed early tax reform relief In Florida, the Florida Public Service Commission allowed several of the state's utilities including Florida Power & Light Company (A1 stable), Duke Energy Florida, LLC (A3 stable) and Tampa Electric Company (A3 stable) to use the bulk of customer refunds resulting from tax reform changes to offset rate increases for power restoration costs associated with the utilities' response to Hurricane Irma. Duke Energy Florida was

[2] *Standard & Poor's Global Ratings*: "Industry Top Trends 2018: North America Regulated Utilities," January 25, 2018, at 1 (emphasis added).

> also permitted to use a portion of the savings to accelerate the depreciation of existing coal plants.[3]

As outlined above, Moody's is concerned about short-term cash flow impacts for the regulated utility industry. However, it is looking for regulatory decisions that support the utility's cash flow while the utility transforms to the new federal tax law environment.

In a recent report Fitch states:

> The Tax Cuts and Jobs Act signed into law on Dec. 22, 2017 has negative credit implications for U.S. regulated utilities and utility holding companies over the short-to-medium term, according to Fitch Ratings. A reduction in customer bills to reflect lower federal income taxes and return of excess accumulated deferred income taxes is expected to lower revenues and funds from operations (FFO) across the sector. Absent mitigating strategies on the regulatory front, this is expected to lead to weaker credit metrics and negative rating actions for those issuers that have limited headroom to absorb the leverage creep.
>
> * * *
>
> Over a longer-term perspective, Fitch views tax reform as modestly positive for utilities. The sector retained the deductibility of interest expense, which would have otherwise significantly impacted cost of capital for this capital intensive sector. The exemption from 100% capex expensing is also welcome news for the sector, which has seen years of bonus depreciation reduce rate base leading to lower earnings. Finally, the reduction in federal income taxes lowers cost of service to customers, providing utilities headroom to increase rates for capital investments.[4]

Credit analysts are observing the impact on utilities as they transform to the new federal tax law. However, while the credit analysts are watching the impact on the industry, they are expecting the industry's cash flows to improve over time which should lead to stabilizing the credit standing, and outlook for the utility industry.

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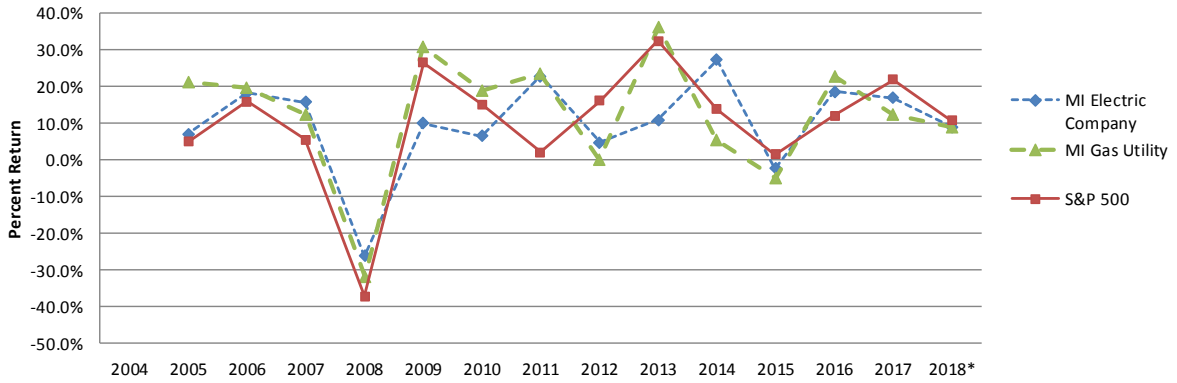
[3] *Moody's Investors Service*: "Outlook: Regulated utilities - US, 2019 outlook shifts to negative due to weaker cash flows, continued high leverage," June 18, 2018 at 3.

[4] *Fitch Ratings*: "Tax Reform Creates Near-term Credit Pressure for U.S. Utilities," January 24, 2018.

Q PLEASE DESCRIBE UTILITY STOCK PRICE PERFORMANCE OVER THE LAST SEVERAL YEARS.

A As shown in Figure 3 below, S&P Global Market Intelligence ("MI") has recorded utility stock price performance compared to the market. The industry's stock performance data from 2004 through September 2018 shows that the MI Electric Company and Gas Utility Indexes have followed the market through downturns and recoveries. However, utility investments have exhibited less volatile movement during extreme market downturns. This more stable price performance for utilities supports my conclusion that utility stock investments are regarded by market participants as moderate- to low-risk investments.

FIGURE 3



Source: S&P Global Market Intelligence.
*Data through September 2018

II.C. Federal Reserve and Market Capital Costs Outlook

Q HAVE YOU CONSIDERED CONSENSUS MARKET OUTLOOKS FOR CHANGES IN INTEREST RATES IN FORMING YOUR RECOMMENDED RETURN ON EQUITY IN THIS CASE?

A Yes. The outlook for changes in interest rates, inflation, and Gross Domestic Product ("GDP") growth has been impacted by expectations that the Federal Reserve Bank

Open Market Committee ("FOMC") will raise short-term interest rates. Consensus economists are expecting continued increases in the Federal Funds Rate as the FOMC continues to normalize interest rates in response to the strengthening of the U.S. economy.

This is evident from a comparison of current and forecasted changes in the Federal Funds Rate. Table 2 below shows that while the Federal Funds Rate (the short-term rate) is expected to increase over the next several years (a consensus increase of 1.4% to 2.9%), the consensus for increases in long-term interest rates is not as significant (a consensus increase of 3.0% to 3.6%).

TABLE 2

Blue Chip Financial Forecasts
Projected Federal Funds Rate, 30-Year Treasury Bond Yields, and GDP Price Index

Publication Date	1Q 2018	2Q 2018	3Q 2018	4Q 2018	1Q 2019	2Q 2019	3Q 2019	4Q 2019	1Q 2020
Federal Funds Rate									
May-18	**1.4**	1.7	2.0	2.2	2.4	2.6	2.8		
Jun-18	**1.4**	1.7	2.0	2.2	2.4	2.6	2.8		
Jul-18		1.7	2.0	2.2	2.4	2.6	2.8	2.9	
Aug-18		**1.7**	2.0	2.2	2.4	2.6	2.8	2.9	
Sep-18		**1.7**	2.0	2.2	2.4	2.6	2.8	2.9	
Oct-18			1.9	2.2	2.4	2.7	2.8	2.9	2.9
T-Bond, 30 yr.									
May-18	**3.0**	3.2	3.3	3.5	3.6	3.7	3.8		
Jun-18	**3.0**	3.2	3.3	3.4	3.5	3.7	3.8		
Jul-18		3.1	3.3	3.4	3.5	3.6	3.7	3.8	
Aug-18		**3.1**	3.2	3.3	3.5	3.6	3.7	3.7	
Sep-18		**3.1**	3.1	3.3	3.4	3.5	3.6	3.7	
Oct-18			3.1	3.3	3.4	3.5	3.6	3.7	3.6
GDP Price Index									
May-18	**2.0**	2.0	2.2	2.1	2.2	2.2	2.3		
Jun-18	**2.0**	2.1	2.2	2.1	2.2	2.2	2.2		
Jul-18		2.1	2.2	2.2	2.2	2.2	2.3	2.2	
Aug-18		**3.0**	2.3	2.2	2.3	2.2	2.3	2.2	
Sep-18		**3.0**	2.2	2.3	2.3	2.3	2.2	2.2	
Oct-18			2.2	2.3	2.3	2.3	2.2	2.2	2.2

Source and Note:
Blue Chip Financial Forecasts, May 2018 through October 2018.
Actual Yields in Bold

Importantly, one should recognize that an increase in the Federal Funds Rate does not automatically result in an increase in long-term interest rates. Specifically, I note that none of the eight increases in the Federal Funds Rate experienced over the last few years caused comparable changes in long-term interest rates. This is illustrated on my Exhibit MPG-3. As shown on that exhibit, the actions taken by the FOMC to increase the Federal Funds Rate have simply flattened the yield curve, and have not resulted in a corresponding increase in long-term interest rates. This is significant because the cost of common equity is impacted by long-term interest rates, not short-term interest rates. As a result, the recent increases in the Federal Funds Rate, and the expectation of continued increases in the Federal Funds Rate, have not, and are not expected to, significantly impact long-term interest rates.

Also, the Federal Reserve has recently implemented a strategy to begin to unwind its balance sheet position in long-term interest rate securities. The Federal Reserve built up approximately $4.7 trillion of Treasury and mortgage-backed security holdings as part of a quantitative easing ("QE") program that spanned 2008 to 2014. During the QE program, the Federal Reserve procured long-term securities in an effort to support the Federal Reserve's monetary policy, mitigate long-term interest rates, and to stimulate the economy. In essence, by purchasing these securities, the Federal Reserve was making capital more readily available at lower long-term interest rates.

The Federal Reserve recently started to unwind its balance sheet positions of mortgage-backed securities and Treasury bonds. The Fed now engages in a slow and systematic reduction to its balance sheet position. This Fed balance sheet action has been fully disclosed to the market, and the impact on capital markets valuation and interest rates is captured in current and projected interest rates.

For these reasons, the Federal Reserve actions on short-term interest rates and unwinding its balance sheet have not resulted in material increases in long-term interest rates.

Q HAVE LONGER-TERM PROJECTIONS OF INTEREST RATES MODERATED MORE RECENTLY RELATIVE TO THE LAST FEW YEARS?

A Yes. This is shown below in Table 3. There, I show the prevailing quarterly average Treasury bond yield, and the projections of Treasury bond yields 18 months out and five to ten years out. Significantly, Treasury bond yields in 2017 were relatively moderate and comparable to those in 2015 and 2016; however, projections of future Treasury bond yields are now much lower five to ten years out than they were for the last three years. In 2014, forecasted Treasury bond yields five to ten years out were projected to increase to 5.6% from the 3.26% to 3.79% prevailing yields. These five to ten-year projections have steadily declined through 2015 and 2016. Most recently, long-term projections of Treasury bond yields are now expected to remain relatively low in the 4.2% to 4.4% area.

It is significant that the consensus now projects out relatively low levels of capital market costs will be sustained at least over the next five to ten years. This outlook represents a material moderation in capital market cost outlooks over the forecast period. Recognizing that Treasury bond yields are not expected to increase over the next five to ten years, it is reasonable to expect that return on equity should also remain low.

TABLE 3

30-Year Treasury Bond Yield Actual Vs. Projection

Description	Quarterly Average	2-Year Projected	5- to 10-Year Projected
2014			
Q1	3.79%	4.40%	5.0% - 5.5%
Q2	3.69%	4.50%	
Q3	3.44%	4.40%	5.3% - 5.6%
Q4	3.26%	4.30%	
2015			
Q1	2.97%	4.00%	4.9% - 5.1%
Q2	2.55%	3.70%	
Q3	2.83%	4.00%	4.8% - 5.0%
Q4	2.84%	3.90%	
2016			
Q1	2.96%	3.80%	4.5% - 4.8%
Q2	2.72%	3.60%	
Q3	2.64%	3.40%	4.3% - 4.6%
Q4	2.29%	3.10%	
2017			
Q1	2.82%	3.70%	4.2% - 4.5%
Q2	3.05%	3.80%	
Q3	2.91%	3.70%	4.3% - 4.5%
Q4	2.82%	3.60%	
2018			
Q1	2.82%	3.60%	4.1% - 4.3%
Q2	3.02%	3.80%	
Q3	3.09%	3.80%	4.2% - 4.4%

Sources:

Blue Chip Financial Forecasts ,
December 2013 through September 2018.

II.D. VEDO Investment Risk

Q PLEASE DESCRIBE THE MARKET'S ASSESSMENT OF THE INVESTMENT RISK OF VEDO.

A The market's assessment of VEDO's investment risk is reflected in credit rating analysts' reports. VEDO is not rated by S&P or Moody's but its intermediate parent company, Vectren Utility Holdings, Inc. ("VUHI"), is rated by both S&P and Moody's. VUHI's current corporate bond ratings from S&P and Moody's are A- and A2, respectively. VUHI's outlook from both credit rating agencies was "Stable" prior to the Company agreeing to be acquired by CenterPoint Energy Inc. Specifically, S&P states:

> **CreditWatch**
> The CreditWatch negative listing on Vectren Utility Holdings Inc. (VUHI) reflects the prospect of a downgrade of Vectren Corp. due to its agreement to be acquired by CenterPoint Energy Inc. Our rating on CenterPoint is also on CreditWatch with negative implications. Without regulatory or structural insulation measures that would insulate Vectren from CenterPoint, we would lower our ratings on Vectren, Vectren Utility Holdings Inc., Indiana Gas Co. Inc., and Southern Indiana Gas & Electric Co. to align them with possible lower ratings on CenterPoint. We expect to resolve the CreditWatch by transaction's closing, which could be in early 2019.
>
> * * *
>
> **Business Risk**
> Our assessment of VUHI's business risk is based on its very low-risk regulated utility operations under SIGECO, IGC, and VEDO. The company operates in Indiana and Ohio, and both jurisdictions have generally supportive regulation. The stability of VUHI's operating cash flow is strengthened through the use of various regulatory mechanisms, including riders, gas adjustment clauses, weather normalization adjustments, and decoupling. The company also benefits from a larger customer base, with about one million gas customers and 150,000 electric customers that are primarily residential and commercial, providing cash flow stability that, along with the company's efficient operations, results in steady and supportive profitability. We expect regulated investments to be recovered through timely rate cases and rate surcharges. After factoring in these components, we assess VUHI's business risk profile to be at the higher end of excellent.

Financial Risk

Under our base-case scenario we expect VUHI's cash flow measures to remain stable, though weaker than historical levels, with adjusted funds from operations (FFO) to debt of 23% to 25%. This places the company at the lower end of the intermediate benchmark range. Our base-case scenario incorporates elevated capital spending through 2020 to support infrastructure investments at its electricity and gas utilities, in addition to the effects of U.S. corporate tax reform. Supporting our financial risk assessment is the adjusted operating cash flow (OCF) to debt measure which we forecast at 22% to 24% through 2020.

In line with the company's higher capital spending and greater leverage, we expect debt to EBITDA to average 3.5x through 2020, which is at the lower end of the benchmark range. In addition, we anticipate discretionary cash flow, or operating cash flow after capital expenditures and dividend payments, to remain negative through the forecast period, which will necessitate external funding. Continued negative discretionary cash flow will also significantly limit any deleveraging. Nevertheless, we expect timely and ongoing cost recovery through the regulatory process, as the company continues to invest in its regulated utility operations. VUHI's various rate mechanisms will help it to manage regulatory risk in a credit-supportive manner.

We assess VUHI's financial measures using a moderate financial benchmark table compared with those we use for a typical corporate issuer because its predominantly low-risk utility operations offer more financial stability.

Group Influence

Under our group rating methodology, we assess VUHI to be a core subsidiary of Vectren, reflecting our view that VUHI is highly unlikely to be sold, has a strong long-term commitment from senior management, is successful at what it does, and contributes meaningfully to the group. There are no meaningful insulation measures in place that protect VUHI from its parent. As such, our issuer credit rating on VUHI is in line with Vectren's group credit profile of 'a'.[5]

[5] *Standard & Poor's RatingsDirect:* "Summary: Vectren Utility Holdings Inc.," October 16, 2018, at 2-4 (emphasis added).

III. VEDO'S PROPOSED CAPITAL STRUCTURE

Q WHAT IS VEDO'S PROPOSED CAPITAL STRUCTURE?

A VEDO's proposed capital structure is shown below in Table 4. This actual capital structure ending on December 31, 2017 is sponsored by VEDO witness Mr. Patrick C. Edwards.

TABLE 4

VEDO's Proposed Capital Structure
(December 31, 2017)

Description	Weight
Long-Term Debt	48.94%
Common Equity	51.06%
Total	100.00%

Source: Schedule D-1.

III.A. Embedded Cost of Debt

Q WHAT IS THE COMPANY'S EMBEDDED COST OF DEBT?

A Mr. Edwards is proposing an embedded cost of debt of 5.07% as developed on his Schedule D-3A.

IV. RETURN ON EQUITY

Q PLEASE DESCRIBE WHAT IS MEANT BY A "UTILITY'S COST OF COMMON EQUITY."

A A utility's cost of common equity is the expected return that investors require on an investment in the utility. Investors expect to earn their required return from receiving dividends and through stock price appreciation.

Q PLEASE DESCRIBE THE FRAMEWORK FOR DETERMINING A REGULATED UTILITY'S COST OF COMMON EQUITY.

A In general, determining a fair cost of common equity for a regulated utility has been framed by two hallmark decisions of the U.S. Supreme Court: Bluefield Water Works & Improvement Co. v. Pub. Serv. Comm'n of W. Va., 262 U.S. 679 (1923) and Fed. Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944).

These decisions identify the general financial and economic standards to be considered in establishing the cost of common equity for a public utility. Those general standards provide that the authorized return should: (1) be sufficient to maintain financial integrity; (2) attract capital under reasonable terms; and (3) be commensurate with returns investors could earn by investing in other enterprises of comparable risk.

Q PLEASE DESCRIBE THE METHODS YOU HAVE USED TO ESTIMATE VEDO'S COST OF COMMON EQUITY.

A I have used several models based on financial theory to estimate VEDO's cost of common equity. These models are: (1) a constant growth Discounted Cash Flow ("DCF") model using consensus analysts' growth rate projections; (2) a constant growth DCF using sustainable growth rate estimates; (3) a multi-stage growth DCF model;

(4) a Risk Premium model; and (5) a Capital Asset Pricing Model ("CAPM"). I have applied these models to a group of publicly traded utilities with investment risk similar to VEDO.

IV.A. Risk Proxy Group

Q PLEASE DESCRIBE HOW YOU IDENTIFIED A PROXY UTILITY GROUP THAT COULD BE USED TO ESTIMATE VEDO'S CURRENT MARKET COST OF EQUITY.

A I relied on the same proxy group developed by VEDO witness Dr. Vilbert with two exceptions. I excluded WGL Holdings, Inc. ("WGL") because the company was acquired by AltaGas. At the time Dr. Vilbert developed his study, the transaction was still pending and he determined that it had a small impact on WGL's valuation. However, after the transaction was finalized in mid-2018, WGL was not included in the *Value Line Investment Survey*. I also excluded Chesapeake Utilities because it was not rated by S&P or Moody's.

Q WHY IS IT APPROPRIATE TO EXCLUDE COMPANIES WHICH ARE INVOLVED IN MERGER AND ACQUISITION ("M&A") ACTIVITY FROM THE PROXY GROUP?

A M&A activity can distort the market factors used in DCF and risk premium studies. M&A activity can have impacts on stock prices, growth outlooks, and relative volatility in historical stock prices if the market was anticipating or expecting the M&A activity prior to it actually being announced. This distortion in the market data thus impacts the reliability of the DCF and risk premium estimates for a company involved in M&A.

Moreover, companies generally enter into M&A in order to produce greater shareholder value by combining companies. The enhanced shareholder value normally could not be realized had the two companies not combined.

When companies announce a merger or acquisition, the public assesses the proposed merger and develops outlooks on the value of the two companies after the combination based on expected synergies or other value additions created by the M&A.

As a result, the stock value before the merger is completed may not reflect the forward-looking earnings and dividend payments for the company absent the merger or on a stand-alone basis. Therefore, an accurate DCF return estimate on companies involved in M&A activities cannot be produced because their stock prices do not reflect the stand-alone investment characteristics of the companies. Rather, the stock price more likely reflects the shareholder enhancement produced by the proposed transaction. For these reasons, it is appropriate to remove companies involved in M&A activities from a proxy group used to estimate a fair return on equity for a utility.

Q WHY IS IT APPROPRIATE TO EXCLUDE COMPANIES THAT DO NOT HAVE A BOND RATING FROM S&P OR MOODY'S?

A Credit rating agencies undertake a detailed assessment of the business and financial risk in awarding a bond rating. This bond rating is available to public capital market participants, and is a generally independent assessment of the investment risk of the subject company. While a bond rating generally assesses the credit strength of the company, it is useful in determining the predictability and strength of the company's cash flows to meet its financial obligations including cash needed to meet common equity shareholders' investment return outlooks. For these reasons, credit ratings from S&P and Moody's are information that is available to the investment community to assess the overall investment risk of the underlying company.

Because Chesapeake Utilities does not have a bond rating from S&P or Moody's, it is not possible to rely on independent market participants' assessment of

its investment risk in comparison to VUHC. Because credit rating data was not available to determine that it is reasonably comparable in investment risk to VEDO, it was excluded from the proxy group.

Q PLEASE DESCRIBE WHY YOU BELIEVE YOUR PROXY GROUP IS REASONABLY COMPARABLE IN INVESTMENT RISK TO VEDO.

A The proxy group shown in Exhibit MPG-4, has an average corporate credit rating from S&P of A-, which is identical to VUHC's credit rating from S&P. The proxy group has an average corporate credit rating from Moody's of A2, which is also identical to the Moody's credit rating for its intermediate parent Company. Based on this information, I believe my proxy group is reasonably comparable in investment risk to VEDO.

I also note that the proxy group has an average common equity ratio of 48.1% (including short-term debt) from S&P Global Market Intelligence ("MI") and 53.9% (excluding short-term debt) from *The Value Line Investment Survey* ("*Value Line*"). The Company's proposed common equity ratio of 51.1% reflects less financial risk, but is reasonably comparable to the proxy group average. For these reasons, I believe my proxy group is reasonably comparable to VEDO.

IV.B. Discounted Cash Flow Model

Q PLEASE DESCRIBE THE DCF MODEL.

A The DCF model posits that a stock price is valued by summing the present value of expected future cash flows discounted at the investor's required rate of return or cost of capital. This model is expressed mathematically as follows:

$$P_0 = \frac{D_1}{(1+K)^1} + \frac{D_2}{(1+K)^2} \ldots . \frac{D_\infty}{(1+K)^\infty} \qquad \text{(Equation 1)}$$

P_0 = Current stock price
D = Dividends in periods 1 - ∞
K = Investor's required return

This model can be rearranged in order to estimate the discount rate or investor-required return, known as "K." If it is reasonable to assume that earnings and dividends will grow at a constant rate, then Equation 1 can be rearranged as follows:

$$K = D_1/P_0 + G \qquad \text{(Equation 2)}$$

K = Investor's required return
D_1 = Dividend in first year
P_0 = Current stock price
G = Expected constant dividend growth rate

Equation 2 is referred to as the annual "constant growth" DCF model.

Q PLEASE DESCRIBE THE INPUTS TO YOUR CONSTANT GROWTH DCF MODEL.

A As shown in Equation 2 above, the DCF model requires a current stock price, expected dividend, and expected growth rate in dividends.

Q WHAT STOCK PRICE HAVE YOU RELIED ON IN YOUR CONSTANT GROWTH DCF MODEL?

A I relied on the average of the weekly high and low stock prices of the utilities in the proxy group over a 13-week period ending on October 12, 2018. An average stock price is less susceptible to market price variations than a price at a single point in time. Therefore, an average stock price is less susceptible to aberrant market price movements, which may not reflect the stock's long-term value.

A 13-week average stock price reflects a period that is still short enough to contain data that reasonably reflects current market expectations but the period is not

so short as to be susceptible to market price variations that may not reflect the stock's long-term value. In my judgment, a 13-week average stock price is a reasonable balance between the need to reflect current market expectations and the need to capture sufficient data to smooth out aberrant market movements.

Q WHAT DIVIDEND DID YOU USE IN YOUR CONSTANT GROWTH DCF MODEL?

A I used the most recently paid quarterly dividend as reported in *Value Line*.[6] This dividend was annualized (multiplied by 4) and adjusted for next year's growth to produce the D_1 factor for use in Equation 2 above. In other words, I calculate D_1 by multiplying the annualized dividend (D_0) by (1+G).

Q WHAT DIVIDEND GROWTH RATES HAVE YOU USED IN YOUR CONSTANT GROWTH DCF MODEL?

A There are several methods that can be used to estimate the expected growth in dividends. However, regardless of the method, for purposes of determining the market-required return on common equity, one must attempt to estimate investors' consensus about what the dividend, or earnings growth rate, will be and not what an individual investor or analyst may use to make individual investment decisions.

As predictors of future returns, securities analysts' growth estimates have been shown to be more accurate than growth rates derived from historical data.[7] That is, assuming the market generally makes rational investment decisions, analysts' growth projections are more likely to influence investors' decisions, which are captured in observable stock prices, than growth rates derived only from historical data.

[6] *The Value Line Investment Survey*, August 31, 2018.

[7] *See, e.g.,* David Gordon, Myron Gordon, and Lawrence Gould, "Choice Among Methods of Estimating Share Yield," *The Journal of Portfolio Management*, Spring 1989 at 54.

For my constant growth DCF analysis, I have relied on a consensus, or mean, of professional securities analysts' earnings growth estimates as a proxy for investor consensus dividend growth rate expectations. I used the average of analysts' growth rate estimates from three sources: Zacks, MI, and Reuters. All such projections were available on October 16, 2018, and all were reported online.

