BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

OPENING TESTIMONY OF MICHAEL P. GORMAN

ON BEHALF OF

ALLIANCE OF WESTERN ENERGY CONSUMERS

AND OREGON CITIZENS' UTILITY BOARD

April 22, 2022

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EXHIBIT LIST

I. INTRODUCTION AND SUMMARY

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 AND BY WHOM ARE YOU EMPLOYED?

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 DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. This information is included in Exhibit AWEC-CUB/101.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of the Alliance of Western Energy Consumers ("AWEC") and the Oregon Citizens' Utility Board ("CUB"). AWEC members include large energy consumers that purchase services from Northwest Natural Gas Company, dba NW Natural ("NW Natural" or "Company"). CUB represents the interests of NW Natural's residential customers.

Q. ARE YOU SPONSORING ANY EXHIBITS IN CONNECTION WITH YOUR TESTIMONY?

A. Yes. I am sponsoring Exhibit AWEC-CUB/101 through Exhibit AWEC-CUB/121.

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

A. My testimony will address adjustments to NW Natural's proposed overall rate of return including return on equity, embedded debt cost of NW Natural, and analysis of NW Natural's testimony on these subjects.

Q. DOES THE FACT THAT YOU DID NOT ADDRESS EVERY ISSUE RAISED IN NW NATURAL'S TESTIMONY MEAN THAT YOU AGREE WITH NW NATURAL'S TESTIMONY ON THOSE ISSUES?

A. No. Both AWEC and CUB have other witnesses that will address revenue requirement and other issues in NW Natural's rate filing. Any issue that I did not address should not be read as an endorsement of, or agreement with, NW Natural's position on such issues.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS AND CONCLUSIONS ON RETURN ON EQUITY.

A. I recommend the Public Utility Commission of Oregon ("Commission" or "PUC") award a return on common equity in the range of 8.90% to 9.55%, with a midpoint of 9.20%. This return on equity reflects NW Natural's current market cost of equity. I recommend the Commission approve a return on equity that reflects fair compensation for NW Natural's level of investment risk, and impose tariff rate charges on customers that are no more expensive than necessary to fairly compensate the Company and maintain its financial integrity and credit standing.

Q. ARE YOU RECOMMENDING AN OVERALL RATE OF RETURN FOR NW NATURAL IN THIS CASE?

A. Yes. As shown on my Exhibit AWEC-CUB/102, my recommended overall rate of return is 6.74%, which reflects my recommended return on equity of 9.20% and the Company's proposed capital structure.

Q. PLEASE DESCRIBE HOW YOUR TESTIMONY IS ORGANIZED.

A. First, I provide observable evidence on current market costs and regulatory support for financial integrity, credit standing, and access to capital. Second, I estimate NW Natural's current market cost of equity using market-based cost of capital models to

estimate the current market-required return on equity that investors demand to assume the investment risk similar to NW Natural. Third, I rely on my recommended rate of return and the Company's proposed capital structure to develop credit metrics, which demonstrate that my recommended rate of return for NW Natural will support its investment grade bond rating, and support its access to capital. Finally, I respond to NW Natural witnesses Dr. Bente Villadsen's and Mr. Josh Figueroa's recommended return on equity. Dr. Villadsen and Mr. Figueroa recommend a return on equity in the range of 9.50% to 10.50%, with a point estimate of 9.90% and NW Natural's requested return on equity of 9.50%. I comment on their analysis and show that their recommended return on equity substantially exceeds the current market cost of capital for companies with investment risk similar to that of NW Natural. Dr. Villadsen's and Mr. Figueroa's recommended return on equity unnecessarily inflates NW Natural's claimed revenue deficiency, and would increase rates beyond a just and reasonable level.

II. RATE OF RETURN

II.A. Current Capital Market

Q. DO YOU BELIEVE MARKET-BASED MODELS PRODUCE REASONABLE ESTIMATES OF NW NATURAL'S CURRENT COST OF EQUITY?

A. Yes. I believe the application of a Discounted Cash Flow ("DCF") analysis, risk premium, and Capital Asset Pricing Model ("CAPM") produces reasonable and accurate estimates of the current market cost of equity for NW Natural and other utility companies of similar investment risk.

Q. PLEASE EXPLAIN WHY YOU BELIEVE THE DCF MODELS PRODUCE A REASONABLE ESTIMATE OF NW NATURAL'S MARKET COST OF COMMON EQUITY.

A. The DCF model is producing an economically logical estimate of the current market cost of equity and a return that is comparable with observable returns in alternative investments of comparable risk. The DCF model sums the observable dividend yield on utility stocks and then adds to that an estimate of expected growth. These two components yield DCF returns that are comparable to alternative investments, and, thus, reasonably reflect the current market cost of capital for NW Natural.

Specifically, the 2021 dividend yield of electric (3.53%) and gas (3.40%) utility stock was comparable to the yield on "A" rated utility bonds in 2021 (3.10%).[1/] At the end of 2021 and including the study period I used to measure NW Natural's current market cost of equity, the dividend yield for the gas proxy group is approximately 3.4% to 3.5%, which continues to align with the "A" rated utility bond yield of 3.68% during the same time period.[2/] Historically the stock yield spread has been at a positive spread to that of "A" rated utility bond yields.[3/] The stock yield spread relative to "A" rated utility bond yield spread during the study period has converged to more normal levels relative to the last few years, where stock spreads were actually at a negative level. The high level of stock yield relative to utility bond yield indicates the yield component of the DCF model is very competitive in relationship to alternative income investments, and produces a reasonable estimate of the current market level of income for comparable risk investments.