Each consensus growth rate projection is based on a survey of securities analysts. There is no clear evidence whether a particular analyst is most influential on general market investors. Therefore, a single analyst's projection does not as reliably predict consensus investor outlooks as does a consensus of market analysts' projections. The consensus estimate is a simple arithmetic average, or mean, of surveyed analysts' earnings growth forecasts. A simple average of the growth forecasts gives equal weight to all surveyed analysts' projections. Therefore, a simple average, or arithmetic mean, of analyst forecasts is a good proxy for market consensus expectations.

Q WHAT ARE THE GROWTH RATES YOU USED IN YOUR CONSTANT GROWTH DCF MODEL?

A The growth rates I used in my DCF analysis are shown in Exhibit MPG-5. The average growth rate for my proxy group is 6.21%.

Q WHAT ARE THE RESULTS OF YOUR CONSTANT GROWTH DCF MODEL?

A As shown in Exhibit MPG-6, the average and median constant growth DCF returns for my proxy group for the 13-week analysis are 9.04% and 8.12%, respectively.

Q DO YOU HAVE ANY COMMENTS ON THE RESULTS OF YOUR CONSTANT GROWTH DCF ANALYSIS?

A Yes. The constant growth DCF analysis for my proxy group is based on a group average growth rate of 6.21%. The three- to five-year growth rates are higher than my estimate of a maximum long-term sustainable growth rate of 4.10%, which I discuss later in this testimony. Also, the constant growth DCF analysis is impacted by a significant outlier. Specifically, South Jersey Industries, Inc.'s reported growth rate is 12.24%, which yields a cost of equity of almost 16%, which is significantly higher than the average cost of equity produced by this model. Importantly, the median result represents a more accurate return when the distribution is subject to outliers. I believe the constant growth DCF analysis produces a reasonable return estimate.

Q HOW DID YOU ESTIMATE A MAXIMUM LONG-TERM SUSTAINABLE GROWTH RATE?

A A long-term sustainable growth rate for a utility stock cannot exceed the growth rate of the economy in which it sells its goods and services. Hence, the long-term maximum sustainable growth rate for a utility investment is best proxied by the projected long-term Gross Domestic Product ("GDP"). *Blue Chip Economic Indicators* projects that over the next 5 and 10 years, the U.S. nominal GDP will grow at an annual rate of approximately 4.10%. These GDP growth projections reflect a real growth outlook of around 2.0% and an inflation outlook of around 2.1% going forward. As such, the average growth rate over the next 10 years is around 4.10%, which I believe is a reasonable proxy of long-term sustainable growth.[8]

[8] *Blue Chip Economic Indicators,* October 10, 2018, at 14.

In my multi-stage growth DCF analysis, I discuss academic and investment practitioner support for using the projected long-term GDP growth outlook as a maximum sustainable growth rate projection. Hence, using the long-term GDP growth rate as a conservative projection for the maximum sustainable growth rate is logical, and is generally consistent with academic and economic practitioner accepted practices.

IV.C. Sustainable Growth DCF

Q PLEASE DESCRIBE HOW YOU ESTIMATED A SUSTAINABLE LONG-TERM GROWTH RATE FOR YOUR SUSTAINABLE GROWTH DCF MODEL.

A A sustainable growth rate is based on the percentage of the utility's earnings that is retained and reinvested in utility plant and equipment. These reinvested earnings increase the earnings base (rate base). Earnings grow when plant funded by reinvested earnings is put into service, and the utility is allowed to earn its authorized return on such additional rate base investment.

The internal growth methodology is tied to the percentage of earnings retained in the company and not paid out as dividends. The earnings retention ratio is 1 minus the dividend payout ratio. As the payout ratio declines, the earnings retention ratio increases. An increased earnings retention ratio will fuel stronger growth because the business funds more investments with retained earnings.

The payout ratios of the proxy group are shown in my Exhibit MPG-7. These dividend payout ratios and earnings retention ratios then can be used to develop a sustainable long-term earnings retention growth rate. A sustainable long-term earnings retention ratio will help gauge whether analysts' current three- to five-year growth rate projections can be sustained over an indefinite period of time.

The data used to estimate the long-term sustainable growth rate is based on the Company's current market-to-book ratio and on *Value Line*'s three- to five-year projections of earnings, dividends, earned returns on book equity, and stock issuances.

As shown in Exhibit MPG-8, the average sustainable growth rate for the proxy group using this internal growth rate model is 8.33%.

Q WHAT IS THE DCF ESTIMATE USING THESE SUSTAINABLE LONG-TERM GROWTH RATES?

A A DCF estimate based on these sustainable growth rates is developed in Exhibit MPG-9. As shown there, a sustainable growth DCF analysis produces average and median results of 11.21% and 10.64%, respectively.

I am placing minimal emphasis on the results of this sustainable growth DCF analysis because a significant amount of the sustainable growth is produced by expected sales of additional shares over the next three to five years. As shown on my Exhibit MPG-8, page 1, the internal growth by reinvesting retained earnings is about 5.51%. This growth rate is reasonably consistent with a long-term sustainable growth. However, after reflecting sales of additional shares, the sustainable growth rate is increased from 5.51% up to 8.33%. While this growth rate may be achieved over the relatively short run, this significant impact on the internal growth caused by sales of additional shares is not sustainable. Therefore, I do not believe that the sustainable growth rate DCF analysis is producing reliable results in this case.

IV.D. Multi-Stage Growth DCF Model

Q HAVE YOU CONDUCTED ANY OTHER DCF STUDIES?

A Yes. My first constant growth DCF is based on consensus analysts' growth rate projections so it is a reasonable reflection of rational investment expectations over the next three to five years. The limitation on this constant growth DCF model is that it cannot reflect a rational expectation that a period of high or low short-term growth can be followed by a change in growth to a rate that is more reflective of long-term sustainable growth. Hence, I performed a multi-stage growth DCF analysis to reflect this outlook of changing growth expectations.

Q WHY DO YOU BELIEVE GROWTH RATES CAN CHANGE OVER TIME?

A Analyst-projected growth rates over the next three to five years will change as utility earnings growth outlooks change. Utility companies go through cycles in making investments in their systems. When utility companies are making large investments, their rate base grows rapidly, which in turn accelerates earnings growth. Once a major construction cycle is completed or levels off, growth in the utility rate base slows and its earnings growth slows from an abnormally high three- to five-year rate to a lower sustainable growth rate.

As major construction cycles extend over longer periods of time, even with an accelerated construction program, the growth rate of the utility will slow simply because rate base growth will slow and the utility has limited human and capital resources available to expand its construction program. Therefore, the three- to five-year growth rate projection should be used as a long-term sustainable growth rate, but not without making a reasonable informed judgment to determine whether it considers the current

market environment, the industry, and whether the three- to five-year growth outlook is sustainable.

Q PLEASE DESCRIBE YOUR MULTI-STAGE GROWTH DCF MODEL.

A The multi-stage growth DCF model reflects the possibility of non-constant growth for a company over time. The multi-stage growth DCF model reflects three growth periods: (1) a short-term growth period consisting of the first five years; (2) a transition period, consisting of the next five years (6 through 10); and (3) a long-term growth period starting in year 11 through perpetuity.

For the short-term growth period, I relied on the consensus analysts' growth projections described above in relationship to my constant growth DCF model. For the transition period, the growth rates were reduced or increased by an equal factor reflecting the difference between the analysts' growth rates and the long-term sustainable growth rate. For the long-term growth period, I assumed each company's growth would converge to the maximum sustainable long-term growth rate.

Q WHY IS THE GDP GROWTH PROJECTION A REASONABLE PROXY FOR THE MAXIMUM SUSTAINABLE LONG-TERM GROWTH RATE?

A Utilities cannot indefinitely sustain a growth rate that exceeds the growth rate of the economy in which they sell services. Utilities' earnings/dividend growth is created by increased utility investment or rate base. Such investment, in turn, is driven by service area economic growth and demand for utility service. In other words, utilities invest in plant to meet sales demand growth. Sales growth, in turn, is tied to economic growth in their service areas.

The U.S. Department of Energy, Energy Information Administration ("EIA") has observed that utility sales growth tracks the U.S. GDP growth, albeit at a lower level, as shown in Exhibit MPG-10. Utility sales growth has lagged behind GDP growth for more than a decade. As a result, nominal GDP growth is a very conservative proxy for utility sales growth, rate base growth, and earnings growth. Therefore, the U.S. GDP nominal growth rate is a conservative proxy for the highest sustainable long-term growth rate of a utility.

Q IS THERE RESEARCH THAT SUPPORTS YOUR POSITION THAT, OVER THE LONG TERM, A COMPANY'S EARNINGS AND DIVIDENDS CANNOT GROW AT A RATE GREATER THAN THE GROWTH OF THE U.S. GDP?

A Yes. This concept is supported in published analyst literature and academic work. Specifically, in a textbook titled "Fundamentals of Financial Management," published by Eugene Brigham and Joel F. Houston, the authors state as follows:

> The constant growth model is most appropriate for mature companies with a stable history of growth and stable future expectations. Expected growth rates vary somewhat among companies, but dividends for mature firms are often expected to grow in the future at about the same rate as nominal gross domestic product (real GDP plus inflation).[9]

The use of the economic growth rate is also supported by investment practitioners as outlined as follows:

> **Estimating Growth Rates**
>
> One of the advantages of a three-stage discounted cash flow model is that it fits with life cycle theories in regards to company growth. In these theories, companies are assumed to have a life cycle with varying growth characteristics. Typically, the potential for extraordinary growth in the near term eases over time and eventually growth slows to a more stable level.

[9] "*Fundamentals of Financial Management*," Eugene F. Brigham and Joel F. Houston, Eleventh Edition 2007, Thomson South-Western, a Division of Thomson Corporation at 298 (emphasis added).

* * *

> Another approach to estimating long-term growth rates is to focus on estimating the overall economic growth rate. Again, this is the approach used in the *Ibbotson Cost of Capital Yearbook*. To obtain the economic growth rate, a forecast is made of the growth rate's component parts. Expected growth can be broken into two main parts: expected inflation and expected real growth. By analyzing these components separately, it is easier to see the factors that drive growth.[10]

Q IS THERE ANY ACTUAL INVESTMENT HISTORY THAT SUPPORTS THE NOTION THAT THE CAPITAL APPRECIATION FOR STOCK INVESTMENTS WILL NOT EXCEED THE NOMINAL GROWTH OF THE U.S. GDP?

A Yes. This is evident by a comparison of the compound annual growth of the U.S. GDP compared to the geometric growth of the U.S. stock market. Morningstar measured the historical geometric growth of the U.S. stock market over the period 1926-2017 to be approximately 5.8%.[11] During this same time period, the U.S. nominal compound annual growth of the U.S. GDP was approximately 6.0%.[12]

As such, the geometric annual growth of the U.S. nominal GDP has been higher but comparable to the geometric annual growth of the U.S. stock market capital appreciation. This historical relationship indicates that the U.S. GDP growth outlook is a conservative estimate of the long-term sustainable growth of U.S. stock investments.

Q HOW DID YOU DETERMINE A SUSTAINABLE LONG-TERM GROWTH RATE THAT REFLECTS THE CURRENT CONSENSUS OUTLOOK OF THE MARKET?

A I relied on the consensus analysts' projections of long-term GDP growth. *Blue Chip Economic Indicators* publishes consensus economists' GDP growth projections twice

[10] *Morningstar, Inc., Ibbotson SBBI 2013 Valuation Yearbook* at 51-52.
[11] *Duff & Phelps, 2018 SBBI Yearbook* at 6-17.
[12] U.S. Bureau of Economic Analysis, February 28, 2018.

a year. These consensus analysts' GDP growth outlooks are the best available measure of the market's assessment of long-term GDP growth. These analyst projections reflect all current outlooks for GDP and are likely the most influential on investors' expectations of future growth outlooks. The consensus economists' published GDP growth rate outlook is 4.10% over the next 10 years.[13]

Therefore, I propose to use the consensus economists' projected 5- and 10-year average GDP consensus growth rates of 4.10%, as published by *Blue Chip Economic Indicators*, as an estimate of long-term sustainable growth. *Blue Chip Economic Indicators* projections provide real GDP growth projections of 2.0% and GDP inflation of 2.1%[14] over the 5-year and 10-year projection periods. These consensus GDP growth forecasts represent the most likely views of market participants because they are based on published consensus economist projections.

Q DO YOU CONSIDER OTHER SOURCES OF PROJECTED LONG-TERM GDP GROWTH?

A Yes, and these sources corroborate my consensus analysts' projections, as shown below in Table 5.

[13] *Blue Chip Economic Indicators*, October 10, 2018, at 14.
[14] *Id.*

TABLE 5

GDP Forecasts

Source	Term	Real GDP	Inflation	Nominal GDP
Blue Chip Economic Indicators	5-10 Yrs	2.0%	2.1%	4.1%
EIA - Annual Earnings Outlook	28 Yrs	2.0%	2.3%	4.4%
Congressional Budget Office	6 Yrs	1.8%	2.1%	4.0%
Moody's Analytics	25 Yrs	2.0%	1.8%	3.8%
Social Security Administration	48 Yrs			4.4%
The Economist Intelligence Unit	25 Yrs	1.9%	1.8%	3.7%

The EIA in its *Annual Energy Outlook* projects real GDP out until 2050. In its 2018 Annual Report, the EIA projects real GDP through 2050 to be 2.0% and a long-term GDP price inflation projection of 2.3%. The EIA data supports a long-term nominal GDP growth outlook of 4.4%.[15]

Also, the Congressional Budget Office ("CBO") makes long-term economic projections. The CBO is projecting real GDP growth to be 1.8% during the next 6 years, with a GDP price inflation outlook of 2.1%. The CBO 6-year outlook for nominal GDP based on this projection is 4.0%.[16]

Moody's Analytics also makes long-term economic projections. In its recent 25-year outlook to 2047, Moody's Analytics is projecting real GDP growth of 2.0% with GDP inflation of 1.8%.[17] Based on these projections, Moody's is projecting nominal GDP growth of 3.8% over the next 25 years.

The Social Security Administration ("SSA") makes long-term economic projections out to 2095. The SSA's nominal GDP projection, under its intermediate cost scenario of approximately 50 years, is 4.4%.[18]

[15]DOE/EIA Annual Energy Outlook 2018 With Projections to 2050, February 2018, Table 20.
[16]*CBO: The Budget and Economic Outlook: 2018 to 2028*, April 2018.
[17]www.economy.com, *Moody's Analytics Forecast*, January 24, 2018.
[18]www.ssa.gov, "2018 OASDI Trustees Report," Table VI.G4.

The Economist Intelligence Unit, a division of *The Economist* and a third-party data provider to MI, makes a long-term economic projection out to 2050. The Economist Intelligence Unit is projecting real GDP growth of 1.9% with an inflation rate of 1.8% out to 2050. The real GDP growth projection is in line with the consensus economists. The long-term nominal GDP projection based on these outlooks is approximately 3.7%.[19]

The real GDP and nominal GDP growth projections made by these independent sources support the use of the consensus economist 5-year and 10-year projected GDP growth outlooks as a reasonable estimate of market participants' long-term GDP growth outlooks.

Q WHAT STOCK PRICE, DIVIDEND, AND GROWTH RATES DID YOU USE IN YOUR MULTI-STAGE GROWTH DCF ANALYSIS?

A I relied on the same 13-week average stock prices and the most recent quarterly dividend payment data discussed above. For stage one growth, I used the consensus analysts' growth rate projections discussed above in my constant growth DCF model. The first stage covers the first five years, consistent with the time horizon of the securities analysts' growth rate projections. The second stage, or transition stage, begins in year 6 and extends through year 10. The second stage growth transitions the growth rate from the first stage to the third stage using a straight linear trend. For the third stage, or long-term sustainable growth stage, starting in year 11, I used a 4.10% long-term sustainable growth rate based on the consensus economists' long-term projected nominal GDP growth rate.

[19] *S&P Global Market Intelligence, Economist Intelligence Unit*, downloaded on March 14, 2018.

Q WHAT ARE THE RESULTS OF YOUR MULTI-STAGE GROWTH DCF MODEL?

A As shown in Exhibit MPG-11, the average and median DCF returns on equity for my proxy group using the 13-week average stock price are 7.32% and 7.04%, respectively.

Q PLEASE SUMMARIZE THE RESULTS FROM YOUR DCF ANALYSES.

A The results from my DCF analyses are summarized in Table 6 below:

TABLE 6

Summary of DCF Results

Description	Proxy Group Average	Proxy Group Median
Constant Growth DCF Model (Analysts' Growth)	9.04%	8.12%
Constant Growth DCF Model (Sustainable Growth)	11.21%	10.64%
Multi-Stage Growth DCF Model	7.32%	7.04%

I conclude that my DCF studies support a return on equity of 9.0%. For the reasons outlined above, I have concerns with the reliability of my sustainable growth DCF model and I am placing little relevance on my multi-stage growth DCF model because the results appear to be producing unreasonably low estimates. In contrast, my constant growth DCF model using analysts' growth rate projections is producing reasonably sound analysis, and I believe the results to be reasonable.

IV.E. Risk Premium Model

Q PLEASE DESCRIBE YOUR BOND YIELD PLUS RISK PREMIUM MODEL.

A This model is based on the principle that investors require a higher return to assume greater risk. Common equity investments have greater risk than bonds because bonds have more security of payment in bankruptcy proceedings than common equity and the

coupon payments on bonds represent contractual obligations. In contrast, companies are not required to pay dividends or guarantee returns on common equity investments. Therefore, common equity securities are considered to be riskier than bond securities.

This risk premium model is based on two estimates of an equity risk premium. First, I estimated the difference between the required return on utility common equity investments and U.S. Treasury bonds. The difference between the required return on common equity and the Treasury bond yield is the risk premium. I estimated the risk premium on an annual basis for each year over the period January 1986 through March 2018. The common equity required returns were based on regulatory commission-authorized returns for gas utility companies. Authorized returns are typically based on expert witnesses' estimates of the contemporary investor-required return.

The second equity risk premium estimate is based on the difference between regulatory commission-authorized returns on common equity and contemporary "A" rated utility bond yields by Moody's. I selected the period January 1986 through September 2018 because public utility stocks consistently traded at a premium to book value during that period. This is illustrated in Exhibit MPG-12, which shows the market-to-book ratio since 1986 for the gas utility industry was consistently above a multiple of 1.0x. Over this period, regulatory authorized returns were sufficient to support market prices that at least exceeded book value. This is an indication that regulatory authorized returns on common equity supported a utility's ability to issue additional common stock without diluting existing shares. It further demonstrates utilities were able to access equity markets without a detrimental impact on current shareholders.

Based on this analysis, as shown in Exhibit MPG-13, the average indicated equity risk premium over U.S. Treasury bond yields has been 5.45%. Since the risk

premium can vary depending upon market conditions and changing investor risk perceptions, I believe using an estimated range of risk premiums provides the best method to measure the current return on common equity for a risk premium methodology.

I incorporated five-year and 10-year rolling average risk premiums over the study period to gauge the variability over time of risk premiums. These rolling average risk premiums mitigate the impact of anomalous market conditions and skewed risk premiums over an entire business cycle. As shown on my Exhibit MPG-13, the five-year rolling average risk premium over Treasury bonds ranged from 4.17% to 6.71%, while the 10-year rolling average risk premium ranged from 4.30% to 6.48%.

As shown on my Exhibit MPG-14, the average indicated equity risk premium over contemporary Moody's utility bond yields was 4.08%. The five-year and 10-year rolling average risk premiums ranged from 2.80% to 5.55% and 3.11% to 5.25%, respectively.

Q DO YOU BELIEVE THAT THE TIME PERIOD USED TO DERIVE THESE EQUITY RISK PREMIUM ESTIMATES IS APPROPRIATE TO FORM ACCURATE CONCLUSIONS ABOUT CONTEMPORARY MARKET CONDITIONS?

A Yes. The time period I use in this risk premium study is a generally accepted period to develop a risk premium study using "expectational" data.

Contemporary market conditions can change dramatically during the period that rates determined in this proceeding will be in effect. A relatively long period of time where stock valuations reflect premiums to book value is an indication that the authorized returns on equity and the corresponding equity risk premiums were supportive of investors' return expectations and provided utilities access to the equity

markets under reasonable terms and conditions. Further, this time period is long enough to smooth abnormal market movement that might distort equity risk premiums. While market conditions and risk premiums do vary over time, this historical time period is a reasonable period to estimate contemporary risk premiums.

Alternatively, some studies, such as Duff & Phelps referred to later in this testimony, have recommended that use of "actual achieved investment return data" in a risk premium study should be based on long historical time periods. The studies find that achieved returns over short time periods may not reflect investors' expected returns due to unexpected and abnormal stock price performance. Short-term, abnormal actual returns would be smoothed over time and the achieved actual investment returns over long time periods would approximate investors' expected returns. Therefore, it is reasonable to assume that averages of annual achieved returns over long time periods will generally converge on the investors' expected returns.

My risk premium study is based on expectational data, not actual investment returns, and, thus, need not encompass a very long historical time period.

Q BASED ON HISTORICAL DATA, WHAT RISK PREMIUM HAVE YOU USED TO ESTIMATE VEDO'S COST OF COMMON EQUITY IN THIS PROCEEDING?

A The equity risk premium should reflect the relative market perception of risk in the utility industry today. I have gauged investor perceptions in utility risk today in Exhibit MPG-15, where I show the yield spread between utility bonds and Treasury bonds over the last 38 years. As shown in this exhibit, the average utility bond yield spreads over Treasury bonds for "A" and "Baa" rated utility bonds for this historical period are 1.50% and 1.94%, respectively. The utility bond yield spreads over Treasury bonds for "A" and "Baa" rated utilities for 2017 were 1.10% and 1.48%, respectively. Similarly, the

"A" and "Baa" utility spreads through September 2018 are 1.12% and 1.51%, respectively. The current average "A" rated utility bond yield spread over Treasury bond yields is now lower than the 38-year average spread. The current "Baa" rated utility bond yield spread over Treasury bond yields is lower than the 38-year average spread.

A current 13-week average "A" rated utility bond yield of 4.31% when compared to the current Treasury bond yield of 3.12%, as shown in Exhibit MPG-16, page 1, implies a yield spread of 119 basis points. This current utility bond yield spread is lower than the 38-year average spread for "A" rated utility bonds of 150 basis points. The current spread for the "Baa" rated utility bond yield of 160 basis points is also lower than the 38-year average spread of 1.94%.

These utility bond yield spreads are evidence that the market perceives utility investment risk as relatively low compared to historical valuation and corporate security valuation. This relative valuation and pricing demonstrate that utilities continue to have strong access to capital and at low costs in the current market.

Q IS THERE MARKET EVIDENCE TO HELP GAUGE MARKET RISK PREMIUMS BASED ON OBSERVABLE MARKET EVIDENCE?

A Yes. Market data does illustrate how the market is pricing investment risk, and gauging the current demands for returns based on securities of varying levels of investment risk. This market evidence includes bond yield spreads for different bond return ratings as implied by the yield spreads for Treasury, corporate and utility bonds. These spreads provide an indication of the market's return requirement for securities of different levels of investment risk and required risk premiums.

Table 7 below shows the utility and corporate bond spreads relative to Treasury bond yields.

TABLE 7

Comparison of Yield Spreads Over Treasury Bonds

Description	Utility		Corporate	
	A	Baa	Aaa	Baa
Average Historical Spread	1.50%	1.94%	0.84%	1.93%
2016 Spread	1.33%	2.08%	1.07%	2.12%
2017 Spread	1.10%	1.48%	0.85%	1.55%
2018 Spread	1.12%	1.51%	0.80%	1.62%

Source: Exhibit MPG-15.

As shown above in Table 7, the average historical bond yield spread over the period 1980-September 2018 shows a fairly divergent spread for utilities relative to corporate bonds. Specifically, the average historical utility bond yield spread is greater than the current yield spread based on 2017-2018 data. This is an indication that the market is placing a higher value on utility securities currently, and indicating a preference for lower-risk investment securities. Specifically, the 38-year average yield spread for A-rated utilities of 1.50% is greater than the 2018 average spread of 1.12%. Again, this indicates the market is paying a premium for a lower-risk utility security now compared to the past. This phenomenon is also evident in spreads for general corporate securities. An AAA-rated corporate bond 38-year average spread is 0.84%, which is comparable to the average spread in 2017 and slightly higher than the 2018 spread of 0.80. For higher-risk bonds, utility Baa and corporate bonds reflect reasonably consistent yield spreads, suggesting that these higher-risk utility and corporate bond securities are not receiving the same premium valuation as are the lower-risk A-rated and AAA-rated utility and corporate bond securities.

A relative low yield for utility and corporate bonds is also reflected in outlooks of real returns on these bond yields relative to that earned in the past. Over the period 1926-2017, long-term corporate bond yields have earned around 6.0%, compared to inflation of around 3.0%.[20] This implies an historical real return on long-term corporate bonds of around 3.3%. In 2017-2018, long-term corporate bonds rated AAA averaged around 3.80%. At that time, future inflation outlooks over the long term were expected to be around 2%. This implies a current real return outlook on long-term corporate bonds of only 1.80%. Again, this indicates that bond yields are being priced at a premium by the market participants.

This information supports the finding that higher-risk securities are being valued to produce higher-risk spreads relative to low-risk securities in the current marketplace. As such, I believe this information supports the use of an above average risk premium in the current marketplace in order to accurately estimate the market's required return for making an investment in a security of higher risk (common stock) compared to a security of lower risk (utility and Treasury bond yields). For these reasons, I believe an above average risk premium is supported by observable market evidence in this proceeding.

Q WHAT IS YOUR RECOMMENDED RETURN FOR VEDO BASED ON YOUR RISK PREMIUM STUDY?

A I am recommending more weight be given to the high-end risk premium estimates than the low-end. Hence, I propose to provide 70% weight to my high-end risk premium estimates and 30% to the low-end. Applying these weights, the risk premium for Treasury bond yields would be approximately 6.0%,[21] which is considerably higher than

[20] *Duff & Phelps 2018 SBBI Yearbook* at 6-17.
[21] (4.17% * 30%) + (6.71% * 70%) = 5.95%, rounded to 6.0%.

the 32-year average risk premium of 5.45% and reasonably reflective of the 3.6% projected Treasury bond yield. A Treasury bond risk premium of 6.0% and projected Treasury bond yield of 3.6% produce a risk premium estimate of 9.60%.

Similarly, applying these weights to the utility risk premium indicates a risk premium of 4.75%.[22] This risk premium is above the 32-year historical average risk premium of 4.08%. Adding this risk premium to the current observable Baa utility bond yield of 4.72% produces an estimated return on equity of approximately 9.47%, rounded to 9.50%.

Based on this methodology, my Treasury bond risk premium and my utility bond risk premium indicate a return in the range of 9.50% to 9.60%, with a midpoint of 9.55%, rounded to 9.60%.

IV.F. Capital Asset Pricing Model ("CAPM")

Q PLEASE DESCRIBE THE CAPM.

A The CAPM method of analysis is based upon the theory that the market-required rate of return for a security is equal to the risk-free rate, plus a risk premium associated with the specific security. This relationship between risk and return can be expressed mathematically as follows:

$R_i = R_f + B_i \times (R_m - R_f)$ where:

R_i = Required return for stock i
R_f = Risk-free rate
R_m = Expected return for the market portfolio
B_i = Beta - Measure of the risk for stock

The stock-specific risk term in the above equation is beta. Beta represents the investment risk that cannot be diversified away when the security is held in a diversified

[22](2.80% * 30%) + (5.55% * 70%) = 4.73%, rounded to 4.75%.

portfolio. When stocks are held in a diversified portfolio, firm-specific risks can be eliminated by balancing the portfolio with securities that react in the opposite direction to firm-specific risk factors (e.g., business cycle, competition, product mix, and production limitations).

The risks that cannot be eliminated when held in a diversified portfolio are non-diversifiable risks. Non-diversifiable risks are related to the market in general and referred to as systematic risks. Risks that can be eliminated by diversification are non-systematic risks. In a broad sense, systematic risks are market risks and non-systematic risks are business risks. The CAPM theory suggests the market will not compensate investors for assuming risks that can be diversified away. Therefore, the only risk investors will be compensated for are systematic, or non-diversifiable, risks. The beta is a measure of the systematic, or non-diversifiable risks.

Q PLEASE DESCRIBE THE INPUTS TO YOUR CAPM.

A The CAPM requires an estimate of the market risk-free rate, the Company's beta, and the market risk premium.

Q WHAT DID YOU USE AS AN ESTIMATE OF THE MARKET RISK-FREE RATE?

A As previously noted, *Blue Chip Financial Forecasts*' projected 30-year Treasury bond yield is 3.60%.[23] The current 30-year Treasury bond yield is 3.12%, as shown in Exhibit MPG-16. I used *Blue Chip Financial Forecasts*' projected 30-year Treasury bond yield of 3.60% for my CAPM analysis.

[23] *Blue Chip Financial Forecasts*, October 1, 2018 at 2.

Q WHY DID YOU USE LONG-TERM TREASURY BOND YIELDS AS AN ESTIMATE OF THE RISK-FREE RATE?

A Treasury securities are backed by the full faith and credit of the United States government, so long-term Treasury bonds are considered to have negligible credit risk. Also, long-term Treasury bonds have an investment horizon similar to that of common stock. As a result, investor-anticipated long-run inflation expectations are reflected in both common stock required returns and long-term bond yields. Therefore, the nominal risk-free rate (or expected inflation rate and real risk-free rate) included in a long-term bond yield is a reasonable estimate of the nominal risk-free rate included in common stock returns.

Treasury bond yields, however, do include risk premiums related to unanticipated future inflation and interest rates. A Treasury bond yield is not a risk-free rate. Risk premiums related to unanticipated inflation and interest rates reflect systematic market risks. Consequently, for companies with betas less than 1.0, using the Treasury bond yield as a proxy for the risk-free rate in the CAPM analysis can produce an overstated estimate of the CAPM return.

Q WHAT BETA DID YOU USE IN YOUR ANALYSIS?

A As shown in Exhibit MPG-17, the proxy group average *Value Line* beta estimate is 0.68.

Q HOW DID YOU DERIVE YOUR MARKET RISK PREMIUM ESTIMATE?

A I derived two market risk premium estimates: a forward-looking estimate and one based on a long-term historical average.

The forward-looking estimate was derived by estimating the expected return on the market (as represented by the S&P 500) and subtracting the risk-free rate from this estimate. I estimated the expected return on the S&P 500 by adding an expected inflation rate to the long-term historical arithmetic average real return on the market. The real return on the market represents the achieved return above the rate of inflation.

Duff & Phelps' *2018 SBBI Yearbook* estimates the historical arithmetic average real market return over the period 1926 to 2017 to be 9.0%.[24] A current consensus analysts' inflation projection, as measured by the Consumer Price Index, is 2.3%.[25] Using these estimates, the expected market return is 11.51%.[26] The market risk premium then is the difference between the 11.51% expected market return and my 3.60% risk-free rate estimate, or approximately 7.90%.

My historical estimate of the market risk premium was also calculated by using data provided by Duff & Phelps in its *2018 SBBI Yearbook*. Over the period 1926 through 2017, the Duff & Phelps study estimated that the arithmetic average of the achieved total return on the S&P 500 was 12.1%[27] and the total return on long-term Treasury bonds was 6.00%.[28] The indicated market risk premium is 6.0% (12.1% - 6.0% = 6.1%).

The long-term government bond yield of 6.0% occurred during a period of inflation of around 3.0%, thus implying a real return on long-term government bonds of around 3.0%.

[24] *Duff & Phelps, 2018 SBBI Yearbook at 6-18.*
[25] *Blue Chip Financial Forecasts*, October 1, 2018 at 2.
[26] { [(1 + 0.090) ∗ (1 + 0.023)] – 1 } ∗ 100.
[27] *Duff & Phelps, 2018 Yearbook at 6-17*.
[28] *Id.*

Q HOW DOES YOUR ESTIMATED MARKET RISK PREMIUM RANGE COMPARE TO THAT ESTIMATED BY DUFF & PHELPS?

A The Duff & Phelps analysis indicates a market risk premium falls somewhere in the range of 5.0% to 7.1%. My market risk premium falls in the range of 6.1% to 7.7%. My average market risk premium of 6.9% is at the high end of the Duff & Phelps range.

Q HOW DOES DUFF & PHELPS MEASURE A MARKET RISK PREMIUM?

A Duff & Phelps makes several estimates of a forward-looking market risk premium based on actual achieved data from the historical period of 1926 through 2017 as well as normalized data. Using this data, Duff & Phelps estimates a market risk premium derived from the total return on large company stocks (S&P 500), less the income return on Treasury bonds. The total return includes capital appreciation, dividend or coupon reinvestment returns, and annual yields received from coupons and/or dividend payments. The income return, in contrast, only reflects the income return received from dividend payments or coupon yields. Duff & Phelps claims the income return is the only true risk-free rate associated with Treasury bonds and is the best approximation of a truly risk-free rate.[29] I disagree with this assessment from Duff & Phelps because it does not reflect a true investment option available to the marketplace and therefore does not produce a legitimate estimate of the expected premium of investing in the stock market versus that of Treasury bonds. Nevertheless, I will use Duff & Phelps' conclusion to show the reasonableness of my market risk premium estimates.

Duff & Phelps' range is based on several methodologies. First, Duff & Phelps estimates a market risk premium of 7.07% based on the difference between the total

[29] *Duff & Phelps 2018 Valuation Handbook* at 3-41.

market return on common stocks (S&P 500) less the income return on 20-year Treasury bond investments over the 1926-2017 period.[30]

Second, Duff & Phelps used the Ibbotson & Chen supply-side model, which produced a market risk premium estimate of 6.04%.[31] In the 2017 edition of the Valuation Handbook, Duff & Phelps explained that the historical market risk premium based on the S&P 500 was influenced by an abnormal expansion of price-to-earnings ("P/E") ratios relative to earnings and dividend growth during the period, primarily over the last 30 years. Duff & Phelps believes this abnormal P/E expansion is not sustainable.[32] Therefore, Duff & Phelps adjusted this market risk premium estimate to normalize the growth in the P/E ratio to be more in line with the growth in dividends and earnings.

Finally, Duff & Phelps develops its own recommended equity, or market, risk premium by employing an analysis that takes into consideration a wide range of economic information, multiple risk premium estimation methodologies, and the current state of the economy by observing measures such as the level of stock indices and corporate spreads as indicators of perceived risk. Based on this methodology, and utilizing a "normalized" risk-free rate of 3.5%, Duff & Phelps concludes the current expected, or forward-looking, market risk premium is 5.0%, implying an expected return on the market of 8.5%.[33]

It should be noted that Duff & Phelps' market risk premiums are measured over a 20-year Treasury bond. Because I am relying on a projected 30-year Treasury bond yield, the results of my CAPM analysis should be considered conservative estimates for the cost of equity.

[30] *Duff & Phelps 2018 Valuation Handbook* at 3-45.
[31] *Id.*
[32] *Duff & Phelps 2018 Valuation Handbook* at 3-44.
[33] *Duff & Phelps 2018 Valuation Handbook* at 3-32, 3-33 and 3-62.

Q WHAT ARE THE RESULTS OF YOUR CAPM ANALYSIS?

A As shown in Exhibit MPG-18 based on my low market risk premium of 6.1% and my high market risk premium of 7.9%, a risk-free rate of 3.6%, and a beta of 0.68, my CAPM analysis produces a return of 7.74% to 8.96%.

The projected risk-free rate of 3.6% aligns with an outlook for future inflation of around 2%. This implies a relatively high premium for low-risk Treasury securities in the market, and indicates the market is still paying a premium for relatively low-risk securities, thus indicating that the market risk premium is relatively high in the current market. Based on this assessment of observable market evidence, I recommend the high-end CAPM return estimate because it closely aligns the market risk premium with the prevailing risk-free rate. I recommend a CAPM return of approximately 9.00%.

IV.G. Return on Equity Summary

Q BASED ON THE RESULTS OF YOUR RETURN ON COMMON EQUITY ANALYSES DESCRIBED ABOVE, WHAT RETURN ON COMMON EQUITY DO YOU RECOMMEND FOR VEDO?

A Based on my analyses, I estimate VEDO's current market cost of equity to be 9.30%.

TABLE 8

Return on Common Equity Summary

Description	Results
DCF	9.00%
Risk Premium	9.60%
CAPM	9.00%

My recommended return on common equity of 9.30% is the midpoint of my estimated range of 9.00% to 9.60%. As shown in Table 8 above, the high end of my estimated range is based on my risk premium studies. The low end is based on my DCF return. My CAPM result falls within my recommended range.

My return on equity estimates reflect observable market evidence, the impact of Federal Reserve policies on current and expected long-term capital market costs, an assessment of the current risk premium built into current market securities, and a general assessment of the current investment risk characteristics of the regulated utility industry and the market's demand for utility securities.

IV.H. Financial Integrity

Q WILL YOUR RECOMMENDED OVERALL RATE OF RETURN SUPPORT AN INVESTMENT GRADE BOND RATING FOR VEDO?

A Yes. I have reached this conclusion by comparing the key credit rating financial ratios for VEDO at my proposed return on equity and the Company's proposed capital structure to S&P's benchmark financial ratios using S&P's new credit metric ranges.

Q PLEASE DESCRIBE THE MOST RECENT S&P FINANCIAL RATIO CREDIT METRIC METHODOLOGY.

A S&P publishes a matrix of financial ratios corresponding to its assessment of the business risk of utility companies and related bond ratings. On May 27, 2009, S&P expanded its matrix criteria by including additional business and financial risk categories.[34]

[34]S&P updated its 2008 credit metric guidelines in 2009, and incorporated utility metric benchmarks with the general corporate rating metrics. *Standard & Poor's RatingsDirect*: "Criteria Methodology: Business Risk/Financial Risk Matrix Expanded," May 27, 2009.

Based on S&P's most recent credit matrix, the business risk profile categories are "Excellent," "Strong," "Satisfactory," "Fair," "Weak," and "Vulnerable." Most utilities have a business risk profile of "Excellent" or "Strong."

The financial risk profile categories are "Minimal," "Modest," "Intermediate," "Significant," "Aggressive," and "Highly Leveraged." Most of the utilities have a financial risk profile of "Aggressive." VEHC, which is used as a proxy for VEDO, has an "Excellent" business risk profile and an "Intermediate" financial risk profile.

Q PLEASE DESCRIBE S&P'S USE OF THE FINANCIAL BENCHMARK RATIOS IN ITS CREDIT RATING REVIEW.

A S&P evaluates a utility's credit rating based on an assessment of its financial and business risks. A combination of financial and business risks equates to the overall assessment of VEDO's total credit risk exposure. On November 19, 2013, S&P updated its methodology. In its update, S&P published a matrix of financial ratios that defines the level of financial risk as a function of the level of business risk.

S&P publishes ranges for primary financial ratios that it uses as guidance in its credit review for utility companies. The two core financial ratio benchmarks it relies on in its credit rating process include: (1) Debt to Earnings Before Interest, Taxes, Depreciation and Amortization ("EBITDA"); and (2) Funds From Operations ("FFO") to Total Debt.[35]

[35] *Standard & Poor's RatingsDirect*: "Criteria: Corporate Methodology," November 19, 2013.

Q HOW DID YOU APPLY S&P'S FINANCIAL RATIOS TO TEST THE REASONABLENESS OF YOUR RATE OF RETURN RECOMMENDATIONS?

A I calculated each of S&P's financial ratios based on VEDO's cost of service for its retail jurisdictional operations. While S&P would normally look at total consolidated VEDO financial ratios in its credit review process, my investigation in this proceeding is not the same as S&P's. I am attempting to judge the reasonableness of my proposed cost of capital for rate-setting in VEDO's retail regulated utility operations. Hence, I am attempting to determine whether my proposed equity rate of return will in turn support cash flow metrics, balance sheet strength, and earnings that will support an investment grade bond rating and VEDO's financial integrity.

Q DID YOU INCLUDE ANY OFF-BALANCE SHEET DEBT EQUIVALENTS?

A Yes, I did. I included the entire amount of off-balance sheet debt equivalents as reported by S&P Capital IQ, because the Company is proposing to use its parent company consolidated capital structure. This resulted in approximately $141 million of off-balance sheet debt equivalents adjustments, as shown on my Exhibit MPG-19, page 3. I used an allocation factor for the imputed interest and amortization expenses. To allocate the proper amount I developed an allocation factor of approximately 17%, based on the VEDO's total capital divided by Vectren Corp.'s total capital, as filed in the Company's Schedule D-5.

Q PLEASE DESCRIBE THE RESULTS OF THIS CREDIT METRIC ANALYSIS AS IT RELATES TO VEDO.

A The S&P financial metric calculations for VEDO at a 9.30% equity return are developed on Exhibit MPG-19, page 1. The credit metrics produced below, with VEDO's financial

risk profile from S&P of "Intermediate" and business risk score by S&P of "Excellent," will be used to assess the strength of the credit metrics based on VEDO's gas retail operations in Ohio.

Based on an equity return of 9.30%, VEDO will be provided an opportunity to produce a debt to Earnings Before Interest, Taxes, Depreciation and Amortization ("EBITDA") ratio of 3.4x. This is within S&P's "Intermediate" guideline range of 2.5x to 3.5x, which is VEDO's current financial risk rating.[36] This ratio supports VEDO's investment grade credit rating.

VEDO's retail operations FFO to total debt coverage at a 9.30% equity return is 22%, which is within S&P's "Significant" metric guideline range of 13% to 23%, and above the Intermediate range. This FFO/total debt ratio will support VEDO's investment grade bond rating.

VEDO's adjusted total debt ratio, based on the Company's proposed capital structure, is approximately 51%. As shown on Exhibit MPG-19, page 4, this adjusted debt ratio is reasonably consistent with the industry median adjusted debt ratio for an "A" rated utility. Hence, I concluded this capital structure reasonably supports VEDO's current investment grade bond rating.

At my recommended return on equity of 9.30% in conjunction with the Company's proposed capital structure and embedded debt, VEDO's financial credit metrics will continue to support credit ratings at an investment grade utility level.

[36] *Standard & Poor's RatingsDirect*: "Criteria: Corporate Methodology," November 19, 2013.

V. RESPONSE TO VEDO
WITNESS DR. MICHAEL J. VILBERT

V.A. Summary of Rebuttal

Q WHAT RETURN ON COMMON EQUITY IS VEDO PROPOSING IN THIS PROCEEDING?

A VEDO's proposed return on equity is supported by its witness Dr. Michael Vilbert. He recommends a return on equity for VEDO in the range of 10.00% to 11.00%, with a point estimate of 10.75% (Vilbert Direct at 6). Dr. Vilbert also finds VEDO to be riskier than his utility sample and concludes that a return on equity above the midpoint of his range will be just and reasonable (Vilbert Direct at 62).

Q PLEASE DESCRIBE DR. VILBERT'S METHODOLOGY SUPPORTING HIS RETURN ON COMMON EQUITY.

A Dr. Vilbert arrived at his estimate using several models: a traditional CAPM and an empirical CAPM ("ECAPM"), a simple DCF, a multi-stage growth DCF, and a risk premium model using a regression formula derived from allowed returns on equity and long-term Treasury yields. These models were applied to a sample of nine regulated gas LDC utility companies, which Dr. Vilbert found to be comparable in investment risk to VEDO. (Vilbert Direct at 39).

Q IS DR. VILBERT'S ESTIMATED RETURN ON EQUITY FOR VEDO REASONABLE?

A No. Dr. Vilbert's recommended return on equity of 10.75% for VEDO is excessive and unreasonable for a low-risk regulated delivery utility company. The unreasonableness of Dr. Vilbert's recommendation is evident from a detailed assessment of the rate of return models supporting his recommendation and his flawed external adjustments to his market-based estimated cost of common equity capital.

Q PLEASE SUMMARIZE DR. VILBERT'S RETURN ON EQUITY STUDY RESULTS.

A Dr. Vilbert's return on equity study results are summarized in Table 9 below.

TABLE 9

Summary of Dr. Vilbert's Results

Model	Dr. Vilbert's Results: Model Results (1)	ATWACC Adder (2)	Recommended ROE (3)	Adjusted ROE (4)
CAPM				
Traditional CAPM	9.3% - 9.9%	1.1% - 1.2%	10.4% - 11.1%	8.8% - 9.5%
ECAPM (0.5%)	9.5% - 10.0%	1.0% - 1.2%	10.5% - 11.2%	Reject
ECAPM (1.5%)	9.7% - 10.3%	1.1% - 1.2%	10.8% - 11.5%	Reject
Traditional CAPM (Hamada)			10.4% - 11.2%	Reject
ECAPM (0.5%) (Hamada)			10.4% - 11.2%	Reject
ECAPM (1.5%) (Hamada)			10.5% - 11.3%	Reject
DCF				
Simple (1/4 Growth)	11.3%	2.4%	13.7%	9.6%
Multi-Stage (Blue Chip 4.1%)	8.0%	1.4%	9.4%	7.3%
Risk Premium			10.1% - 10.2%	9.6%
Range			10.00% - 11.00%	8.8% - 9.6%
Requested ROE				
10.75%				

ROE = Return on Equity
ATWACC = After-Tax Weighted Average Cost of Capital

As shown in Table 9 above, the model return on equity results of Dr. Vilbert's studies applied to his proxy group indicate that VEDO's current market return on equity is in the range of 8.0% to 9.9% based on his DCF and CAPM studies, and 10.2% based on his risk premium study.

He then increases his market return on equity estimate by adding a return on equity adder in the range of 1.1% to 2.4%. This adder is based on an After-Tax Weighted Average Cost of Capital ("ATWACC") methodology. This ATWACC adder increases his recommended range up to 9.4% to 13.7%. Dr. Vilbert asserts this

ATWACC return on equity adder is necessary to properly recognize VEDO's financial risk when applying a market return on equity to its book value common equity. (Vilbert Direct at 12).

Q DO DR. VILBERT'S RETURN ON EQUITY MODEL RESULTS SUPPORT THE COMPANY'S REQUESTED 10.75% RETURN ON EQUITY?

A No. As described below and as shown in Table 9 above under Column 4, Dr. Vilbert's own studies, adjusted to remove his flawed ATWACC return on equity adder and incorporate reasonable adjustments, would only support a return on equity in the range of 8.8% to 9.6%.

Q PLEASE DESCRIBE THE ISSUES YOU HAVE WITH DR. VILBERT'S ANALYSES.

A The issues and concerns I have with Dr. Vilbert's analyses in support of the Company's requested return on equity include the following:

1. His ATWACC return on equity ("ROE") adder (applied to both DCF and CAPM returns). This ROE adder is flawed and should be rejected.

2. His CAPM return estimate is increased to include either: (1) an ATWACC ROE adder; or (2) a leveraged beta adjustment. Both of these CAPM adders are flawed and should be rejected.

3. His ECAPM analysis is flawed for several reasons. First, he includes the same flawed CAPM adders he included in his traditional CAPM return estimate – the ATWACC ROE adder or the leveraged beta adjustment – CAPM ROE adder. These adders are flawed and should be rejected. Second, Dr. Vilbert's ECAPM is erroneous because he uses adjusted *Value Line* betas within an ECAPM format. This is inappropriate because an adjusted beta revises the CAPM return in the same manner as does the ECAPM framework. The ECAPM was not developed to be used with an adjusted beta. Both an adjusted beta, and the ECAPM formula flatten the security market line in measuring a return on equity based on a given level of systematic risk or beta risk. Dr. Vilbert's ECAPM analysis double counts the adjustment to the security market line and distorts the required return based on systematic risk.

4. Dr Vilbert's risk premium analysis is based on an overly simplistic inverse relationship between equity risk premiums and interest rates. Equity risk premiums

should be measured based on the current market's assessment of differences in investment risk of equity versus debt securities. While nominal interest rate changes are one factor in assessing this investment risk differential, they are not the only factor, as assumed by Dr. Vilbert, and thus, his risk premium model is flawed and not reliable.

5. Finally, Dr. Vilbert's DCF return results are upwardly biased and based on excessive growth rate estimates and should be used only as high-end cost of equity returns.

V.B. ATWACC

Q PLEASE DESCRIBE DR. VILBERT'S PROPOSED ATWACC RETURN ON EQUITY ADJUSTMENT.

A Dr. Vilbert uses the ATWACC to increase the estimated market return on equity based on his CAPM and DCF analyses, to a higher return that can be applied to VEDO's book value common equity. He does this by calculating the ATWACC using the market return on equity estimate (CAPM and DCF estimates) and market weighted capital structures for each proxy company. He then uses this market ATWACC for each proxy group company and applies VEDO's book value capital structure weights to produce an ATWACC adjusted return for VEDO.

These ATWACC adjustments to his return on equity estimates are discussed on pages 10-15 of his direct testimony, and developed in the workpapers accompanying his schedules for the CAPM and DCF return estimates.

Q WHY DOES DR. VILBERT BELIEVE THE ATWACC ADJUSTMENT TO HIS CAPM AND DCF RETURN ESTIMATES IS REASONABLE?

A Dr. Vilbert testifies that the proxy group firms' financial risk is different based on the market value of common equity weights compared to the financial risk based on market value common equity values. Therefore, Dr. Vilbert proposes to upwardly adjust his

CAPM and DCF model results for the difference in financial risk based on the proxy companies' market value of common equity, compared to VEDO's book value common equity. (Vilbert Direct at 13)

He is in effect suggesting that firms have a different level of financial risk, depending on whether one is observing their market value capital structure or the book value capital structure.

Q IS THE ATWACC ADJUSTMENT TO THE BASE RETURN ON EQUITY REASONABLE?

A No. This adjustment is flawed for several reasons. First, the Company only has one level of financial risk, not two. Investors do not assess a different amount of financial risk for market and book common equity valuation. Rather, financial risk is a singular risk factor, which describes its financial capital structure, cash flow strength to support financial obligations, and default provisions in its financial obligations.

Dr. Vilbert's belief that there are two levels of financial risk is simply not supported. Indeed, it is contradicted by data used by independent market participants to assess investment risk and security valuation. For example, S&P and *Value Line* provide general assessments of the financial and operating (or total investment) risks to the market investors. S&P does this in terms of rating the credit quality of the utility, based on the utility's ability to produce cash flows adequate to meet its book value financial obligations. S&P assesses a company's risk of failing to meet its financial obligations and is a direct assessment of a company's financial risk.

Value Line provides information to the market participants to help them assess the total investment risk including both financial risk and business risk for the utilities and other stock investments. The data *Value Line* provides to investors concerning

these investment risk characteristics relates to book value factors, including book value capital structure, book value cash flows, and book value earnings. All these book value factors are then used by investors to assess investment risk which allows them to derive market value stock prices. The book value parameters are an integral part of assessing risk and allowing investors to produce market valuations.

There is not a difference in financial risk for a company if you are examining its book value financial risk or market value financial risk. Rather, the book value and market value financial risks for the same company are interconnected to one another, and produce a single level of financial risk for the company.

Q DO YOU BELIEVE THAT THE ATWACC METHODOLOGY IS REASONABLE POLICY FOR SETTING AN APPROVED RETURN ON EQUITY?

A No. The ATWACC methodology is poor regulatory policy and should be rejected for several reasons:

1. It does not produce clear and transparent objectives for management to use that will accomplish the objective of minimizing its overall rate of return while preserving its financial integrity. Therefore, a regulatory commission cannot oversee the reasonableness and prudence of management decisions in managing its capital structure. Under the ATWACC theory, management's decisions to manage its capital structure can be skewed by changes in market value which change the market value capitalization mix. Management simply has no control over the market value capital structure, but it does have control over the book value capital structure. As such, setting the rate of return and measuring risk based on book value capital structure creates a more transparent and clear path for regulatory oversight of management's effort to maintain a balanced and reasonable capital structure.

2. The ATWACC introduces significant additional instability and unreliability into the utility's cost of service and tariff rates. Book value capital structure weights permit the utility to hedge or lock-in a large portion of capital market costs in arriving at the rate of return used to set rates. This rate of return cost hedge stabilizes the utility's cost of service, which in turn helps stabilize utility rates. A stable method of setting rates also allows investors to more accurately assess the future earnings and cash flow outlooks for the utility, which will reduce the business risk of the utility. The ATWACC, on the other hand, will produce an overall rate of return which will change based on both changes to market value capital structure weights and also based

on changes to market capital costs. Hence, a major component of the cost structure of the utility (i.e., the overall rate of return) will vary based on market forces from rate case to rate case. This rate of return variability will introduce significant instability in the utility's cost of service (via rate of return changes) and hence instability in tariff rates. Introducing additional instability and unreliability in the utility's cost structure and rates will not benefit either investors or ratepayers.

3. The ATWACC artificially increases rates to produce an excessive return on equity opportunity for utility investors. Inflating utility's rates to provide this excessive earnings opportunity is unjust and unreasonable and should be rejected.

Q IS THE ATWACC METHODOLOGY PROPOSED BY DR. VILBERT COMMONLY ACCEPTED IN RATE-SETTING PROCEEDINGS IN THE UNITED STATES?

A No. As Dr. Vilbert states at page 14 of his Direct testimony, "[…] use of the ATWACC is not prevalent in the U.S." The use of this methodology is not widely accepted by the regulatory commissions.

Most recently the Michigan Public Service Commission has rejected Dr. Vilbert's application of the ATWACC methodology in U-18014, stating: "[…] the Commission does agree with the PFD that little or no weight should be given to the utility's ATWACC calculations." [37]

V.C. Dr. Vilbert's CAPM Analysis

Q PLEASE DESCRIBE DR. VILBERT'S CAPM ANALYSIS.

A Dr. Vilbert develops two versions of the CAPM model, a traditional CAPM and an ECAPM.[38]

In his analyses, Dr. Vilbert relied upon two different scenarios. In the first scenario, he used a projected risk-free rate of 4.14% with a market risk premium of

[37]Michigan Public Service Commission, Case No. U-18014, Final Order, page 66, January 31, 2017.

[38]Vilbert Direct at 41-54.

6.94%. In this scenario, Dr. Vilbert's risk-free rate is based on a *Blue Chip* report from October 10, 2017 of 3.4% for 2019, including adjustments for term to maturity of 0.54%, and outlooks for changes in yield spreads between Treasuries and corporate bonds of 0.20 basis points with lower historical market risk premiums. In the second scenario, he used a risk-free rate of 3.94% with a market risk premium of 7.94%.[39]

As shown in Table 10 below, based on his two scenarios, Dr. Vilbert produced a traditional CAPM before any ROE adders in the range of 9.3% to 9.9% (Column 1). Similarly, applying the ECAPM before any adders, he produces a return estimate in the range of 9.7% to 10.3% (Column 1).

TABLE 10

Dr. Vilbert's CAPM Results

Line	Description	Base	Adjusted ROE			Adders		
			ATWACC	Hamada	Tax Hamada	ATWACC	Hamada	Tax Hamada
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Traditional CAPM							
1	Scenario 1	9.3% [1]	10.4% [3]	10.4% [4]	10.5% [4]	1.1%	1.1%	1.2%
2	Scenario 2	9.9% [2]	11.1% [3]	11.1% [5]	11.2% [5]	1.2%	1.2%	1.3%
	Empirical CAPM (α = 0.5%)							
3	Scenario 1	9.5% [1]	10.5% [3]	10.4% [4]	10.5% [4]	1.0%	0.9%	1.0%
4	Scenario 2	10.0% [2]	11.2% [3]	11.1% [5]	11.2% [5]	1.2%	1.1%	1.2%
	Empirical CAPM (α = 1.5%)							
5	Scenario 1	9.7% [1]	10.8% [3]	10.5% [4]	10.6% [4]	1.1%	0.8%	0.9%
6	Scenario 2	10.3% [2]	11.5% [3]	11.2% [5]	11.3% [5]	1.2%	0.9%	1.0%

Sources:
[1] Attachment A, Revised Schedule D5.10 at 21.
[2] Attachment A, Revised Schedule D5.10 at 22.
[3] Attachment A, Revised Schedule D5.12 at 25.
[4] Attachment A, Revised Schedule D5.15 at 28.
[5] Attachment A, Revised Schedule D5.15 at 29.

To these barebones or "base" CAPM returns, Dr. Vilbert proposes either one of two return on equity adders. First, he proposes to add to his base CAPM return estimate an ATWACC return on equity adder in the range of approximately 110 to 120

[39] Vilbert Direct at 25-28, 52 and Attachment A, Schedule No. D5.9.

basis points. For the reasons outlined above, this ATWACC adder should be rejected as unreliable and an imbalanced return on equity component. Alternatively, Dr. Vilbert proposes a return on equity adder to reflect a leveraged beta adjustment. This leveraged beta adjustment adds approximately 90 to 120 basis points to the base CAPM return.

Dr. Vilbert's leverage adjustment, however, is unreliable and flawed and should be rejected. This leverage adjustment return on equity adder to the base CAPM return estimate produces an excessive and unreasonable return on equity for VEDO.

Q PLEASE EXPLAIN DR. VILBERT'S LEVERAGED BETA ADJUSTMENT.

A As an alternative to his ATWACC adder to his CAPM results, Dr. Vilbert measures an additional return on equity adder based on leveraged adjustments to the beta component of the CAPM study. In producing this adder, he applies the Hamada method for de-levering and re-levering the beta component in both the CAPM and the ECAPM with and without the effect of income taxes.[40]

Applying the Hamada formula increases the *Value Line* beta from 0.75 to 0.90 (without taxes) and 0.91 (with taxes).[41] The Hamada model produces CAPM results in the range of 10.4% to 11.2% and ECAPM results in the range of 10.5% to 11.3%.[42]

Q IS DR. VILBERT'S APPLICATION OF THE LEVERAGED BETA RETURN ON EQUITY ADDER REASONABLE?

A No. Dr. Vilbert's application of the Hamada adjustment in his CAPM and ECAPM analyses is inappropriate in determining VEDO's cost of equity. While the Hamada

[40]Vilbert Direct at 16-19.
[41]Attachment A, Schedule No. D5.13 and D5.14.
[42]Attachment A, Schedule No. D5.15.

adjustment may be an empirically recognized adjustment to *raw* or unadjusted beta estimates, it has not been shown to be applicable to an already-adjusted *Value Line* beta.

While Dr. Vilbert discusses at length the appropriateness for each individual adjustment he makes to the CAPM model and its components, he has not provided empirical support for all the adjustments he makes to be used in concert with one another. I am unaware of any unchallenged academic support for the use of a Hamada leverage adjustment to an already Blume adjusted (*Value Line)* beta.

The second concern I have with Dr. Vilbert's proposed Hamada beta adjustment concerns the material difference in the way he measures leverage risk for the proxy group, and that for VEDO. For the proxy group, Dr. Vilbert measures the leverage risk based on the market value capital structure. For VEDO, he measures leverage risk based on its book value capital structure. Hence, the measurement of leverage risk between the proxy group and VEDO is not comparable. Dr. Vilbert should have either measured the leverage risk based on book value common equity or market value common equity to be consistent. Because of the inconsistent measurement of leverage risk, Dr. Vilbert's Hamada beta adjustment is not measured correctly, and produces a flawed and unreliable CAPM return estimate.

Dr. Vilbert has not produced a reliable beta adjustment using the Hamada methodology. Dr. Vilbert's erroneous application mixes market data for the proxy group and book data for VEDO.

Finally, there is no evidence that VEDO's financial risk is risk distinguishably different from that of the proxy group. Hence, Dr. Vilbert's proposal to substantially increase his CAPM return estimate for higher VEDO leverage risk, is unjustified and

unsupported. Therefore, Dr. Vilbert's Hamada beta adjusted CAPM result should be rejected.

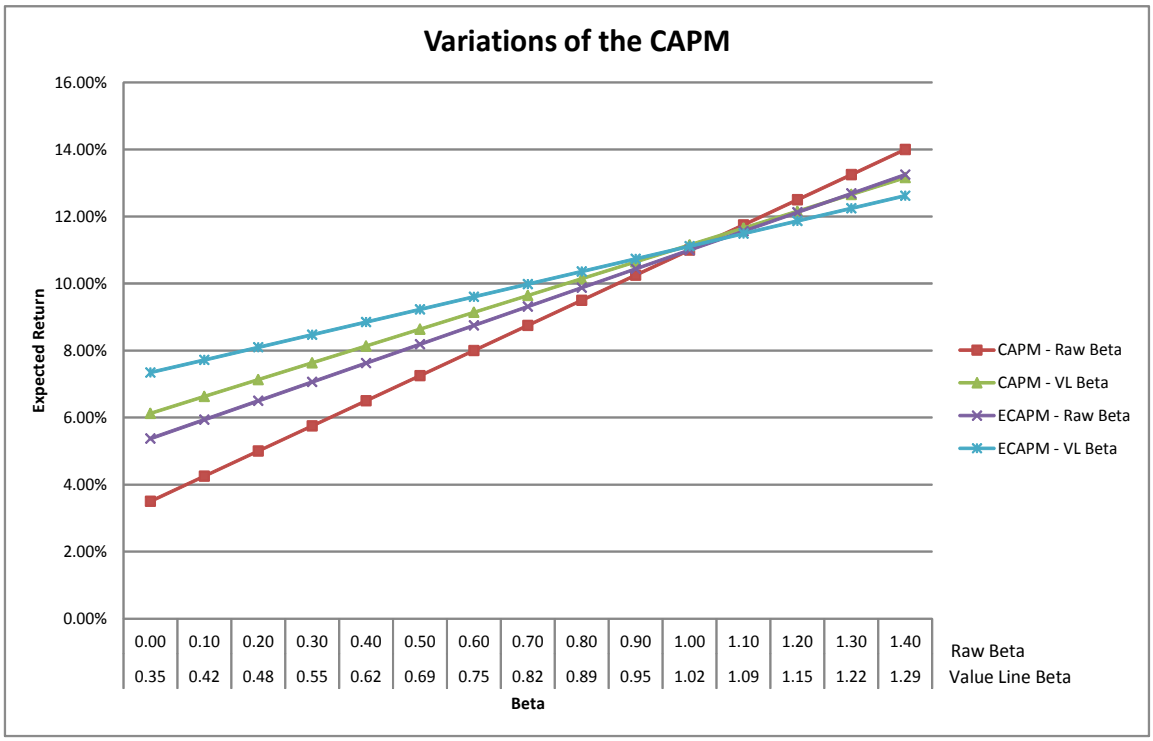
Q PLEASE DESCRIBE YOUR CONCERNS WITH DR. VILBERT'S ECAPM METHODOLOGY.

A Yes. I also have concerns with Dr. Vilbert's development of an ECAPM return estimate. Specifically, Dr. Vilbert included an adjusted beta within his ECAPM studies. This adjustment is inconsistent with the academic research supporting the development of an ECAPM methodology.[43] Bottom line, using adjusted betas within an ECAPM study double counts the purpose of the ECAPM study – that is, to flatten the security market line and increase a CAPM return estimate for companies with betas less than 1, and decrease the CAPM return estimate for betas greater than 1.

Dr. Vilbert discusses the objective of the ECAPM at pages 47-51 of his testimony. As shown in Dr. Vilbert's Figure 6, the ECAPM will raise the intercept point of the security market line and flatten the slope. Again, this has the effect of increasing CAPM return estimates for companies with betas less than 1, and decreasing the CAPM return estimates for companies with betas greater than 1. Importantly, however, the use of an adjusted beta such as those published by *Value Line*, produces comparable adjustments to the security market line and CAPM return estimate. In effect, using an adjusted beta within an ECAPM study has the effect of a double adjustment to the slope and intercept of the security market line. This is illustrated in my Figure 4 below.

[43]See Black, Fischer, "Beta and Return," *The Journal of Portfolio Management,* Fall 1993, 8-18; and Black, Fischer, Michael C. Jensen and Myron Scholes, "The Capital Asset Pricing Model: Some Empirical Tests," 1972.

Figure 4



Assumptions:
Market Risk Premium is 7.50%
Risk-Free Rate is 3.50%

As shown in Figure 4 above, the CAPM using a *Value Line* beta, versus a CAPM using a raw beta shows that the *Value Line* beta raises the intercept slope and flattens the security market line. Further, the ECAPM using a raw beta, and an ECAPM using a *Value Line* beta, have a magnified effect of increasing the intercept slope and further flattening the security market line.

There is simply no legitimate basis to use an adjusted beta within an ECAPM because they are designed to produce the same effect on changing the slope and intercept of the security market line and thus produce adjustment to the CAPM return estimate.

Q IS THERE ANY ACADEMIC SUPPORT FOR DR. VILBERT'S PROPOSED USE OF AN ADJUSTED BETA IN AN ECAPM STUDY?

A No. I am unaware of any peer reviewed academic study showing that the ECAPM is more accurate using adjusted betas. To my knowledge, the ECAPM has been tested and published with raw beta estimates. Further, Dr. Vilbert has not provided any academic research that was subjected to academic peer review, which supports his proposed use of an adjusted beta in an ECAPM study. As such, the practice of using an adjusted beta in an ECAPM study is simply not supported by academic research. While I have encountered the ECAPM analysis in several proceedings over the last few years, I have failed to find any utility witness in support of this methodology that can provide academic support for use of an ECAPM analysis with an adjusted beta such as a *Value Line* published beta. Rather, the ECAPM is designed to be used with an unadjusted beta. Support for this academic study is identified above. For the reasons outlined above, Dr. Vilbert's proposal to use adjusted betas in an ECAPM study should be rejected.

Q IS THERE A WAY TO MORE ACCURATELY MEASURE THE COST OF EQUITY FOR VEDO USING THE ECAPM?

A Because the makeup of the ECAPM model is based on a raw or regression beta, if the appropriate beta is used in the ECAPM it would produce a reasonable return estimate. As such, if the adjusted *Value Line* betas are modified to remove *Value Line*'s adjustment to the regression beta for the long-term tendency to converge on the market beta of 1, the *Value Line* unadjusted beta can be properly used in the ECAPM study.

Removing the beta adjustment to reflect a raw beta for an ECAPM will generally produce a more accurate ECAPM result. For example, Dr. Vilbert produces an average

CAPM cost for his proxy group of 9.3%, and an ECAPM return of 9.7% (α = 1.5%). The average proxy group adjusted *Value Line* beta to produce a 9.3% CAPM return is approximately 0.75. This would equate to an unadjusted/raw beta estimate of 0.60.[44] Using a raw beta of 0.60 and Dr. Vilbert's ECAPM methodology produces an ECAPM estimate of approximately 8.8%.[45]

Q DO YOU HAVE ANY OTHER COMMENTS CONCERNING DR. VILBERT'S CAPM METHODOLOGY?

A Yes. Dr. Vilbert's use of a long-term projected bond yield of 3.9% and 4.1%[46] does not reflect market participants' outlooks for VEDO's cost of capital during the period rates determined in this proceeding will be in effect. This bond yield is largely based on projections of Treasury bond yield for 2019 increased by 54 basis points to reflect the term to maturity and an additional 20 basis points to reflect changes in yield spread outlooks. Those projections are highly uncertain and in any event do not reflect the cost of capital in the test period, the period in which rates determined in this proceeding will largely be in effect. As such, the risk positioning methodology should be based on observable bond yields in the market today, or at most reflect bond yield projections over the next two to three years, the rate-effective period in this case.

[44](Adj. Beta - 0.35)/0.67 = Raw Bea. (0.75 – 0.35)/0.67 = 0.60.
[45]ECAPM (Raw Beta) = RF + 0.21 x MRP + 0.79 x MRP x Raw Beta.
ECAPM (0.60) = 4.1% + 0.21 x 6.9% + 0.79 x 6.9% x 0.60 = 8.8%.
[46]Attachment A, Schedule No. D5.9.

Q CAN DR. VILBERT'S CAPM ANALYSIS BE REVISED TO REFLECT CURRENT PROJECTIONS OF TREASURY YIELDS?

A Yes. Using Dr. Vilbert's average beta of 0.75 and his market risk premium of 6.9% and 7.9% and my projected 30-year Treasury yield of 3.6%, will result in a CAPM return in the range of 8.8% (3.6% + 0.75 x 6.9%) to 9.5% (3.6% + 0.75 x 7.9%).

V.D. Dr. Vilbert's Risk Premium Analyses

Q PLEASE DESCRIBE DR. VILBERT'S RISK PREMIUM ANALYSES.

A As discussed on pages 54-56 of Dr. Vilbert's testimony, he measured the relationship of authorized returns on equity to long-term Treasury yields during the period 1990-2017 through a regression analysis.[47] He then uses the resulting regression formula to predict a risk premium based on forecasted long-term Treasury yields of 4.1% and 3.9%. This regression formula and his forecasted Treasury yields of 4.1% and 3.9% produced an estimated risk premiums of 6.08% and 6.20%, which resulted in a return on equity of 10.1% to 10.2%.[48]

Q DO YOU HAVE ANY ISSUES WITH DR. VILBERT'S RISK PREMIUM ANALYSIS?

A Yes. Dr. Vilbert's regression model reflects a simplistic, linear relationship between equity risk premiums and interest rates. This overly simplistic relationship is not based on basic risk and return valuation principles. While academic studies have shown that there has been a positive and negative linear relationship between these variables in the past, these studies have found that the relationship changes over time and is

[47] Attachment A, Schedule No. D5.16.
[48] Vilbert Direct Testimony at 59.

influenced by changes in perception of the investment risk of bond investments relative to equity investments, rather than only changes to nominal interest rates.[49]

In the 1980s, equity risk premiums were inversely related to interest rates, but that was likely attributable to the interest rate volatility that existed at that time. When interest rates were more volatile, the relative perception of bond investment risk increased relative to the investment risk of equities. This changing investment risk perception caused changes in equity risk premiums.

In today's marketplace, interest rate volatility is not as extreme as it was during the 1980s.[50] Nevertheless, changes in the perceived risk of bond investments relative to equity investments still drive changes in equity premiums. However, a relative investment risk differential cannot be measured simply by observing nominal interest rates. Changes in nominal interest rates are highly influenced by changes to inflation outlooks, which also change equity return expectations. As such, the relevant factor needed to explain changes in equity risk premiums is the relative changes to the risk of equity versus debt securities investments, and not simply changes in interest rates.

Importantly, Dr. Vilbert's analysis simply ignores investment risk differentials. He bases his adjustment to the equity risk premium exclusively on changes in nominal interest rates. This is a flawed methodology and does not produce accurate or reliable risk premium estimates. As such, his argument should be rejected by the Commission.

[49]"The Market Risk Premium: Expectational Estimates Using Analysts' Forecasts," Robert S. Harris and Felicia C. Marston, *Journal of Applied Finance*, Volume 11, No. 1, 2001; "The Risk Premium Approach to Measuring a Utility's Cost of Equity," Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *Financial Management*, Spring 1985.

[50]Duff & Phelps, 2018 SBBI Yearbook 6-7 – 6-10.

Q CAN DR. VILBERT'S RISK PREMIUM STUDY BE MODIFIED TO PRODUCE A REASONABLE RETURN FOR VEDO?

A Yes. Disregarding Dr. Vilbert's simplistic inverse relationship and using a projected Treasury yield published by independent economists of 3.6%, and adding this 3.6% Treasury yield to an equity risk premium of 6.0%, produces a risk premium return on equity for VEDO of 9.6%.

V.E. Dr. Vilbert's DCF Analyses

Q PLEASE DESCRIBE DR. VILBERT'S DCF ANALYSIS.

A Dr. Vilbert developed a constant growth DCF model based on a combined growth rate from IBES consensus analysts' and *Value Line* growth rate projections. Dr. Vilbert's DCF model results fall in the range 7.7% to 11.3%[51], with the higher estimate produced by his simple constant growth DCF model. He applied an ATWACC adjustment to the DCF model results and increased the DCF range to 9.1% to 13.7%.[52]

Q PLEASE DESCRIBE THE ISSUES YOU HAVE WITH DR. VILBERT'S DCF ANALYSIS.

A My primary concern with Dr. Vilbert's DCF analyses, as I discussed at length above, is the use of the ATWACC methodology, which is inappropriate and should be rejected. Also, as discussed in detail below in case of highly dispersed return on equity results, it is a sound practice to rely on the median result in measuring the central tendency of the distribution sample instead of randomly excluding companies with unreliable results.

[51]Attachment A, Schedule No. D5.6 and D5.7.
[52]Vilbert Direct Testimony at 61 and Attachment A, Schedule No. D5.8.

While I appreciate Dr. Vilbert's attempt to gauge the reasonableness of his DCF results there are several flaws with his methodology. First, his full sample return of 13.7% or 11.8% (excl. ATWACC) excludes Chesapeake Utilities (14.2%) and New Jersey Resources (4.8%) because they are not rated and WGL (2.1%) because the cost of equity is below the cost of debt plus a 100 basis points.[53] While I do not have issue with excluding Chesapeake because the entire entity is not rated and WGL, which was recently acquired by AltaGas and is no longer followed by *Value Line*, I do take issues with excluding New Jersey Resources. Dr. Vilbert correctly observes that the holding company is not rated. However, its operating utility subsidiary, New Jersey Natural Gas Co., has a rating of BBB+. Dr. Vilbert's Table 2, on page 39 of his testimony, references the use of a subsidiary credit rating to assess the investment risk of a proxy company – MGE Energy. As shown in Note [7] of this table, Dr. Vilbert used the credit rating of Madison Gas & Electric Company, because the parent company MGE Energy is not rated. While the reference to MGE Energy is an obvious mistake it is clear that Dr. Vilbert has relied on subsidiary utility operating companies, when the parent was not rated. Therefore, the exclusion of New Jersey Resources is without merit.

Second, Dr. Vilbert's high-end simple DCF result (11.8%, excl. ATWACC) includes an extremely high outlier. Specifically, South Jersey Industries has a DCF return of 19.3% produced by an unsustainable growth rate of 14.8% as reported by *Value Line*. This growth rate is more than three times above the sustainable growth of 4.2% as reported by Dr. Vilbert in his multi-stage DCF model.

Therefore, in case of highly dispersed distribution, results ranging from 2.1% to 19.3% as discussed above and shown on Dr. Vilbert's Attachment A, Schedule No.

[53] Attachment A, Schedule No. D5.7, Note [10].

D5.6 and D5.7, relying on the median of the proxy group results is the more appropriate measure of central tendency of the sample. As shown on my Exhibit MPG-20, the median of Dr. Vilbert's DCF results is in the range of 7.3% to 9.6%.

Q DID DR. VILBERT ALSO OFFER AN ASSESSMENT OF CURRENT MARKET CONDITIONS IN SUPPORT OF HIS RECOMMENDED RETURN ON EQUITY?

A Yes. Dr. Vilbert suggests a few factors that gauge investor sentiment, including interest rates, yield spreads and P/E ratios.[54] He concludes that low interest rates resulted in high utility spreads, which remained elevated relative to historical averages.

Q DO YOU BELIEVE THAT DR. VILBERT'S USE OF THESE MARKET SENTIMENTS SUPPORTS HIS FINDINGS THAT VEDO'S MARKET COST OF EQUITY IS 10.75%?

A No. In many instances Dr. Vilbert's analysis simply ignores market sentiments favorable toward utility companies and instead lumps utility investments in with higher-risk corporate investments. A fair analysis of utility securities shows the market generally regards utility securities as low-risk investment instruments and supports the finding that utilities' cost of capital is very low in today's marketplace.

Q WHAT IS THE MARKET SENTIMENT FOR UTILITY INVESTMENTS?

A I have gauged market/investor perceptions in utility risk today in Exhibit MPG-15, where I show the yield spread between utility bonds and Treasury bonds over the last 38 years. As shown in this exhibit, the average utility bond yield spreads over Treasury bonds for "A" and "Baa" rated utility bonds for this historical period are 1.50% and 1.94%, respectively. The utility bond yield spreads over Treasury bonds for "A" and

[54]Vilbert Direct at 19-25.

"Baa" rated utilities for 2016 were 1.33% and 2.08%, respectively. The yield spreads for the nine months of 2018 were considerably lower, 1.12% (A) and 1.51% (Baa). The current average "A" rated utility bond yield spread over Treasury bond yields is now lower than the 38-year average spread. The current "Baa" rated utility bond yield spread over Treasury bond yields is also lower than the 38-year average spread as shown on Exhibit MPG-15.

These yield spreads show that utility capital costs are lower than they have been historically relative to Treasury bond yields, and also that the bond yield spreads expand above historical norms as the investment risk of the security increases. This information allows for an informed determination of the current market sentiment for utility investments. Currently, the market is placing high value on utility securities recognizing their low risk and stable characteristics.

For example, this is illustrated by my Exhibit MPG-15, under column 11 showing the spread between "A" rated utility bond yields and "Aaa" rated corporate bond yields. Currently, the spread is approximately 0.32%. This is a relatively low spread over the 38-year time horizon. This is also reflective of the spreads between "Baa" utility bond yields relative to "Baa" corporate bond yields. Currently, utility bonds are trading at a premium to corporate bonds. This has been largely the case during the significant market turbulence that has occurred over the last five to eight years. However, over longer periods of time, utility bond yields on average trade at parity to a premium to corporate "Baa" rated bond yields. The current strong utility bond valuation is an indication of the market's sentiment that utility bonds have lower risk than general corporate bonds and are generally regarded as a safe haven by the investment industry.

Further, other measures of utility stock valuations also support a robust market for utility stocks. As shown on my Exhibit MPG-2, utility valuation measures – e.g., price-to-earnings ratio, market-to-book ratio, and market price to cash flow ratio – show stock valuation measures for the proxy groups are robust. For example, for the proxy group, the current price-to-earnings ratio is comparable to and the cash flow ratio is stronger than the 13-year average valuation metrics.

For all these reasons, direct assessments of valuation measures and market sentiment toward utility securities support the credit rating agencies' findings, as quoted above, that the utility industry is largely regarded as a low-risk, safe haven investment. All of this supports my finding that utilities' market cost of equity is very low in today's very low cost capital market environment.

Q DO YOU HAVE ANY FURTHER COMMENTS IN REGARD TO DR. VILBERT'S INTEREST RATE PROJECTIONS?

A Yes. First, it is simply not known how much, if any, long-term interest rates will increase from current levels or whether they have already fully accounted for the termination of the Federal Reserve's Quantitative Easing program and the increases in the Federal Funds Rate. Nevertheless, I do agree that this Federal Reserve program introduced risk or uncertainty in long-term interest rate markets. Because of this uncertainty, caution should be taken in estimating VEDO's current return on common equity in this case. However, as noted by the president of the Saint Louis Federal Reserve, even though the short-term interest rates have increased the longer-term yields remain at historically low levels, which is referred to as "flattening" of the yield curve."[55]

[55]Assessing the Risk of Yield Curve Inversion: An Update, July 20, 2018.

Second, I would note VEDO is largely shielded from significant changes in capital market costs. To the extent interest rates ultimately increase above current levels, which may have an impact on required returns on common equity, at that point in time VEDO, like all other utilities, can file to change rates to restate its authorized rate of return at the prevailing market levels.

Finally, while current observable interest rates are actual market data that provides a measure of the current cost of capital, the accuracy of forecasted interest rates is problematic at best.

Q WHY DO YOU BELIEVE THAT THE ACCURACY OF FORECASTED INTEREST RATES IS HIGHLY PROBLEMATIC?

A Over the last several years, observable current interest rates have been a more accurate predictor of future interest rates than economists' consensus projections. Exhibit MPG-21 illustrates this point. On this exhibit, under Columns 1 and 2, I show the actual market yield at the time a projection is made for Treasury bond yields two years in the future. In Column 1, I show the actual Treasury yield. In Column 2, I show the projected yield two years out.

As shown in Columns 1 and 2, over the last several years, Treasury yields were projected to increase relative to the actual Treasury yields at the time of the projection. In Column 4, I show what the Treasury yield actually turned out to be two years after the forecast. In Column 5, I show the actual yield change at the time of the projections relative to the projected yield change.

As shown in this exhibit, economists consistently have been projecting that interest rates will increase over several years. However, as shown in Column 5, those yield projections have turned out to be overstated in almost every case. Indeed, actual

Treasury yields have decreased or remained flat over the last several years rather than increased as the economists' projections indicated. As such, current observable interest rates are just as likely, maybe more likely, to accurately predict future interest rates as are current economists' projections.

VI. RESPONSE TO STAFF

Q WHAT RETURN ON COMMON EQUITY IS STAFF PROPOSING IN THIS PROCEEDING?

A Staff recommends a return on equity for VEDO in the range of 8.80% to 9.81%, which is briefly discussed at pages 20-22 of the Report by Staff of the Public Utility Commission of Ohio ("Staff's Report").

TABLE 11

Staff Return on Equity

Description	Staff Proposed (1)	Adjusted (2)
DCF	9.23%	9.23%
CAPM	9.11%	8.10%[1]
Average Cost of Equity	9.17%	8.67%
Adjustment Factor	1.01407	1.01407
Adjusted Cost of Equity	9.30%	8.79%
ROE Low (- 50 bp)	8.80%	8.29%
ROE High (+ 50 bp)	9.80%	9.29%
Proposed ROE Range	8.80% - 9.81%	8.29% - 9.29%

Source and Note:

Report by Staff of the Public Utility Commission of Ohio at 20-22.

[1] 3.60% + 0.73 x (12.1% - 6.0%) = 8.05%, rounded to 8.10%.

Q PLEASE DESCRIBE STAFF'S METHODOLOGY SUPPORTING ITS RECOMMENDED RETURN ON COMMON EQUITY.

A Staff arrived at its estimated range using traditional CAPM and DCF models. These models were applied to a sample of five electric utilities (Staff Report at 20).

Q IS STAFF'S ESTIMATED RETURN ON EQUITY FOR VEDO REASONABLE?

A No. The high-end of Staff's recommended return on equity of 9.8% for VEDO is excessive and unreasonable for a low-risk regulated delivery utility company. The unreasonableness of Staff's recommendation is evident from a detailed assessment of the rate of return models supporting its recommendation in this proceeding.

Q PLEASE SUMMARIZE STAFF'S RETURN ON EQUITY RESULTS.

A Staff's return on equity is based on its CAPM and DCF return estimates of 9.11% and 9.23%, respectively, which produced an average return on equity of 9.17%, which is consistent with my return on equity recommendation of 9.30%.

However, Staff's midpoint estimate was reduced and increased by an additional 50 basis points to account for uncertainty, which resulted in a range of 8.67% to 9.67%. Finally, Staff increased this range by approximately 13 basis points to account for flotation costs.

Q WHAT ARE THE MAJOR CONCERNS THAT YOU HAVE WITH STAFF'S RETURN ON EQUITY METHODOLOGY?

A I have several major concerns with Staff's methodology:

- Staff's CAPM analysis reflects an uncertain projected risk-free rate of 4.66%, which is at least five years out into the future;

- Staff developed a non-constant DCF analysis, which is based on a long-term growth rate of the historical Gross National Product ("GNP") of 6.37% for the period 1926-2017, which is significantly higher than the long-term consensus analysts' growth rate projection of 4.10%. Even though I disagree with this methodology, to limit the issues in this regulatory proceeding I will not take issue with Staff's DCF analysis;

- Finally, Staff's use of a generic flotation cost adder of 13 basis points without showing proof that those costs were known and measurable for VEDO is without merit and should be rejected. Again, even though I disagree with this adjustment, my understanding is that this is a common practice utilized by the Commission and I will not take any issue with it.

In Column 2 of Table 11 above I have adjusted Staff's CAPM analysis to reflect a more reasonable estimate of the risk-free rate as discussed in detail below, which brings the average cost of equity down to 8.67% or 8.79%, including the flotation cost adjustment. Applying the 100% differential for uncertainty as Staff has done results in a range of 8.29% to 9.29%, as shown in Table 11 above. This range is consistent with Staff's market-based model results. Therefore, the Commission should reject Staff's high-end range estimate of 9.8% because it does not reflect Staff's own studies and exceeds the current cost of equity for a low risk operating utility as VEDO.

Q WHY IS IT UNREASONABLE TO USE A LONG-TERM PROJECTED RISK-FREE RATE?

A As I discussed in my response to the Company's witness, Dr. Vilbert, relying on a long-term projected risk-free rate does not reflect market participants' outlooks for VEDO's cost of capital during the period rates determined in this proceeding will be in effect. Staff did not disclose the exact projected period for its risk-free rate or provide its supporting workpapers, but I am familiar with the sources it relied on. Based on the EIA 2018 macroeconomic indicators the 10-yr. Treasury yield for 2018 is 3.1%, which

is also consistent with the *Blue Chip Financial Forecasts*.[56] Staff's Report relies on a Treasury yield projection from EIA of 4.02% that is 100 basis points above the current consensus market analysts' projections through 2018. Based on the EIA data the projected 10-Year Treasury note for 2019 is 3.81% then it increases to 4.02% to 4.07% in the 2020 to 2024 period.

These long-term Treasury yield projections are highly uncertain and do not reflect the period when the rates approved in this regulatory proceeding will be in effect.

Further, Staff's risk-free rate reflects the projections of a couple of sources, EIA and the Bureau of Labor Statistics ("BLS"). It is more accurate to rely on estimates that represent a consensus of multiple economists instead of relying on a single economist's projections. For all these reasons, I believe Staff's CAPM does not reflect the current cost of equity for VEDO.

Q CAN STAFF'S CAPM ANALYSIS BE REVISED TO REFLECT VEDO'S CURRENT COST OF EQUITY?

A Yes. Using the 30-year Treasury yield from the *Blue Chip Financial Forecast*s of 3.6% as I discussed in regard to my own CAPM study and Staff's beta estimate of 0.73 and market risk premium of approximately 6.1% will result in a revised CAPM of approximately 8.10%.[57]

Q DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A Yes, it does.

[56] *Blue Chip Financial Forecasts*, October 1, 2018, at 2.
[57] 3.6% + 0.73 x 6.1% = 8.05%, rounded to 8.10%.

Qualifications of Michael P. Gorman

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A Michael P. Gorman. My business address is 16690 Swingley Ridge Road, Suite 140, Chesterfield, MO 63017.

Q PLEASE STATE YOUR OCCUPATION.

A I am a consultant in the field of public utility regulation and a Managing Principal with the firm of Brubaker & Associates, Inc. ("BAI"), energy, economic and regulatory consultants.

Q PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A In 1983 I received a Bachelor of Science Degree in Electrical Engineering from Southern Illinois University, and in 1986, I received a Master's Degree in Business Administration with a concentration in Finance from the University of Illinois at Springfield. I have also completed several graduate level economics courses.

In August of 1983, I accepted an analyst position with the Illinois Commerce Commission ("ICC"). In this position, I performed a variety of analyses for both formal and informal investigations before the ICC, including: marginal cost of energy, central dispatch, avoided cost of energy, annual system production costs, and working capital. In October of 1986, I was promoted to the position of Senior Analyst. In this position, I assumed the additional responsibilities of technical leader on projects, and my areas of responsibility were expanded to include utility financial modeling and financial analyses.

In 1987, I was promoted to Director of the Financial Analysis Department. In this position, I was responsible for all financial analyses conducted by the Staff. Among other things, I conducted analyses and sponsored testimony before the ICC on rate of return, financial integrity, financial modeling and related issues. I also supervised the development of all Staff analyses and testimony on these same issues. In addition, I supervised the Staff's review and recommendations to the Commission concerning utility plans to issue debt and equity securities.

In August of 1989, I accepted a position with Merrill-Lynch as a financial consultant. After receiving all required securities licenses, I worked with individual investors and small businesses in evaluating and selecting investments suitable to their requirements.

In September of 1990, I accepted a position with Drazen-Brubaker & Associates, Inc. ("DBA"). In April 1995, the firm of Brubaker & Associates, Inc. was formed. It includes most of the former DBA principals and Staff. Since 1990, I have performed various analyses and sponsored testimony on cost of capital, cost/benefits of utility mergers and acquisitions, utility reorganizations, level of operating expenses and rate base, cost of service studies, and analyses relating to industrial jobs and economic development. I also participated in a study used to revise the financial policy for the municipal utility in Kansas City, Kansas.

At BAI, I also have extensive experience working with large energy users to distribute and critically evaluate responses to requests for proposals ("RFPs") for electric, steam, and gas energy supply from competitive energy suppliers. These analyses include the evaluation of gas supply and delivery charges, cogeneration and/or combined cycle unit feasibility studies, and the evaluation of third-party asset/supply management agreements. I have participated in rate cases on rate

design and class cost of service for electric, natural gas, water and wastewater utilities. I have also analyzed commodity pricing indices and forward pricing methods for third party supply agreements, and have also conducted regional electric market price forecasts.

In addition to our main office in St. Louis, the firm also has branch offices in Phoenix, Arizona and Corpus Christi, Texas.

Q HAVE YOU EVER TESTIFIED BEFORE A REGULATORY BODY?

A Yes. I have sponsored testimony on cost of capital, revenue requirements, cost of service and other issues before the Federal Energy Regulatory Commission and numerous state regulatory commissions including: Arkansas, Arizona, California, Colorado, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Mississippi, Missouri, Montana, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming, and before the provincial regulatory boards in Alberta and Nova Scotia, Canada. I have also sponsored testimony before the Board of Public Utilities in Kansas City, Kansas; presented rate setting position reports to the regulatory board of the municipal utility in Austin, Texas, and Salt River Project, Arizona, on behalf of industrial customers; and negotiated rate disputes for industrial customers of the Municipal Electric Authority of Georgia in the LaGrange, Georgia district.

Q PLEASE DESCRIBE ANY PROFESSIONAL REGISTRATIONS OR ORGANIZATIONS TO WHICH YOU BELONG.

A I earned the designation of Chartered Financial Analyst ("CFA") from the CFA Institute. The CFA charter was awarded after successfully completing three examinations which covered the subject areas of financial accounting, economics, fixed income and equity valuation and professional and ethical conduct. I am a member of the CFA Institute's Financial Analyst Society.

Vectren Energy Delivery of Ohio, Inc.

Rate of Return
(December 31, 2017)
(millions)

Line	Description	Amount[1] (1)	Weight (2)	Cost (3)	Weighted Cost (4)
1	Long-Term Debt	$ 1,817	48.94%	5.07%	2.48%
2	Common Equity	$ 1,896	51.06%	**9.30%**	4.75%
3	Total	$ 3,714	100.00%		7.23%

Source:
[1]Schedule D-1.

Vectren Energy Delivery of Ohio, Inc.

Natural Gas Utilities
(Valuation Metrics)

Price to Earnings (P/E) Ratio [1]

Line	Company	13-Year Average (1)	2018 [2] (2)	2017 (3)	2016 (4)	2015 (5)	2014 (6)	2013 (7)	2012 (8)	2011 (9)	2010 (10)	2009 (11)	2008 (12)	2007 (13)	2006 (14)
1	Atmos Energy	16.46	22.70	22.04	20.80	17.50	16.09	15.87	15.93	14.36	13.21	12.54	13.59	15.87	13.52
2	Chesapeake Utilities	17.93	26.90	27.84	21.77	19.15	17.70	15.62	14.81	14.16	12.21	14.20	14.15	16.72	17.85
3	New Jersey Resources	17.03	19.90	22.38	21.25	16.61	11.73	15.98	16.83	16.76	14.98	14.93	12.27	21.61	16.13
4	NiSource Inc.	20.08	21.90	NMF	23.18	37.34	22.74	18.89	17.87	19.36	15.33	14.34	12.07	18.82	19.16
5	Northwest Nat. Gas	20.12	27.80	NMF	26.92	23.69	20.69	19.38	21.08	19.02	16.97	15.17	18.08	16.74	15.85
6	ONE Gas Inc.	21.44	23.40	23.47	22.74	19.79	17.83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	South Jersey Inds.	18.37	22.20	27.92	21.71	17.95	18.03	18.90	16.94	18.48	16.81	14.96	15.90	17.18	11.86
8	Southwest Gas	17.48	20.10	22.21	21.64	19.35	17.86	15.76	15.00	15.69	13.97	12.20	20.27	17.26	15.94
9	Spire Inc.	16.42	19.70	19.82	19.61	16.49	19.80	21.25	14.46	13.05	13.74	13.39	14.31	14.19	13.60
10	UGI Corp.	15.66	19.50	20.84	19.33	17.71	15.81	15.44	16.38	15.03	10.86	10.30	13.30	15.14	13.97
11	WGL Holdings Inc.	16.71	N/A	25.40	20.05	16.99	15.15	18.25	15.27	16.97	15.11	12.58	13.66	15.60	15.46
12	Average	17.74	22.41	23.55	21.73	20.23	17.58	17.53	16.46	16.29	14.32	13.46	14.76	16.91	15.33
13	Median	17.38	22.05	22.38	21.64	17.95	17.83	17.11	16.15	16.22	14.48	13.80	13.91	16.73	15.66

Market Price to Cash Flow (MP/CF) Ratio [1]

Line	Company	13-Year Average (1)	2018 [2/a] (2)	2017 (3)	2016 (4)	2015 (5)	2014 (6)	2013 (7)	2012 (8)	2011 (9)	2010 (10)	2009 (11)	2008 (12)	2007 (13)	2006 (14)
14	Atmos Energy	8.25	11.99	11.99	11.36	9.30	8.79	7.72	7.02	6.87	6.15	5.76	6.48	7.44	6.36
15	Chesapeake Utilities	9.42	12.60	13.78	12.06	10.16	9.25	8.12	7.46	7.35	6.36	9.48	7.88	8.58	9.40
16	New Jersey Resources	11.79	11.40	14.45	13.94	11.71	8.95	11.29	12.29	12.71	11.32	11.34	9.15	13.76	11.01
17	NiSource Inc.	7.76	8.37	12.11	8.56	10.38	10.56	8.71	7.81	6.81	5.09	4.06	4.87	6.69	6.87
18	Northwest Nat. Gas	13.17	12.18	59.72	11.57	9.46	8.84	8.61	9.48	9.08	8.94	8.26	8.75	8.54	7.83
19	ONE Gas Inc.	10.32	11.25	11.89	11.10	9.19	8.16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	South Jersey Inds.	10.89	12.28	12.33	10.88	10.70	10.57	11.57	10.95	11.98	10.78	9.57	10.38	11.23	8.32
21	Southwest Gas	6.07	8.01	9.10	7.41	6.56	6.35	5.94	5.55	5.60	4.91	3.84	4.89	5.42	5.28
22	Spire Inc.	9.52	9.28	10.39	10.32	8.47	12.03	13.76	8.80	8.08	8.12	8.58	8.95	8.46	8.46
23	UGI Corp.	7.62	9.37	10.09	9.02	8.47	7.49	6.55	6.30	7.51	6.02	5.74	7.11	7.92	7.48
24	WGL Holdings Inc.	9.17	N/A	12.92	11.36	9.59	8.46	9.83	9.03	9.52	8.34	7.17	7.68	8.39	7.81
25	Average	9.34	10.67	16.25	10.69	9.45	9.04	9.21	8.47	8.55	7.60	7.38	7.62	8.64	7.88
26	Median	8.97	11.32	12.11	11.10	9.46	8.84	8.66	8.31	7.80	7.24	7.71	7.78	8.42	7.82

Market Price to Book Value (MP/BV) Ratio [1]

Line	Company	13-Year Average (1)	2018 [2/b] (2)	2017 (3)	2016 (4)	2015 (5)	2014 (6)	2013 (7)	2012 (8)	2011 (9)	2010 (10)	2009 (11)	2008 (12)	2007 (13)	2006 (14)
27	Atmos Energy	1.51	2.00	2.16	2.11	1.72	1.55	1.39	1.28	1.30	1.18	1.05	1.20	1.40	1.34
28	Chesapeake Utilities	1.90	2.42	2.51	2.28	2.19	2.12	1.83	1.66	1.61	1.40	1.37	1.64	1.84	1.85
29	New Jersey Resources	2.25	2.61	2.70	2.52	2.28	2.13	2.05	2.33	2.31	2.09	2.16	1.92	2.17	2.01
30	NiSource Inc.	1.42	1.77	1.96	1.84	1.95	1.94	1.58	1.37	1.15	0.92	0.69	0.94	1.16	1.19
31	Northwest Nat. Gas	1.84	2.24	2.41	1.92	1.63	1.59	1.56	1.72	1.70	1.78	1.73	1.96	2.05	1.69
32	ONE Gas Inc.	1.53	1.78	1.89	1.67	1.26	1.07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
33	South Jersey Inds.	2.11	1.94	2.29	1.79	1.77	2.07	2.27	2.21	2.59	2.38	1.95	2.08	2.21	1.93
34	Southwest Gas	1.55	1.77	2.13	1.96	1.68	1.68	1.61	1.51	1.43	1.24	0.97	1.20	1.46	1.46
35	Spire Inc.	1.55	1.65	1.65	1.64	1.44	1.33	1.34	1.51	1.46	1.39	1.68	1.71	1.66	1.71
36	UGI Corp.	2.02	2.47	2.62	2.41	2.29	1.97	1.69	1.45	1.75	1.55	1.66	2.01	2.16	2.21
37	WGL Holdings Inc.	1.81	N/A	2.69	2.45	2.15	1.69	1.71	1.66	1.63	1.50	1.45	1.59	1.64	1.59
38	Average	1.78	2.06	2.27	2.05	1.85	1.74	1.70	1.67	1.69	1.54	1.47	1.62	1.78	1.70
39	Median	1.74	1.97	2.29	1.96	1.77	1.69	1.65	1.58	1.62	1.45	1.56	1.67	1.75	1.70

Sources:

[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 21, 2018.

[2] The Value Line Investment Survey, August 31, 2018.

Notes:

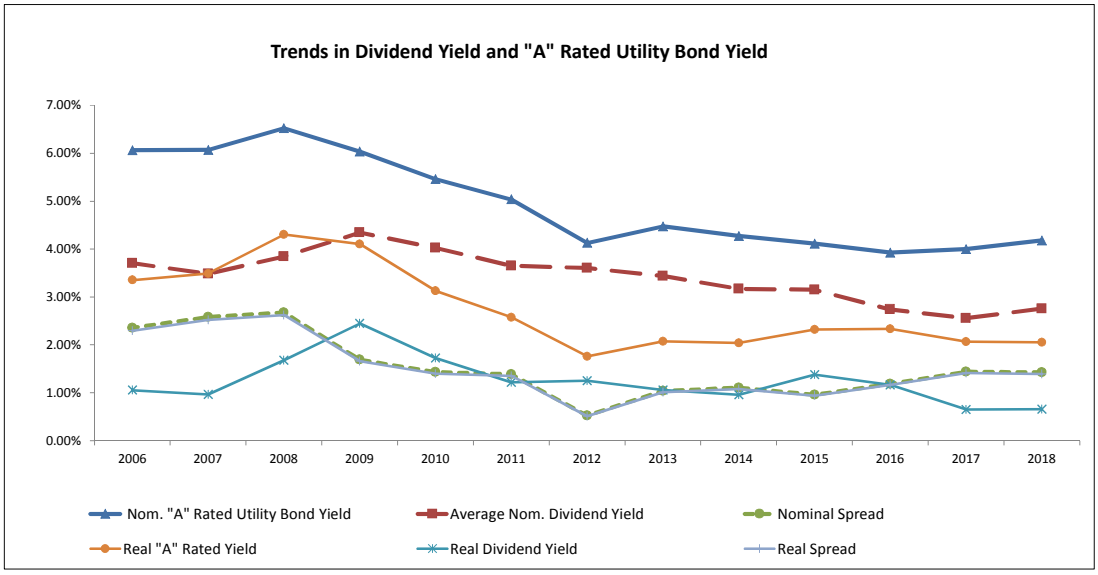
[a] Based on the average of the high and low price for 2018 and the projected 2018 Cash Flow per share, published in The Value Line Investment Survey, August 31, 2018.

[b] Based on the average of the high and low price for 2018 and the projected 2018 Book Value per share, published in The Value Line Investment Survey, August 31, 2018.

Vectren Energy Delivery of Ohio, Inc.

Natural Gas Utilities
(Valuation Metrics)

Line	Company	13-Year Average (1)	2018 [2/a] (2)	2017 (3)	2016 (4)	2015 (5)	2014 (6)	2013 (7)	2012 (8)	2011 (9)	2010 (10)	2009 (11)	2008 (12)	2007 (13)	2006 (14)
		Dividend Yield[1]													
1	Atmos Energy	3.72%	2.26%	2.27%	2.39%	2.88%	3.11%	3.53%	4.13%	4.19%	4.70%	5.34%	4.78%	4.16%	4.66%
2	Chesapeake Utilities	3.00%	1.81%	1.69%	1.91%	2.18%	2.44%	2.87%	3.25%	3.36%	3.91%	4.09%	4.10%	3.62%	3.76%
3	New Jersey Resources	3.23%	2.64%	2.69%	2.86%	3.14%	3.50%	3.71%	3.38%	3.33%	3.69%	3.46%	3.35%	3.02%	3.19%
4	NiSource Inc.	4.16%	3.11%	2.79%	2.76%	3.53%	2.69%	3.30%	3.84%	4.53%	5.66%	7.64%	5.69%	4.29%	4.21%
5	Northwest Nat. Gas	3.62%	3.20%	3.02%	3.28%	4.01%	4.14%	4.22%	3.83%	3.85%	3.63%	3.73%	3.27%	3.12%	3.73%
6	ONE Gas Inc.	2.45%	2.58%	2.37%	2.32%	2.71%	2.28%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	South Jersey Inds.	3.27%	3.75%	3.20%	3.64%	3.95%	3.40%	3.14%	3.22%	2.81%	3.00%	3.43%	3.08%	2.81%	3.15%
8	Southwest Gas	2.87%	2.88%	2.46%	2.62%	2.87%	2.72%	2.69%	2.75%	2.78%	3.15%	4.01%	3.19%	2.56%	2.60%
9	Spire Inc.	3.88%	3.28%	3.09%	3.08%	3.53%	3.78%	3.96%	4.11%	4.31%	4.70%	3.91%	3.94%	4.43%	4.34%
10	UGI Corp.	2.83%	2.07%	2.01%	2.35%	2.50%	2.61%	3.01%	3.68%	3.30%	3.48%	3.23%	2.85%	2.69%	2.96%
11	WGL Holdings Inc.	3.91%	N/A	2.56%	2.94%	3.41%	4.24%	3.94%	3.89%	4.06%	4.37%	4.62%	4.22%	4.19%	4.48%
12	**Average**	**3.42%**	**2.76%**	**2.56%**	**2.74%**	**3.16%**	**3.17%**	**3.44%**	**3.61%**	**3.65%**	**4.03%**	**4.35%**	**3.85%**	**3.49%**	**3.71%**
13	Median	3.36%	2.76%	2.56%	2.76%	3.14%	3.11%	3.42%	3.75%	3.60%	3.80%	3.96%	3.65%	3.37%	3.75%
14	20-Yr Treasury Yields[3]	3.47%	2.97%	2.65%	2.23%	2.55%	3.07%	3.12%	2.54%	3.62%	4.03%	4.11%	4.36%	4.91%	4.99%
15	20-Yr TIPS[3]	1.30%	0.86%	0.75%	0.66%	0.78%	0.87%	0.75%	0.21%	1.19%	1.73%	2.21%	2.19%	2.36%	2.31%
16	Implied Inflation[b]	2.15%	2.09%	1.89%	1.56%	1.75%	2.19%	2.35%	2.33%	2.40%	2.26%	1.85%	2.13%	2.49%	2.62%
17	**Real Dividend Yield[c]**	**1.25%**	**0.66%**	**0.65%**	**1.17%**	**1.38%**	**0.96%**	**1.06%**	**1.25%**	**1.22%**	**1.73%**	**2.45%**	**1.68%**	**0.97%**	**1.06%**
	Utility														
18	**Nominal "A" Rated Yield[4]**	**4.95%**	**4.18%**	**4.00%**	**3.93%**	**4.12%**	**4.28%**	**4.48%**	**4.13%**	**5.04%**	**5.46%**	**6.04%**	**6.53%**	**6.07%**	**6.07%**
19	**Real "A" Rated Yield**	**2.74%**	**2.05%**	**2.07%**	**2.34%**	**2.33%**	**2.04%**	**2.08%**	**1.76%**	**2.58%**	**3.13%**	**4.11%**	**4.31%**	**3.49%**	**3.36%**
	Spreads (Utility Bond - Stock)														
20	**Nominal[d]**	**1.52%**	**1.43%**	**1.44%**	**1.19%**	**0.96%**	**1.11%**	**1.04%**	**0.52%**	**1.39%**	**1.43%**	**1.69%**	**2.68%**	**2.59%**	**2.36%**
21	**Real[e]**	**1.49%**	**1.40%**	**1.41%**	**1.17%**	**0.94%**	**1.08%**	**1.01%**	**0.51%**	**1.36%**	**1.40%**	**1.66%**	**2.62%**	**2.52%**	**2.30%**
	Spreads (Treasury Bond - Stock)														
22	**Nominal[f]**	**0.05%**	**0.21%**	**0.09%**	**-0.52%**	**-0.61%**	**-0.10%**	**-0.32%**	**-1.06%**	**-0.03%**	**0.00%**	**-0.24%**	**0.51%**	**1.42%**	**1.28%**
23	**Real[g]**	**0.05%**	**0.20%**	**0.09%**	**-0.51%**	**-0.60%**	**-0.10%**	**-0.31%**	**-1.04%**	**-0.03%**	**0.00%**	**-0.23%**	**0.50%**	**1.39%**	**1.25%**



Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 21, 2018.
[2] The Value Line Investment Survey, August 31, 2018.
[3] St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org.
[4] www.moodys.com, Bond Yields and Key Indicators, through September 30, 2018.

Notes:
[a] Based on the average of the high and low price for 2017 and the projected 2017 Dividends Declared per share, published in The Value Line Investment Survey, August 31, 2018.
[b] Line 16 = (1 + Line 14) / (1 + Line 15) - 1.
[c] Line 17 = (1 + Line 12) / (1 +Line 16) - 1.
[d] The spread being measured here is the nominal A-rated utility bond yield over the average nominal utility dividend yield; (Line 18 - Line 12).
[e] The spread being measured here is the real A-rated utility bond yield over the average real utility dividend yield; Line 19 - Line 17)
[f] The spread being measured here is the nominal 20-Year Treasury yield over the average nominal utility dividend yield; (Line 14 - Line 12).
[g] The spread being measured here is the real 20-Year TIPS yield over the average real utility dividend yield; Line 15 - Line 17)

Vectren Energy Delivery of Ohio, Inc.

Natural Gas Utilities
(Valuation Metrics)

Line	Company	13-Year Average (1)	2018 [2] (2)	2017 (3)	2016 (4)	2015 (5)	2014 (6)	2013 (7)	2012 (8)	2011 (9)	2010 (10)	2009 (11)	2008 (12)	2007 (13)	2006 (14)
		Dividend per Share[1]													
1	Atmos Energy	1.47	1.94	1.80	1.68	1.56	1.48	1.40	1.38	1.36	1.34	1.32	1.30	1.28	1.26
2	Chesapeake Utilities	1.00	1.39	1.26	1.19	1.12	1.07	1.01	0.96	0.91	0.87	0.83	0.81	0.78	0.77
3	New Jersey Resources	0.77	1.10	1.04	0.98	0.93	0.86	0.81	0.77	0.72	0.68	0.62	0.56	0.51	0.48
4	NiSource Inc.	0.88	0.78	0.70	0.64	0.83	1.02	0.98	0.94	0.92	0.92	0.92	0.92	0.92	0.92
5	Northwest Nat. Gas	1.72	1.89	1.88	1.87	1.86	1.85	1.83	1.79	1.75	1.68	1.60	1.52	1.44	1.39
6	ONE Gas Inc.	1.39	1.84	1.68	1.40	1.20	0.84	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	South Jersey Inds.	0.81	1.15	1.10	1.06	1.02	0.96	0.90	0.83	0.75	0.68	0.61	0.56	0.51	0.46
8	Southwest Gas	1.31	2.08	1.98	1.80	1.62	1.46	1.32	1.18	1.06	1.00	0.95	0.90	0.86	0.82
9	Spire Inc.	1.72	2.25	2.10	1.96	1.84	1.76	1.70	1.66	1.61	1.57	1.53	1.49	1.45	1.40
10	UGI Corp.	0.71	1.02	0.96	0.93	0.89	0.79	0.74	0.71	0.68	0.60	0.52	0.50	0.48	0.46
11	WGL Holdings Inc.	1.62	N/A	2.02	1.93	1.83	1.72	1.66	1.59	1.55	1.50	1.47	1.41	1.37	1.35
12	**Average**	**1.20**	**1.54**	**1.50**	**1.40**	**1.34**	**1.25**	**1.24**	**1.18**	**1.13**	**1.08**	**1.04**	**1.00**	**0.96**	**0.93**
13	**Industry CAGR**	**4.32%**													

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 21, 2018.
[2] The Value Line Investment Survey, August 31, 2018.
Notes:
CAGR = Compound Annual Growth Rate

Vectren Energy Delivery of Ohio, Inc.

Natural Gas Utilities
(Valuation Metrics)

Line	Company	Cash Flow / Capital Spending 2017 (1)	2018 (2)	2019 (3)	3 - 5 yr Projection (4)
1	Atmos Energy	0.62x	0.57x	0.60x	0.61x
2	Chesapeake Utilities	0.50x	0.48x	0.60x	0.70x
3	New Jersey Resources	0.70x	1.66x	1.69x	1.79x
4	NiSource Inc.	0.41x	0.61x	0.58x	0.61x
5	Northwest Nat. Gas	0.14x	0.71x	0.85x	1.02x
6	ONE Gas Inc.	0.87x	0.87x	0.90x	1.09x
7	South Jersey Inds.	0.81x	0.89x	0.84x	0.71x
8	Southwest Gas	0.68x	0.65x	0.68x	0.81x
9	Spire Inc.	0.72x	0.80x	0.79x	0.83x
10	UGI Corp.	1.29x	1.40x	1.38x	1.38x
11	WGL Holdings Inc.	0.61x	N/A	N/A	N/A
12	Average	0.67x	0.86x	0.89x	0.95x
13	Median	0.68x	0.75x	0.81x	0.82x

Sources:
The Value Line Investment Survey Investment Analyzer Software, downloaded on July 9, 2018.
The Value Line Investment Survey, August 31, 2018.
Notes:
Based on the projected Cash Flow per share and Capital Spending per share.

Vectren Energy Delivery of Ohio, Inc.

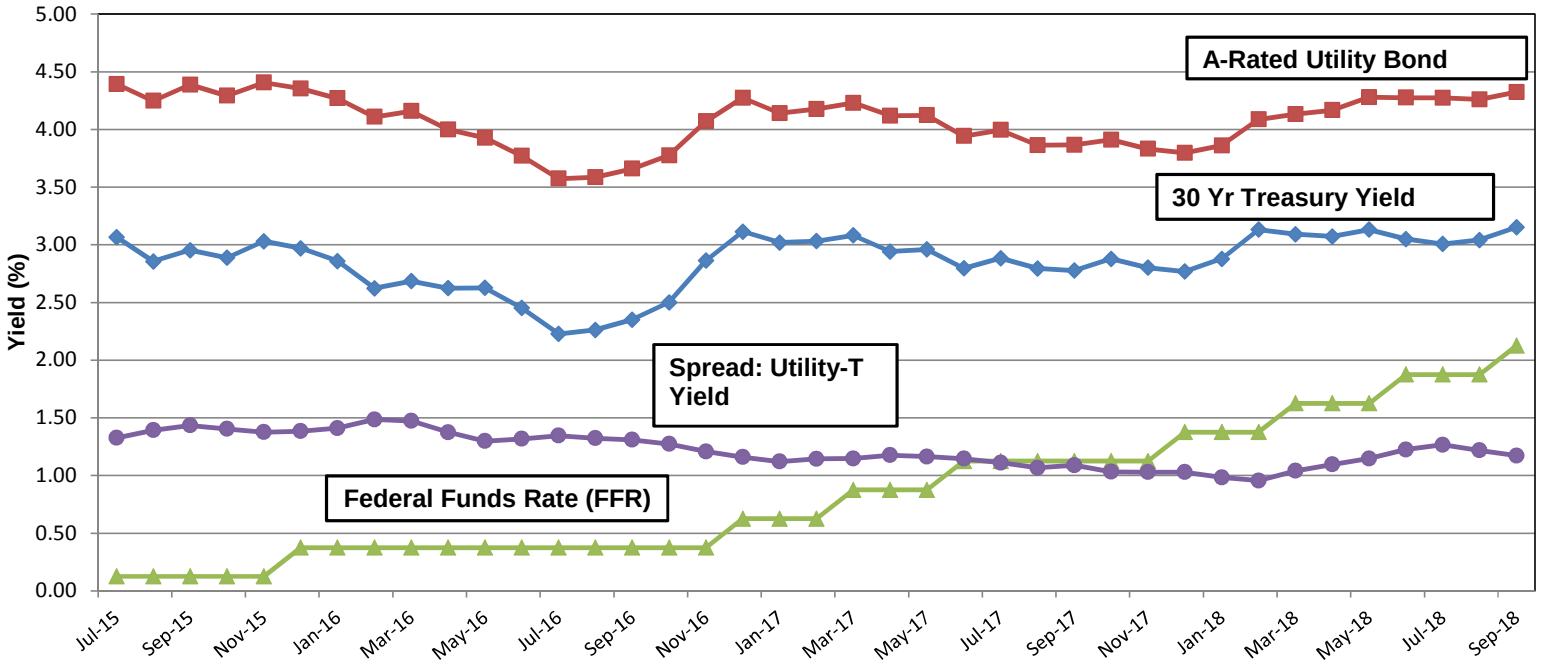
Electric Utilities
(Valuation Metrics)

Line	Company	13-Year Average (1)	2018 [2] (2)	2017 (3)	2016 (4)	2015 (5)	2014 (6)	2013 (7)	2012 (8)	2011 (9)	2010 (10)	2009 (11)	2008 (12)	2007 (13)	2006 (14)
							Earnings per Share[1]								
1	Atmos Energy	2.61	3.95	3.60	3.38	3.09	2.96	2.50	2.10	2.26	2.16	1.97	2.00	1.94	2.00
2	Chesapeake Utilities	2.08	3.15	2.68	2.86	2.68	2.47	2.26	1.99	1.91	1.82	1.43	1.39	1.29	1.15
3	New Jersey Resources	1.49	2.65	1.73	1.61	1.78	2.08	1.37	1.36	1.29	1.23	1.20	1.35	0.78	0.93
4	NiSource Inc.	1.12	1.35	0.39	1.00	0.63	1.67	1.57	1.37	1.05	1.06	0.84	1.34	1.14	1.14
5	Northwest Nat. Gas	2.05	2.25	-1.94	2.12	1.96	2.16	2.24	2.22	2.39	2.73	2.83	2.57	2.76	2.35
6	ONE Gas Inc.	2.67	3.35	3.02	2.65	2.24	2.07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	South Jersey Inds.	1.36	1.70	1.23	1.34	1.44	1.57	1.52	1.52	1.45	1.35	1.19	1.14	1.05	1.23
8	Southwest Gas	2.66	3.90	3.62	3.18	2.92	3.01	3.11	2.86	2.43	2.27	1.94	1.39	1.95	1.98
9	Spire Inc.	2.85	4.50	3.43	3.24	3.16	2.35	2.02	2.79	2.86	2.43	2.92	2.64	2.31	2.37
10	UGI Corp.	1.69	2.77	2.29	2.05	2.01	1.92	1.59	1.17	1.37	1.59	1.57	1.33	1.18	1.10
11	WGL Holdings Inc.	2.56	N/A	3.11	3.27	3.16	2.68	2.31	2.68	2.25	2.27	2.53	2.44	2.09	1.94
12	**Average**	**2.06**	**2.96**	**2.11**	**2.43**	**2.28**	**2.27**	**2.05**	**2.01**	**1.93**	**1.89**	**1.84**	**1.76**	**1.65**	**1.62**
13	**Industry CAGR**	**5.15%**													

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 21, 2018.
[2] The Value Line Investment Survey, August 31, 2018.
Notes:
CAGR = Compound Annual Growth Rate

Vectren Energy Delivery of Ohio, Inc.

Timeline of Federal Funds Rate Increases



Fed FFR Actions:

1	December 2015	0.25	→	0.50
2	December 2016	0.50	→	0.75
3	March 2017	0.75	→	1.00
4	June 2017	1.00	→	1.25
5	December 2017	1.25	→	1.50
6	March 2018	1.50	→	1.75
7	June 2018	1.75	→	2.00
8	September 2018	2.00	→	2.25

Sources:
Federal Reserve Bank of New York, https://apps.newyorkfed.org/markets/autorates/fed-funds-search-page
Board of Governors of the Federal Reserve System, https://www.federalreserve.gov/datadownload/
Moody's Credit Trends, https://credittrends.moodys.com/

Vectren Energy Delivery of Ohio, Inc.

Proxy Group

Line	Company	Credit Ratings[1] S&P (1)	Credit Ratings[1] Moody's (2)	Common Equity Ratios MI[1] (3)	Common Equity Ratios Value Line[2] (4)
1	Atmos Energy Corporation	A	A2	52.6%	56.0%
2	ONE Gas, Inc.	A	A2	55.8%	62.2%
3	South Jersey Industries, Inc.	BBB	N/A	43.7%	51.5%
4	Southwest Gas Holdings, Inc.	BBB+	Baa1	47.1%	50.2%
5	Spire Inc.	A-	Baa2	43.6%	50.0%
6	New Jersey Resources Corporation	BBB+	Aa2	46.4%	55.4%
7	Northwest Natural Gas Company [3]	A+	A3	47.1%	52.1%
8	**Average**	**A-**	**A2**	**48.1%**	**53.9%**
9	**Vectren Utility Holdings, Inc.**	**A-**[4]	**A2**[4]	**51.1%**[5]	

Sources:

[1] S&P Global Market Intelligence, Downloaded on October 16, 2018.

[2] *The Value Line Investment Survey* , August 31, 2018.

[3] NJR is not rated, so ratings of New Jersey Natural Gas Co., a wholly owned subsidiary of NJR, are used.

[4] Schedule D-5B at 3.

[5] Schedule D-1B.

Vectren Energy Delivery of Ohio, Inc.

Consensus Analysts' Growth Rates

Line	Company	Zacks Estimated Growth %[1] (1)	Zacks Number of Estimates (2)	MI Estimated Growth %[2] (3)	MI Number of Estimates (4)	Reuters Estimated Growth %[3] (5)	Reuters Number of Estimates (6)	Average of Growth Rates (7)
1	Atmos Energy Corporation	6.50%	N/A	5.50%	2	6.95%	2	6.32%
2	ONE Gas, Inc.	5.70%	N/A	5.80%	3	5.50%	2	5.67%
3	South Jersey Industries, Inc.	12.20%	N/A	12.52%	2	12.00%	1	12.24%
4	Southwest Gas Holdings, Inc.	4.00%	N/A	5.40%	3	4.00%	1	4.47%
5	Spire Inc.	4.00%	N/A	3.57%	2	3.53%	3	3.70%
6	New Jersey Resources Corporation	7.00%	N/A	6.33%	3	7.10%	3	6.81%
7	Northwest Natural Gas Company	4.30%	N/A	4.00%	2	4.50%	2	4.27%
8	**Average**	**6.24%**	**N/A**	**6.16%**	**2**	**6.23%**	**2**	**6.21%**

Sources:

[1] Zacks, http://www.zacks.com/, downloaded on October 16, 2018.

[2] S&P Global Market Intelligence, https://platform.mi.spglobal.com, downloaded on October 16, 2018.

[3] Reuters, http://www.reuters.com/, downloaded on October 16, 2018.

Vectren Energy Delivery of Ohio, Inc.

Constant Growth DCF Model
(Consensus Analysts' Growth Rates)

Line	Company	13-Week AVG Stock Price[1] (1)	Analysts' Growth[2] (2)	Annualized Dividend[3] (3)	Adjusted Yield (4)	Constant Growth DCF (5)
1	Atmos Energy Corporation	$92.64	6.32%	$1.94	2.23%	8.54%
2	ONE Gas, Inc.	$79.10	5.67%	$1.84	2.46%	8.12%
3	South Jersey Industries, Inc.	$34.03	12.24%	$1.12	3.69%	15.93%
4	Southwest Gas Holdings, Inc.	$79.03	4.47%	$2.08	2.75%	7.22%
5	Spire Inc.	$73.96	3.70%	$2.25	3.15%	6.85%
6	New Jersey Resources Corporation	$45.99	6.81%	$1.09	2.54%	9.35%
7	Northwest Natural Gas Company	$65.75	4.27%	$1.89	3.00%	7.26%
8	**Average**	**$67.21**	**6.21%**	**$1.74**	**2.83%**	**9.04%**
9	**Median**					**8.12%**

Sources:
[1] S&P Global Market Intelligence, Downloaded on October 16, 2018.
[2] Exhibit MPG-5.
[3] *The Value Line Investment Survey* , August 31, 2018.

Vectren Energy Delivery of Ohio, Inc.

Payout Ratios

Line	Company	Dividends Per Share 2017 (1)	Dividends Per Share Projected (2)	Earnings Per Share 2017 (3)	Earnings Per Share Projected (4)	Payout Ratio 2017 (5)	Payout Ratio Projected (6)
1	Atmos Energy Corporation	$1.80	$2.50	$3.60	$5.15	50.00%	48.54%
2	ONE Gas, Inc.	$1.68	$2.50	$3.02	$4.75	55.63%	52.63%
3	South Jersey Industries, Inc.	$1.10	$1.35	$1.23	$2.30	89.43%	58.70%
4	Southwest Gas Holdings, Inc.	$1.98	$2.60	$3.62	$5.40	54.70%	48.15%
5	Spire Inc.	$2.10	$2.50	$3.43	$5.00	61.22%	50.00%
6	New Jersey Resources Corporation	$1.04	$1.24	$1.73	$2.95	60.12%	42.03%
7	Northwest Natural Gas Company *	$1.88	$2.20	-$1.94	$3.50	-96.91%	62.86%
8	**Average**	**$1.65**	**$2.13**	**$2.10**	**$4.15**	**61.85%**	**51.84%**

Source and Note:
The Value Line Investment Survey , August 31, 2018.
*Northwest Natural Gas is excluded from Payout Ratio Average due to negative Earnings Per Share.

Vectren Energy Delivery of Ohio, Inc.

Sustainable Growth Rate

Line	Company	3 to 5 Year Projections: Dividends Per Share (1)	Earnings Per Share (2)	Book Value Per Share (3)	Book Value Growth (4)	ROE (5)	Adjustment Factor (6)	Adjusted ROE (7)	Payout Ratio (8)	Retention Rate (9)	Internal Growth Rate (10)	Sustainable Growth Rate (11)
1	Atmos Energy Corporation	$2.50	$5.15	$46.55	4.85%	11.06%	1.02	11.33%	48.54%	51.46%	5.83%	12.14%
2	ONE Gas, Inc.	$2.50	$4.75	$43.40	2.98%	10.94%	1.01	11.11%	52.63%	47.37%	5.26%	6.38%
3	South Jersey Industries, Inc.	$1.35	$2.30	$22.65	8.61%	10.15%	1.04	10.57%	58.70%	41.30%	4.37%	8.96%
4	Southwest Gas Holdings, Inc.	$2.60	$5.40	$52.85	6.97%	10.22%	1.03	10.56%	48.15%	51.85%	5.48%	7.62%
5	Spire Inc.	$2.50	$5.00	$48.10	3.12%	10.40%	1.02	10.55%	50.00%	50.00%	5.28%	7.38%
6	New Jersey Resources Corporation	$1.24	$2.95	$22.70	9.64%	13.00%	1.05	13.59%	42.03%	57.97%	7.88%	7.97%
7	Northwest Natural Gas Company	$2.20	$3.50	$29.40	2.61%	11.90%	1.01	12.06%	62.86%	37.14%	4.48%	7.83%
8	**Average**	**$2.13**	**$4.15**	**$37.95**	**5.54%**	**11.10%**	**1.03**	**11.40%**	**51.84%**	**48.16%**	**5.51%**	**8.33%**

Sources and Notes:
Cols. (1), (2) and (3): *The Value Line Investment Survey* , August 31, 2018.
Col. (4): [Col. (3) / Page 2 Col. (2)] ^ (1/number of years projected) - 1.
Col. (5): Col. (2) / Col. (3).
Col. (6): [2 * (1 + Col. (4))] / (2 + Col. (4)).
Col. (7): Col. (6) * Col. (5).
Col. (8): Col. (1) / Col. (2).
Col. (9): 1 - Col. (8).
Col. (10): Col. (9) * Col. (7).
Col. (11): Col. (10) + Page 2 Col. (9).

Vectren Energy Delivery of Ohio, Inc.

Sustainable Growth Rate

Line	Company	13-Week Average Stock Price[1] (1)	2017 Book Value Per Share[2] (2)	Market to Book Ratio (3)	Common Shares Outstanding (in Millions)[2] 2017 (4)	Common Shares Outstanding (in Millions)[2] 3-5 Years (5)	Growth (6)	S Factor[3] (7)	V Factor[4] (8)	S * V (9)
1	Atmos Energy Corporation	$92.64	$36.74	2.52	106.10	130.00	4.15%	10.46%	60.34%	6.31%
2	ONE Gas, Inc.	$79.10	$37.47	2.11	52.31	55.00	1.01%	2.13%	52.63%	1.12%
3	South Jersey Industries, Inc.	$34.03	$14.99	2.27	79.55	95.00	3.61%	8.20%	55.95%	4.59%
4	Southwest Gas Holdings, Inc.	$79.03	$37.74	2.09	48.09	53.00	1.96%	4.11%	52.25%	2.15%
5	Spire Inc.	$73.96	$41.26	1.79	48.26	55.00	2.65%	4.75%	44.21%	2.10%
6	New Jersey Resources Corporation	$45.99	$14.33	3.21	86.32	86.50	0.04%	0.13%	68.84%	0.09%
7	Northwest Natural Gas Company	$65.75	$25.85	2.54	28.74	32.00	2.17%	5.52%	60.68%	3.35%
8	**Average**	**$67.21**	**$29.77**	**2.36**	**64.20**	**72.36**	**2.23%**	**5.04%**	**56.41%**	**2.82%**

Sources and Notes:

[1] S&P Global Market Intelligence, Downloaded on October 16, 2018.

[2] *The Value Line Investment Survey* , August 31, 2018.

[3] Expected Growth in the Number of Shares, Column (3) * Column (6).

[4] Expected Profit of Stock Investment, [1 - 1 / Column (3)].

Vectren Energy Delivery of Ohio, Inc.

Constant Growth DCF Model
(Sustainable Growth Rate)

Line	Company	13-Week AVG Stock Price[1] (1)	Sustainable Growth[2] (2)	Annualized Dividend[3] (3)	Adjusted Yield (4)	Constant Growth DCF (5)
1	Atmos Energy Corporation	$92.64	12.14%	$1.94	2.35%	14.48%
2	ONE Gas, Inc.	$79.10	6.38%	$1.84	2.47%	8.85%
3	South Jersey Industries, Inc.	$34.03	8.96%	$1.12	3.59%	12.54%
4	Southwest Gas Holdings, Inc.	$79.03	7.62%	$2.08	2.83%	10.46%
5	Spire Inc.	$73.96	7.38%	$2.25	3.27%	10.64%
6	New Jersey Resources Corporation	$45.99	7.97%	$1.09	2.56%	10.54%
7	Northwest Natural Gas Company	$65.75	7.83%	$1.89	3.10%	10.93%
8	**Average**	**$67.21**	**8.33%**	**$1.74**	**2.88%**	**11.21%**
9	**Median**					**10.64%**

Sources:

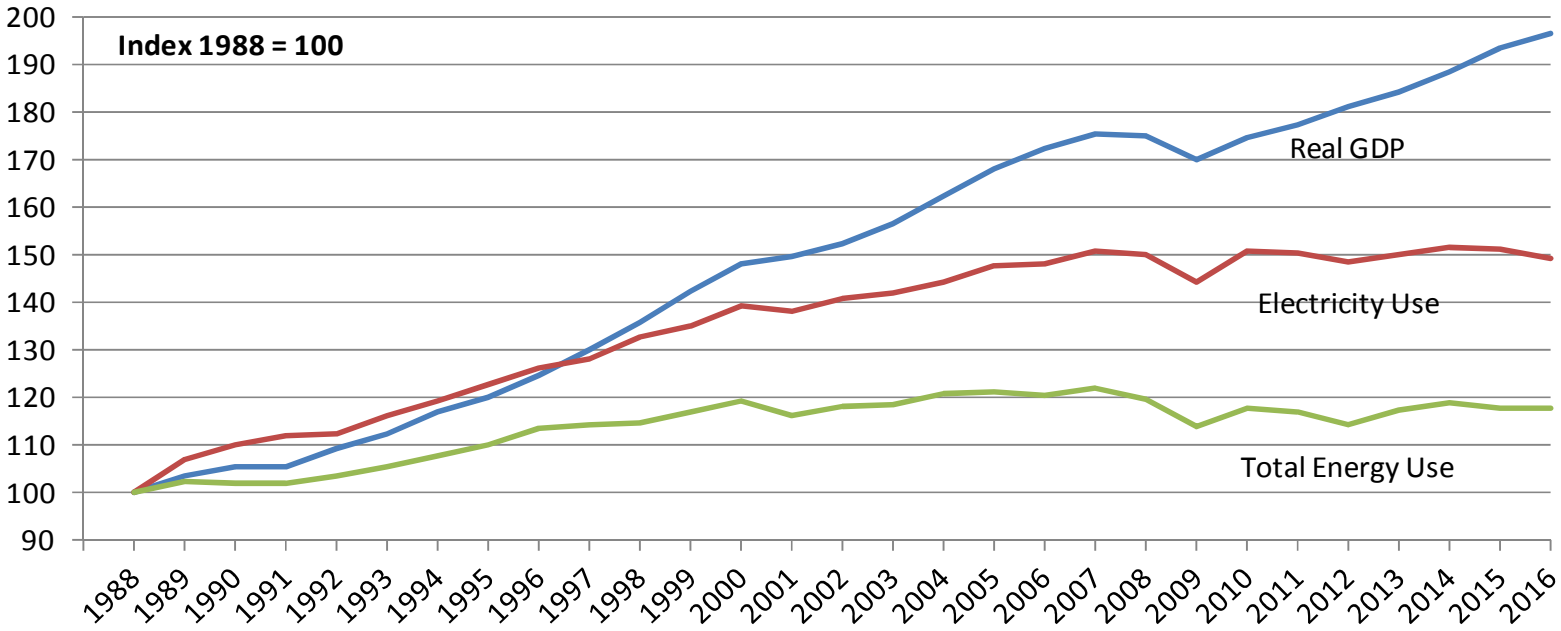
[1] S&P Global Market Intelligence, Downloaded on October 16, 2018.

[2] Exhibit MPG-8, page 1.

[3] *The Value Line Investment Survey*, August 31, 2018.

Vectren Energy Delivery of Ohio, Inc.

Electricity Sales Are Linked to U.S. Economic Growth



Note:
1988 represents the base year. Graph depicts increases or decreases from the base year.

Sources:
U.S. Energy Information Administration
Federal Reserve Bank of St. Louis

Vectren Energy Delivery of Ohio, Inc.

Multi-Stage Growth DCF Model

Line	Company	13-Week AVG Stock Price[1] (1)	Annualized Dividend[2] (2)	First Stage Growth[3] (3)	Second Stage Growth Year 6 (4)	Year 7 (5)	Year 8 (6)	Year 9 (7)	Year 10 (8)	Third Stage Growth[4] (9)	Multi-Stage Growth DCF (10)
1	Atmos Energy Corporation	$92.64	$1.94	6.32%	5.95%	5.58%	5.21%	4.84%	4.47%	4.10%	6.60%
2	ONE Gas, Inc.	$79.10	$1.84	5.67%	5.41%	5.14%	4.88%	4.62%	4.36%	4.10%	6.77%
3	South Jersey Industries, Inc.	$34.03	$1.12	12.24%	10.88%	9.53%	8.17%	6.81%	5.46%	4.10%	9.68%
4	Southwest Gas Holdings, Inc.	$79.03	$2.08	4.47%	4.41%	4.34%	4.28%	4.22%	4.16%	4.10%	6.89%
5	Spire Inc.	$73.96	$2.25	3.70%	3.77%	3.83%	3.90%	3.97%	4.03%	4.10%	7.18%
6	New Jersey Resources Corporation	$45.99	$1.09	6.81%	6.36%	5.91%	5.46%	5.00%	4.55%	4.10%	7.04%
7	Northwest Natural Gas Company	$65.75	$1.89	4.27%	4.24%	4.21%	4.18%	4.16%	4.13%	4.10%	7.12%
8	**Average**	**$67.21**	**$1.74**	**6.21%**	**5.86%**	**5.51%**	**5.15%**	**4.80%**	**4.45%**	**4.10%**	**7.32%**
9	**Median**										**7.04%**

Sources:

[1] S&P Global Market Intelligence, Downloaded on October 16, 2018.

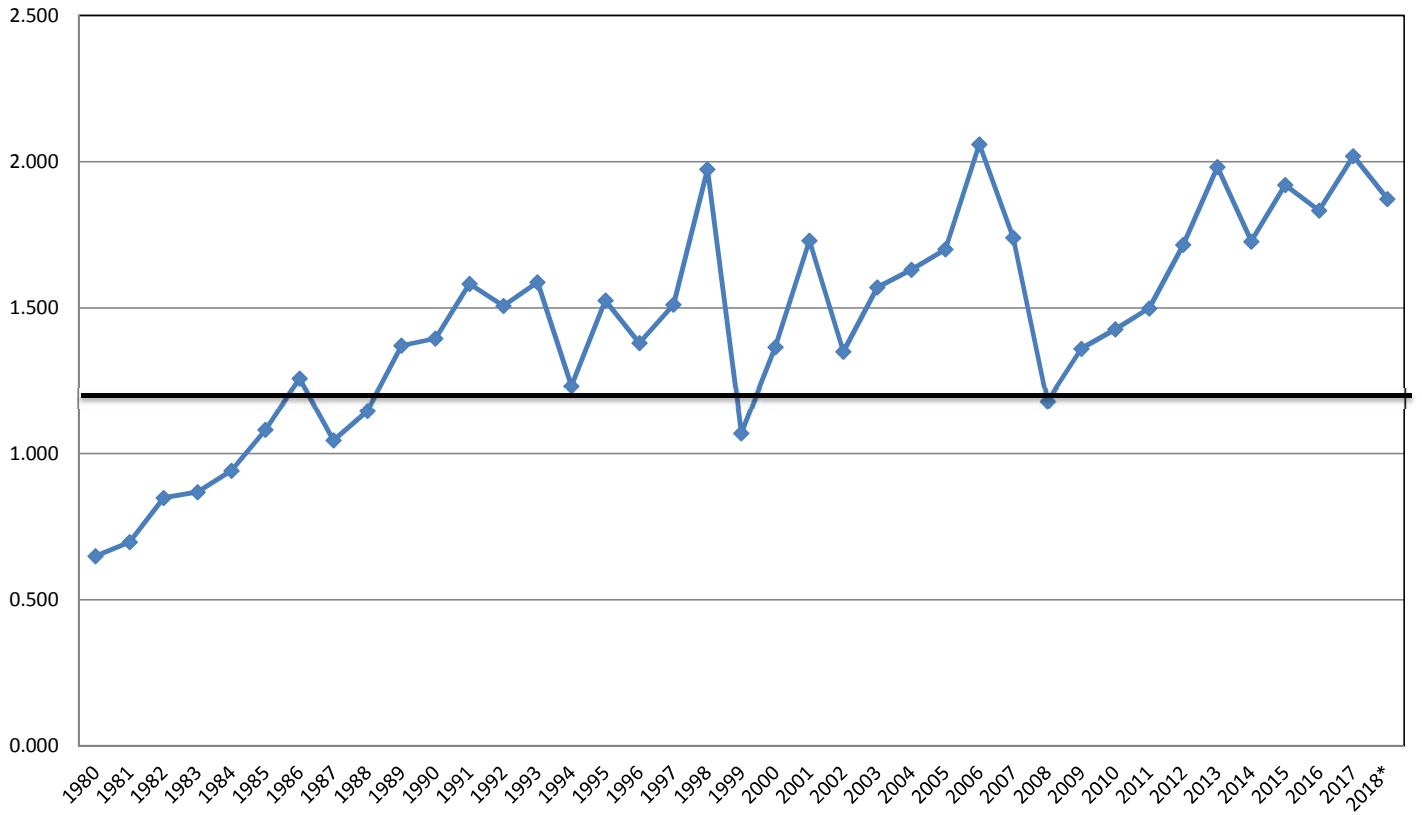
[2] *The Value Line Investment Survey*, August 31, 2018.

[3] Exhibit MPG-5.

[4] *Blue Chip Economic Indicators*, October 10, 2018 at 14.

Vectren Energy Delivery of Ohio, Inc.

Common Stock Market/Book Ratio



Source:
1980 - 2000: Mergent Public Utility Manual.
2001 - 2015: AUS Utility Reports, multiple dates.
2016 - 2017: Value Line Investment Survey, multiple dates.
* Value Line Investment Survey Reports, July 27, August 17, August 31, and September 14, 2018.

Vectren Energy Delivery of Ohio, Inc.

Equity Risk Premium - Treasury Bond

Line	Year	Authorized Gas Returns[1] (1)	30 yr. Treasury Bond Yield[2] (2)	Indicated Risk Premium (3)	Rolling 5 - Year Average (4)	Rolling 10 - Year Average (5)
1	1986	13.46%	7.80%	5.66%		
2	1987	12.74%	8.58%	4.16%		
3	1988	12.85%	8.96%	3.89%		
4	1989	12.88%	8.45%	4.43%		
5	1990	12.67%	8.61%	4.06%	4.44%	
6	1991	12.46%	8.14%	4.32%	4.17%	
7	1992	12.01%	7.67%	4.34%	4.21%	
8	1993	11.35%	6.60%	4.75%	4.38%	
9	1994	11.35%	7.37%	3.98%	4.29%	
10	1995	11.43%	6.88%	4.55%	4.39%	4.42%
11	1996	11.19%	6.70%	4.49%	4.42%	4.30%
12	1997	11.29%	6.61%	4.68%	4.49%	4.35%
13	1998	11.51%	5.58%	5.93%	4.73%	4.55%
14	1999	10.66%	5.87%	4.79%	4.89%	4.59%
15	2000	11.39%	5.94%	5.45%	5.07%	4.73%
16	2001	10.95%	5.49%	5.46%	5.26%	4.84%
17	2002	11.03%	5.43%	5.60%	5.45%	4.97%
18	2003	10.99%	4.96%	6.03%	5.47%	5.10%
19	2004	10.59%	5.05%	5.54%	5.62%	5.25%
20	2005	10.46%	4.65%	5.81%	5.69%	5.38%
21	2006	10.40%	4.90%	5.50%	5.70%	5.48%
22	2007	10.22%	4.83%	5.39%	5.66%	5.55%
23	2008	10.39%	4.28%	6.11%	5.67%	5.57%
24	2009	10.22%	4.07%	6.15%	5.79%	5.70%
25	2010	10.15%	4.25%	5.90%	5.81%	5.75%
26	2011	9.92%	3.91%	6.01%	5.91%	5.80%
27	2012	9.94%	2.92%	7.02%	6.24%	5.95%
28	2013	9.68%	3.45%	6.23%	6.26%	5.97%
29	2014	9.78%	3.34%	6.44%	6.32%	6.06%
30	2015	9.60%	2.84%	6.76%	6.49%	6.15%
31	2016	9.54%	2.60%	6.94%	6.68%	6.29%
32	2017	9.72%	2.90%	6.83%	6.64%	6.44%
33	2018 [3]	9.62%	3.06%	6.56%	6.71%	6.48%
34	**Average**	**10.98%**	**5.54%**	**5.45%**	**5.41%**	**5.40%**
35	**Minimum**				**4.17%**	**4.30%**
36	**Maximum**				**6.71%**	**6.48%**

Sources:

[1] *Regulatory Research Associates, Inc*., Regulatory Focus, Major Rate Case Decisions, Jan. 1997 p. 5, and Jan. 2011 p. 3. *S&P Global Market Intelligence*, RRA Regulatory Focus, Major Rate Case Decisions, January-September 2018, October 11, 2018, p. 9.

[2] St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org/.
The yields from 2002 to 2005 represent the 20-Year Treasury yields obtained from the Federal Reserve Bank.

[3] Data includes January - September, 2018.

Vectren Energy Delivery of Ohio, Inc.

Equity Risk Premium - Utility Bond

Line	Year	Authorized Gas Returns[1] (1)	Average "A" Rated Utility Bond Yield[2] (2)	Indicated Risk Premium (3)	Rolling 5 - Year Average (4)	Rolling 10 - Year Average (5)
1	1986	13.46%	9.58%	3.88%		
2	1987	12.74%	10.10%	2.64%		
3	1988	12.85%	10.49%	2.36%		
4	1989	12.88%	9.77%	3.11%		
5	1990	12.67%	9.86%	2.81%	2.96%	
6	1991	12.46%	9.36%	3.10%	2.80%	
7	1992	12.01%	8.69%	3.32%	2.94%	
8	1993	11.35%	7.59%	3.76%	3.22%	
9	1994	11.35%	8.31%	3.04%	3.21%	
10	1995	11.43%	7.89%	3.54%	3.35%	3.16%
11	1996	11.19%	7.75%	3.44%	3.42%	3.11%
12	1997	11.29%	7.60%	3.69%	3.49%	3.22%
13	1998	11.51%	7.04%	4.47%	3.64%	3.43%
14	1999	10.66%	7.62%	3.04%	3.64%	3.42%
15	2000	11.39%	8.24%	3.15%	3.56%	3.45%
16	2001	10.95%	7.76%	3.19%	3.51%	3.46%
17	2002	11.03%	7.37%	3.66%	3.50%	3.50%
18	2003	10.99%	6.58%	4.41%	3.49%	3.56%
19	2004	10.59%	6.16%	4.43%	3.77%	3.70%
20	2005	10.46%	5.65%	4.81%	4.10%	3.83%
21	2006	10.40%	6.07%	4.33%	4.33%	3.92%
22	2007	10.22%	6.07%	4.15%	4.43%	3.96%
23	2008	10.39%	6.53%	3.86%	4.32%	3.90%
24	2009	10.22%	6.04%	4.18%	4.27%	4.02%
25	2010	10.15%	5.47%	4.68%	4.24%	4.17%
26	2011	9.92%	5.04%	4.88%	4.35%	4.34%
27	2012	9.94%	4.13%	5.81%	4.68%	4.55%
28	2013	9.68%	4.48%	5.20%	4.95%	4.63%
29	2014	9.78%	4.28%	5.50%	5.22%	4.74%
30	2015	9.60%	4.12%	5.48%	5.38%	4.81%
31	2016	9.54%	3.93%	5.61%	5.52%	4.94%
32	2017	9.72%	4.00%	5.72%	5.50%	5.09%
33	2018 [3]	9.62%	4.18%	5.44%	5.55%	5.25%
34	**Average**	**10.98%**	**6.90%**	**4.08%**	**4.05%**	**4.01%**
35	**Minimum**				**2.80%**	**3.11%**
36	**Maximum**				**5.55%**	**5.25%**

Sources:

[1] *Regulatory Research Associates, Inc* ., Regulatory Focus, Major Rate Case Decisions, Jan. 1997 p. 5, and Jan. 2011 p. 3.
S&P Global Market Intelligence , RRA Regulatory Focus, Major Rate Case Decisions, January-September 2018, October 11, 2018, p. 9.

[2] Mergent Public Utility Manual, Mergent Weekly News Reports, 2003.
The utility yields for the period 2001-2009 were obtained from the Mergent Bond Record.
The utility yields from 2010-2017 were obtained from http://credittrends.moodys.com/.

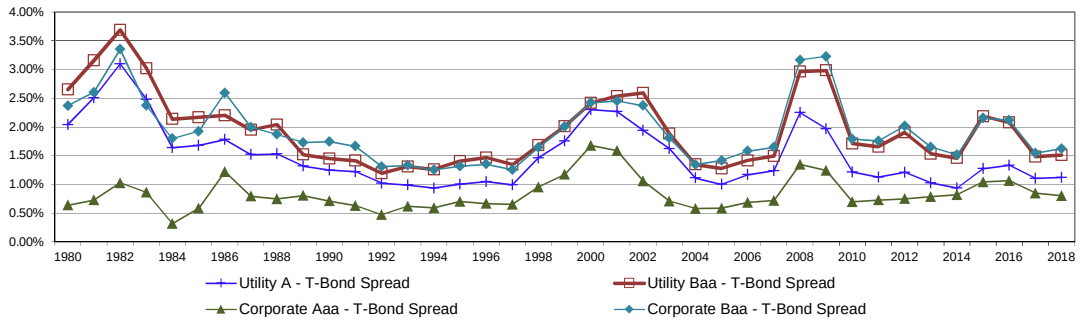
[3] Data includes January - September, 2018.

Vectren Energy Delivery of Ohio, Inc.

Bond Yield Spreads

Line	Year	T-Bond Yield[1] (1)	Public Utility Bond A[2] (2)	Public Utility Bond Baa[2] (3)	Public Utility Bond A-T-Bond Spread (4)	Public Utility Bond Baa-T-Bond Spread (5)	Corporate Bond Aaa[3] (6)	Corporate Bond Baa[3] (7)	Corporate Bond Aaa-T-Bond Spread (8)	Corporate Bond Baa-T-Bond Spread (9)	Utility to Corporate Baa Spread (10)	Utility to Corporate A-Aaa Spread (11)
1	1980	11.30%	13.34%	13.95%	2.04%	2.65%	11.94%	13.67%	0.64%	2.37%	0.28%	1.40%
2	1981	13.44%	15.95%	16.60%	2.51%	3.16%	14.17%	16.04%	0.73%	2.60%	0.56%	1.78%
3	1982	12.76%	15.86%	16.45%	3.10%	3.69%	13.79%	16.11%	1.03%	3.35%	0.34%	2.07%
4	1983	11.18%	13.66%	14.20%	2.48%	3.02%	12.04%	13.55%	0.86%	2.38%	0.65%	1.62%
5	1984	12.39%	14.03%	14.53%	1.64%	2.14%	12.71%	14.19%	0.32%	1.80%	0.34%	1.32%
6	1985	10.79%	12.47%	12.96%	1.68%	2.17%	11.37%	12.72%	0.58%	1.93%	0.24%	1.10%
7	1986	7.80%	9.58%	10.00%	1.78%	2.20%	9.02%	10.39%	1.22%	2.59%	-0.39%	0.56%
8	1987	8.58%	10.10%	10.53%	1.52%	1.95%	9.38%	10.58%	0.80%	2.00%	-0.05%	0.72%
9	1988	8.96%	10.49%	11.00%	1.53%	2.04%	9.71%	10.83%	0.75%	1.87%	0.17%	0.78%
10	1989	8.45%	9.77%	9.97%	1.32%	1.52%	9.26%	10.18%	0.81%	1.73%	-0.21%	0.51%
11	1990	8.61%	9.86%	10.06%	1.25%	1.45%	9.32%	10.36%	0.71%	1.75%	-0.30%	0.54%
12	1991	8.14%	9.36%	9.55%	1.22%	1.41%	8.77%	9.80%	0.63%	1.67%	-0.25%	0.59%
13	1992	7.67%	8.69%	8.86%	1.02%	1.19%	8.14%	8.98%	0.47%	1.31%	-0.12%	0.55%
14	1993	6.60%	7.59%	7.91%	0.99%	1.31%	7.22%	7.93%	0.62%	1.33%	-0.02%	0.37%
15	1994	7.37%	8.31%	8.63%	0.94%	1.26%	7.96%	8.62%	0.59%	1.25%	0.01%	0.35%
16	1995	6.88%	7.89%	8.29%	1.01%	1.41%	7.59%	8.20%	0.71%	1.32%	0.09%	0.30%
17	1996	6.70%	7.75%	8.17%	1.05%	1.47%	7.37%	8.05%	0.67%	1.35%	0.12%	0.38%
18	1997	6.61%	7.60%	7.95%	0.99%	1.34%	7.26%	7.86%	0.66%	1.26%	0.09%	0.34%
19	1998	5.58%	7.04%	7.26%	1.46%	1.68%	6.53%	7.22%	0.95%	1.64%	0.04%	0.51%
20	1999	5.87%	7.62%	7.88%	1.75%	2.01%	7.04%	7.87%	1.18%	2.01%	0.01%	0.58%
21	2000	5.94%	8.24%	8.36%	2.30%	2.42%	7.62%	8.36%	1.68%	2.42%	-0.01%	0.62%
22	2001	5.49%	7.76%	8.03%	2.27%	2.54%	7.08%	7.95%	1.59%	2.45%	0.08%	0.68%
23	2002	5.43%	7.37%	8.02%	1.94%	2.59%	6.49%	7.80%	1.06%	2.37%	0.22%	0.88%
24	2003	4.96%	6.58%	6.84%	1.62%	1.89%	5.67%	6.77%	0.71%	1.81%	0.08%	0.91%
25	2004	5.05%	6.16%	6.40%	1.11%	1.35%	5.63%	6.39%	0.58%	1.35%	0.00%	0.53%
26	2005	4.65%	5.65%	5.93%	1.00%	1.28%	5.24%	6.06%	0.59%	1.42%	-0.14%	0.41%
27	2006	4.90%	6.07%	6.32%	1.17%	1.42%	5.59%	6.48%	0.69%	1.58%	-0.16%	0.48%
28	2007	4.83%	6.07%	6.33%	1.24%	1.50%	5.56%	6.48%	0.72%	1.65%	-0.15%	0.52%
29	2008	4.28%	6.53%	7.25%	2.25%	2.97%	5.63%	7.45%	1.35%	3.17%	-0.20%	0.90%
30	2009	4.07%	6.04%	7.06%	1.97%	2.99%	5.31%	7.30%	1.24%	3.23%	-0.24%	0.73%
31	2010	4.25%	5.47%	5.96%	1.22%	1.71%	4.95%	6.04%	0.70%	1.79%	-0.08%	0.52%
32	2011	3.91%	5.04%	5.57%	1.13%	1.66%	4.64%	5.67%	0.73%	1.76%	-0.10%	0.40%
33	2012	2.92%	4.13%	4.83%	1.21%	1.90%	3.67%	4.94%	0.75%	2.02%	-0.11%	0.46%
34	2013	3.45%	4.48%	4.98%	1.03%	1.53%	4.24%	5.10%	0.79%	1.65%	-0.12%	0.24%
35	2014	3.34%	4.28%	4.80%	0.94%	1.46%	4.16%	4.86%	0.82%	1.52%	-0.06%	0.12%
36	2015	2.84%	4.12%	5.03%	1.27%	2.19%	3.89%	5.00%	1.05%	2.16%	0.03%	0.23%
37	2016	2.60%	3.93%	4.67%	1.33%	2.08%	3.66%	4.71%	1.07%	2.12%	-0.04%	0.27%
38	2017	2.90%	4.00%	4.38%	1.10%	1.48%	3.74%	4.44%	0.85%	1.55%	-0.06%	0.26%
39	2018[4]	3.06%	4.18%	4.57%	1.12%	1.51%	3.87%	4.68%	0.80%	1.62%	-0.11%	0.32%
40	**Average**	**6.53%**	**8.03%**	**8.46%**	**1.50%**	**1.94%**	**7.36%**	**8.45%**	**0.84%**	**1.93%**	**0.01%**	**0.66%**

Yield Spreads
Treasury Vs. Corporate & Treasury Vs. Utility



Sources:

[1] St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org/.

[2] The utility yields for the period 1980-2000 were obtained from Mergent Public Utility Manual, Mergent Weekly News Reports, 2003.
The utility yields for the period 2001-2009 were obtained from the Mergent Bond Record.
The utility yields for the period 2010-2017 were obtained from http://credittrends.moodys.com/.

[3] The corporate yields for the period 1980-2009 were obtained from the St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org/.
The corporate yields from 2010-2017 were obtained from http://credittrends.moodys.com/.

[4] Data includes January - September, 2018.

Vectren Energy Delivery of Ohio, Inc.

Treasury and Utility Bond Yields

Line	Date	Treasury Bond Yield[1] (1)	"A" Rated Utility Bond Yield[2] (2)	"Baa" Rated Utility Bond Yield[2] (3)
1	10/12/18	3.32%	4.42%	4.88%
2	10/05/18	3.40%	4.52%	4.94%
3	09/28/18	3.19%	4.33%	4.75%
4	09/21/18	3.20%	4.36%	4.77%
5	09/14/18	3.13%	4.30%	4.74%
6	09/07/18	3.11%	4.29%	4.72%
7	08/31/18	3.02%	4.24%	4.64%
8	08/24/18	2.97%	4.21%	4.59%
9	08/17/18	3.03%	4.25%	4.64%
10	08/10/18	3.03%	4.22%	4.61%
11	08/03/18	3.09%	4.30%	4.68%
12	07/27/18	3.09%	4.32%	4.70%
13	07/20/18	3.03%	4.29%	4.67%
14	**Average**	**3.12%**	**4.31%**	**4.72%**
15	**Spread To Treasury**		**1.19%**	**1.60%**

Sources:
[1] St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org.
[2] http://credittrends.moodys.com/.

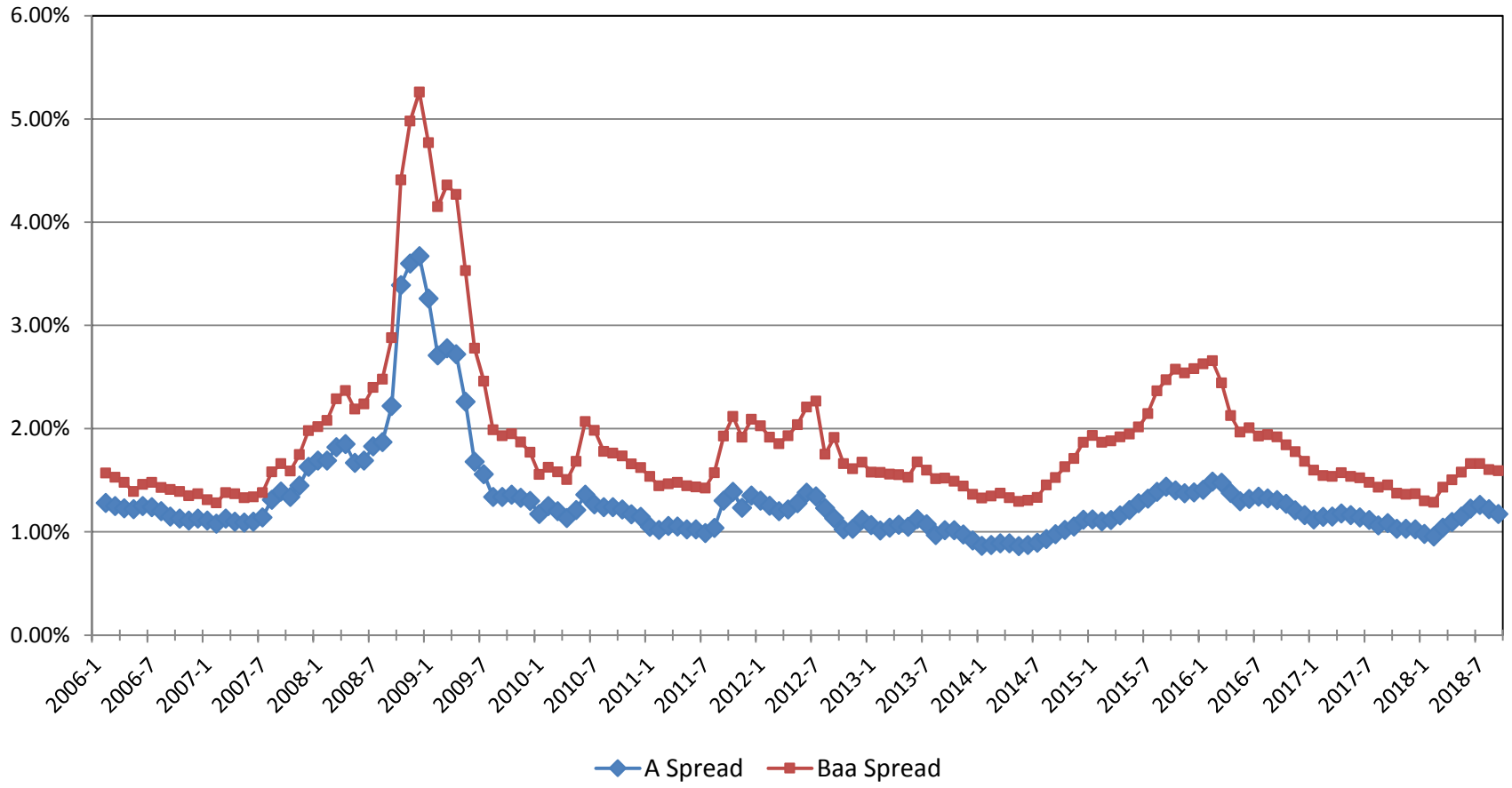
Vectren Energy Delivery of Ohio, Inc.

Trends in Bond Yields

Sources:
Mergent Bond Record.
www.moodys.com, Bond Yields and Key Indicators.
St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org/

Vectren Energy Delivery of Ohio, Inc.

Yield Spread Between Utility Bonds and 30-Year Treasury Bonds



Sources:
Mergent Bond Record.
www.moodys.com, Bond Yields and Key Indicators.
St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org/

Vectren Energy Delivery of Ohio, Inc.

Value Line Beta

Line	Company	Beta
1	Atmos Energy Corporation	0.60
2	ONE Gas, Inc.	0.65
3	South Jersey Industries, Inc.	0.75
4	Southwest Gas Holdings, Inc.	0.75
5	Spire Inc.	0.65
6	New Jersey Resources Corporation	0.70
7	Northwest Natural Gas Company	0.65
8	**Average**	**0.68**

Source:
The Value Line Investment Survey,
August 31, 2018.

Vectren Energy Delivery of Ohio, Inc.

CAPM Return

Line	Description	High Market Risk Premium (1)	Low Market Risk Premium (2)
1	Risk-Free Rate[1]	3.60%	3.60%
2	Risk Premium[2]	7.90%	6.10%
3	Beta[3]	0.68	0.68
4	**CAPM**	**8.96%**	**7.74%**

Sources:

[1] *Blue Chip Financial Forecasts*, October 1, 2018, at 2.

[2] *Duff & Phelps, 2018 SBBI Yearbook* at 6-17 and 6-18, and *Duff & Phelps, 2018 Valuation Handbook* at 3-33 and 3-45.

[3] Exhibit MPG-17.

Vectren Energy Delivery of Ohio, Inc.

Standard & Poor's Credit Metrics

(December 31, 2017)

Line	Description	Retail Cost of Service Amount (1)	S&P Benchmark (Medial Volatility)[1] Intermediate (2)	Significant (3)	Aggressive (4)	Reference (5)
1	Rate Base	$ 627,591,444				Schedule A-1.
2	Weighted Common Return	4.75%				Page 2, Line 2, Col. 3.
3	Pre-Tax Rate of Return	8.81%				Page 2, Line 3, Col. 4.
4	Income to Common	$ 29,801,476				Line 1 x Line 2.
5	EBIT	$ 55,296,269				Line 1 x Line 3.
6	Depreciation & Amortization	$ 36,853,846				Schedule C-1.
7	Imputed Amortization*	$ 1,660,424				S&P, Capital IQ, downloaded October 25, 2018.
8	Capitalized Interest*	$ (4,336,613)				S&P, Capital IQ, downloaded October 25, 2018.
9	Deferred Income Taxes & ITC	$ 4,628,163				Schedule C-2.
10	Funds from Operations (FFO)	$ 68,607,295				Sum of Line 4 and Lines 6 through 8.
11	Imputed Interest Expense*	$ 341,090				S&P, Capital IQ, downloaded October 25, 2018.
12	EBITDA	$ 94,151,629				Sum of Lines 5 through 7 and Line 10.
13	Total Adjusted Debt Ratio	51%				Page 3, Line 3, Col. 2.
14	Debt to EBITDA	3.4x	2.5x - 3.5x	3.5x - 4.5x	4.5x - 5.5x	(Line 1 x Line 12) / Line 11.
15	FFO to Total Debt	22%	23% - 35%	13% - 23%	9% - 13%	Line 9 / (Line 1 x Line 12).
16	Indicative Credit Rating		**A**	**A-**	**BBB**	S&P Methodology, November 19, 2013

Sources:
Standard & Poor's: "Criteria: Corporate Methodology," November 19, 2013.

Note:
Based on the October 2018 S&P report, VEHC has an "Excellent" business profile and an "Intermediate" financial profile, and falls under the 'Medial Volatility' matrix, and an A- bond rating.

S&P Business/Financial Risk Profile Metrix			
Business Risk	**Financial Risk Profile**		
	Intermediate	**Significant**	**Aggressive**
Excellent	**A**	**A-**	**BBB**
Strong	**A-**	**BBB**	**BB**
Satisfactory	**BBB**	**BB+**	**BB-**

Vectren Energy Delivery of Ohio, Inc.

Standard & Poor's Credit Metrics
(Pre-Tax Rate of Return)

Line	Description	Weight[1] (1)	Cost (2)	Weighted Cost (3)	Pre-Tax Weighted Cost (4)
1	Long-Term Debt	48.94%	5.07%	2.48%	2.48%
2	Common Equity	51.06%	**9.30%**	4.75%	6.33%
3	Total	**100.00%**		**7.23%**	**8.81%**
4	Tax Conversion Factor[2]				1.3330

Sources:
[1]Schedule D-1.
[2]Schedule A-1.

Vectren Energy Delivery of Ohio, Inc.

Standard & Poor's Credit Metrics
(Financial Capital Structure)

Line	Description	Amount[1] (1)	Weight (2)
1	Long-Term Debt	$ 1,817	47.2%
2	Debt Adjustments[2]	$ 141	3.7%
3	Total Long-Term Debt	$ 1,958	50.8%
4	Common Equity	$ 1,896	49.2%
5	**Total**	**$ 3,854**	**100.0%**

Sources:
[1]Schedule D-1.
[2]Standard & Poor's, Capital IQ, downloaded October 25, 2018.

Vectren Energy Delivery of Ohio, Inc.

S&P Adjusted Debt Ratio
Operating Subsidiaries of Value Line Electric and Gas Utilities
(Industry Medians)

		% Distribution of 9 Year Average		
Rating	**Median**	**<50**	**50 to 55**	**>55**
AA-	45.19%	100%	0%	0%
A+	55.17%	0%	0%	100%
A	51.50%	42%	42%	17%
A-	53.33%	35%	35%	31%
BBB+	52.88%	8%	63%	29%
BBB	53.49%	30%	30%	40%
BBB-	56.88%	10%	30%	60%

Sources:
S&P Capital IQ, downloaded November 30, 2017.

Vectren Energy Delivery of Ohio, Inc.

DCF Cost of Equity of the Expanded Sample

Panel A: Simple DCF Method (Quarterly)

Line	Company	Stock Price (1)	Most Recent Dividend (2)	Quarterly Dividend Yield (t+1) (3)	Combined Long-Term Growth Rate (4)	Quarterly Growth Rate (5)	DCF Cost of Equity (6)
1	Atmos Energy	$81.51	$0.49	0.60%	5.4%	1.3%	7.9%
2	Chesapeake Utilities	$72.90	$0.33	0.46%	12.2%	2.9%	14.2%
3	ONE Gas Inc.	$69.72	$0.42	0.61%	7.0%	1.7%	9.6%
4	South Jersey Inds.	$29.55	$0.28	0.98%	14.8%	3.5%	19.3%
5	Southwest Gas	$75.01	$0.50	0.67%	7.8%	1.9%	10.7%
6	Spire Inc.	$68.72	$0.56	0.83%	4.7%	1.2%	8.2%
7	New Jersey Resources	$39.29	$0.27	0.70%	1.9%	0.5%	4.8%
8	Northwest Natural Gas	$57.07	$0.47	0.85%	8.8%	2.1%	12.4%
9	WGL Holdings Inc.	$84.73	$0.51	0.60%	-0.4%	-0.1%	2.1%
10	Average						9.9%
11	Median						9.6%

Source:
Schedule D5.6

Vectren Energy Delivery of Ohio, Inc.

DCF Cost of Equity of the Expanded Sample

Panel B: Multi-Stage DCF (Using Blue Chip Economic Indicators, October 2017 U.S. GDP Growth Forecast as the Perpetual Rate)

Line	Company	Stock Price (1)	Most Recent Dividend (2)	Combined Long-Term Growth Rate (3)	Growth Rate: Year 6 (4)	Growth Rate: Year 7 (5)	Growth Rate: Year 8 (6)	Growth Rate: Year 9 (7)	Growth Rate: Year 10 (8)	GDP Long-Term Growth Rate (9)	DCF Cost of Equity (10)
1	Atmos Energy	$81.51	$0.49	5.41%	5.21%	5.01%	4.80%	4.60%	4.40%	4.20%	6.9%
2	Chesapeake Utilities	$72.90	$0.33	12.20%	10.87%	9.53%	8.20%	6.87%	5.53%	4.20%	7.3%
3	ONE Gas Inc.	$69.72	$0.42	6.95%	6.50%	6.04%	5.58%	5.12%	4.66%	4.20%	7.2%
4	South Jersey Inds.	$29.55	$0.28	14.84%	13.06%	11.29%	9.52%	7.75%	5.97%	4.20%	11.6%
5	Southwest Gas	$75.01	$0.50	7.83%	7.23%	6.62%	6.02%	5.41%	4.81%	4.20%	7.7%
6	Spire Inc.	$68.72	$0.56	4.71%	4.63%	4.54%	4.46%	4.37%	4.29%	4.20%	7.8%
7	New Jersey Resources	$39.29	$0.27	1.92%	2.30%	2.68%	3.06%	3.44%	3.82%	4.20%	6.7%
8	Northwest Natural Gas	$57.07	$0.47	8.78%	8.01%	7.25%	6.49%	5.73%	4.96%	4.20%	8.8%
9	WGL Holdings Inc.	$84.73	$0.51	-0.36%	0.40%	1.16%	1.92%	2.68%	3.44%	4.20%	6.1%
10	Average										7.8%
11	Median										7.3%

Source:
Schedule No. D5.6

Vectren Energy Delivery of Ohio, Inc.

Accuracy of Interest Rate Forecasts
(Long-Term Treasury Bond Yields - Projected Vs. Actual)

Line	Date	Publication Data: Prior Quarter Actual Yield (1)	Publication Data: Projected Yield (2)	Publication Data: Projected Quarter (3)	Actual Yield in Projected Quarter (4)	Projected Yield Higher (Lower) Than Actual Yield* (5)
1	Dec-00	5.8%	5.8%	1Q, 02	5.6%	0.2%
2	Mar-01	5.7%	5.6%	2Q, 02	5.8%	-0.2%
3	Jun-01	5.4%	5.8%	3Q, 02	5.2%	0.6%
4	Sep-01	5.7%	5.9%	4Q, 02	5.1%	0.8%
5	Dec-01	5.5%	5.7%	1Q, 03	5.0%	0.7%
6	Mar-02	5.3%	5.9%	2Q, 03	4.7%	1.2%
7	Jun-02	5.6%	6.2%	3Q, 03	5.2%	1.0%
8	Sep-02	5.8%	5.9%	4Q, 03	5.2%	0.7%
9	Dec-02	5.2%	5.7%	1Q, 04	4.9%	0.8%
10	Mar-03	5.1%	5.7%	2Q, 04	5.4%	0.3%
11	Jun-03	5.0%	5.4%	3Q, 04	5.1%	0.3%
12	Sep-03	4.7%	5.8%	4Q, 04	4.9%	0.9%
13	Dec-03	5.2%	5.9%	1Q, 05	4.8%	1.1%
14	Mar-04	5.2%	5.9%	2Q, 05	4.6%	1.4%
15	Jun-04	4.9%	6.2%	3Q, 05	4.5%	1.7%
16	Sep-04	5.4%	6.0%	4Q, 05	4.8%	1.2%
17	Dec-04	5.1%	5.8%	1Q, 06	4.6%	1.2%
18	Mar-05	4.9%	5.6%	2Q, 06	5.1%	0.5%
19	Jun-05	4.8%	5.5%	3Q, 06	5.0%	0.5%
20	Sep-05	4.6%	5.2%	4Q, 06	4.7%	0.5%
21	Dec-05	4.5%	5.3%	1Q, 07	4.8%	0.5%
22	Mar-06	4.8%	5.1%	2Q, 07	5.0%	0.1%
23	Jun-06	4.6%	5.3%	3Q, 07	4.9%	0.4%
24	Sep-06	5.1%	5.2%	4Q, 07	4.6%	0.6%
25	Dec-06	5.0%	5.0%	1Q, 08	4.4%	0.6%
26	Mar-07	4.7%	5.1%	2Q, 08	4.6%	0.5%
27	Jun-07	4.8%	5.1%	3Q, 08	4.5%	0.7%
28	Sep-07	5.0%	5.2%	4Q, 08	3.7%	1.5%
29	Dec-07	4.9%	4.8%	1Q, 09	3.5%	1.4%
30	Mar-08	4.6%	4.8%	2Q, 09	4.0%	0.8%
31	Jun-08	4.4%	4.9%	3Q, 09	4.3%	0.6%
32	Sep-08	4.6%	5.1%	4Q, 09	4.3%	0.8%
33	Dec-08	4.5%	4.6%	1Q, 10	4.6%	0.0%
34	Mar-09	3.7%	4.1%	2Q, 10	4.4%	-0.3%
35	Jun-09	3.5%	4.6%	3Q, 10	3.9%	0.8%
36	Sep-09	4.0%	5.0%	4Q, 10	4.2%	0.8%
37	Dec-09	4.3%	5.0%	1Q, 11	4.6%	0.4%
38	Mar-10	4.3%	5.2%	2Q, 11	4.3%	0.9%
39	Jun-10	4.6%	5.2%	3Q, 11	3.7%	1.5%
40	Sep-10	4.4%	4.7%	4Q, 11	3.0%	1.7%
41	Dec-10	3.9%	4.6%	1Q, 12	3.1%	1.5%
42	Mar-11	4.2%	5.1%	2Q, 12	2.9%	2.2%
43	Jun-11	4.6%	5.2%	3Q, 12	2.8%	2.5%
44	Sep-11	4.3%	4.2%	4Q, 12	2.9%	1.3%
45	Dec-11	3.7%	3.8%	1Q, 13	3.1%	0.7%
46	Mar-12	3.0%	3.8%	2Q, 13	3.2%	0.7%
47	Jun-12	3.1%	3.7%	3Q, 13	3.7%	0.0%
48	Sep-12	2.9%	3.4%	4Q, 13	3.8%	-0.4%
49	Dec-12	2.8%	3.4%	1Q, 14	3.7%	-0.3%
50	Mar-13	2.9%	3.6%	2Q, 14	3.4%	0.2%
51	Jun-13	3.1%	3.7%	3Q, 14	3.3%	0.4%
52	Sep-13	3.2%	4.2%	4Q, 14	3.0%	1.2%
53	Dec-13	3.7%	4.2%	1Q, 15	2.6%	1.7%
54	Mar-14	3.8%	4.4%	2Q 15	2.9%	1.5%
55	Jun-14	3.7%	4.3%	3Q 15	2.8%	1.5%
56	Sep-14	3.4%	4.3%	4Q 15	3.0%	1.3%
57	Dec-14	3.3%	4.0%	1Q 16	2.7%	1.3%
58	Mar-15	3.0%	3.7%	2Q 16	2.6%	1.1%
59	Jun-15	2.6%	3.7%	3Q 16	2.3%	1.4%
60	Sep-15	2.9%	3.8%	4Q 16	2.8%	1.0%
61	Dec-15	2.8%	3.7%	1Q 17	3.0%	0.7%
62	Mar-16	3.0%	3.5%	2Q 17	2.9%	0.6%
63	Jun-16	2.7%	3.4%	3Q 17	2.8%	0.6%
64	Sep-16	2.6%	3.1%	4Q 17	2.8%	0.3%
65	Dec-16	2.3%	3.4%	1Q 18	3.0%	0.4%
66	Mar-17	2.8%	3.7%	2Q 18	3.1%	0.6%
67	Apr-17	3.1%	3.8%	3Q 18		
68	May-17	3.0%	3.7%	3Q 18		
69	Jun-17	3.0%	3.7%	3Q 18		
70	Jul-17	2.9%	3.7%	4Q 18		
71	Aug-17	2.9%	3.7%	4Q 18		
72	Sep-17	2.9%	3.6%	4Q 18		
73	Oct-17	2.8%	3.6%	1Q 19		
74	Nov-17	2.8%	3.6%	1Q 19		
75	Dec-17	2.8%	3.6%	1Q 19		
76	Jan-18	2.8%	3.6%	2Q 19		
77	Feb-18	2.8%	3.6%	2Q 19		
78	Mar-18	2.8%	3.7%	2Q 19		
79	Apr-18	3.0%	3.8%	3Q 19		
80	May-18	3.0%	3.8%	3Q 19		
81	Jun-18	3.0%	3.8%	3Q 19		
82	Jul-18	3.1%	3.8%	4Q 19		
83	Aug-18	3.1%	3.7%	4Q 19		
84	Sep-18	3.1%	3.7%	4Q 19		
85	Oct-18	3.1%	3.6%	1Q 20		

Source:
Blue Chip Financial Forecasts, Various Dates.
* Col. 2 - Col. 4.

Summary: Testimony FEA's Direct Testimony and Exhibits of Michael P. Gorman and Direct Testimony of Brian C. Collings electronically filed by Mrs. Ebony M Payton on behalf of Federal Executive Agencies