1/ Exhibit AWEC-CUB/103, Gorman/Page 4 and Gorman/Page 12.
2/ Exhibit AWEC-CUB/106 and Exhibit AWEC-CUB/116, Gorman/Page 1.
3/ Exhibit AWEC-CUB/103, Gorman/Page 4 and Gorman/Page 12.

The growth component of the DCF return relates to earnings and stock growth over time. The growth outlook for utility stocks is not depressed generally, but rather provides a robust outlook for dividends and stock price growth. The DCF return is not understated due to the DCF growth rate component.

Also, the annual growth in dividends for utilities over the last 16 years has been approximately 4.09% for electric and 4.67% for gas.[4/] In my constant growth DCF study presented below, the current three- to five-year forward projected growth rate for gas utilities is 5.93%, which is considerably higher than the historical growth rate for the electric and gas industry. Also, utility earnings growth is expected to be considerably higher than the growth of the U.S. GDP, which generally is regarded as the maximum sustainable growth of the market in general. Going forward, long-term sustainable growth for equity investments is around 4.10%, as described above. Based on these factors, the growth rate component of a regulated utility DCF return is quite robust and produces a highly competitive DCF return estimate.

For these reasons, both dividend yield and growth components of a utility DCF indicate an economically logical return estimate that is competitive with comparably risky alternative investments.

4/ Exhibit AWEC-CUB/103, Gorman/Page 5 and Gorman/Page 13.

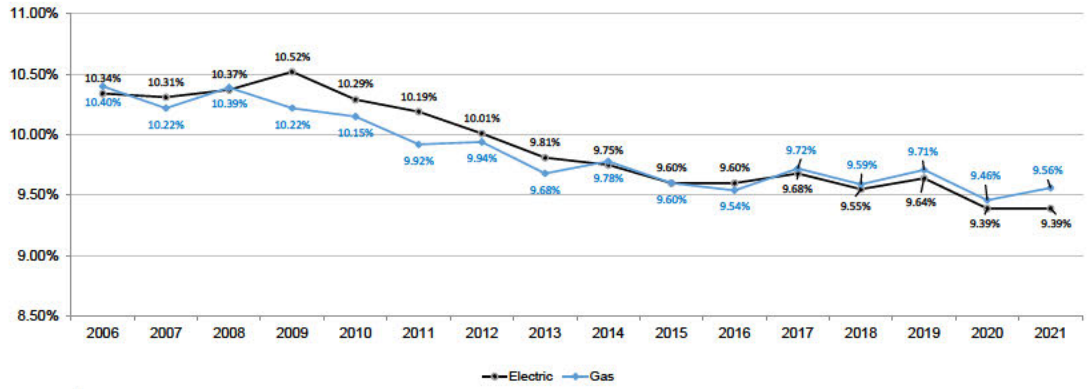
II.B. Utility Industry Authorized Returns on Equity, Access to Capital, and Credit Strength

Q. PLEASE DESCRIBE THE OBSERVABLE EVIDENCE ON TRENDS IN AUTHORIZED RETURNS ON EQUITY FOR REGULATED UTILITIES.

A. As illustrated in Figure 1 below, national average authorized returns on equity for both electric and gas utilities have ranged between 9.39% to 9.78% for the last eight years (2014-2021 to date).

FIGURE 1

**Authorized Returns on Equity*
(Exclude Limited Issue Riders)**



ROE Distributions[2]

Electric Utilities	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<= Average	100.0%	100.0%	63.6%	84.6%	70.0%	64.3%	52.6%	55.6%	73.7%	57.1%	50.0%	64.0%	56.0%	63.6%	53.6%	73.3%
> Average	0.0%	0.0%	36.4%	15.4%	30.0%	35.7%	47.4%	44.4%	26.3%	42.9%	50.0%	36.0%	44.0%	36.4%	46.4%	26.7%
Gas Utilities																
<= Average	46.7%	51.4%	50.0%	50.0%	56.4%	31.3%	45.7%	47.6%	50.0%	50.0%	53.8%	70.8%	47.5%	53.1%	52.9%	47.6%
> Average	53.3%	48.6%	50.0%	50.0%	43.6%	68.8%	54.3%	52.4%	50.0%	50.0%	46.2%	29.2%	52.5%	46.9%	47.1%	52.4%

Source and Notes:
[1] *S&P Global Market Intelligence*, RRA Regulatory Focus, Major Rate Case Decisions -- January - December 2021, February 10, 2022, p. 1.
[2] Download from S&P Global Market Intelligence, April 6, 2022.
* Electric Returns exclude Limited Issue Rider Decisions.
* RRA excludes the 2017 Alaska ENSTAR decision from its Industry Average.

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

A. Yes. In its November 30, 2021 Utility Capital Expenditures Update report, *RRA Financial Focus*, a division of S&P Global Market Intelligence, made several relevant comments about utility investments generally:

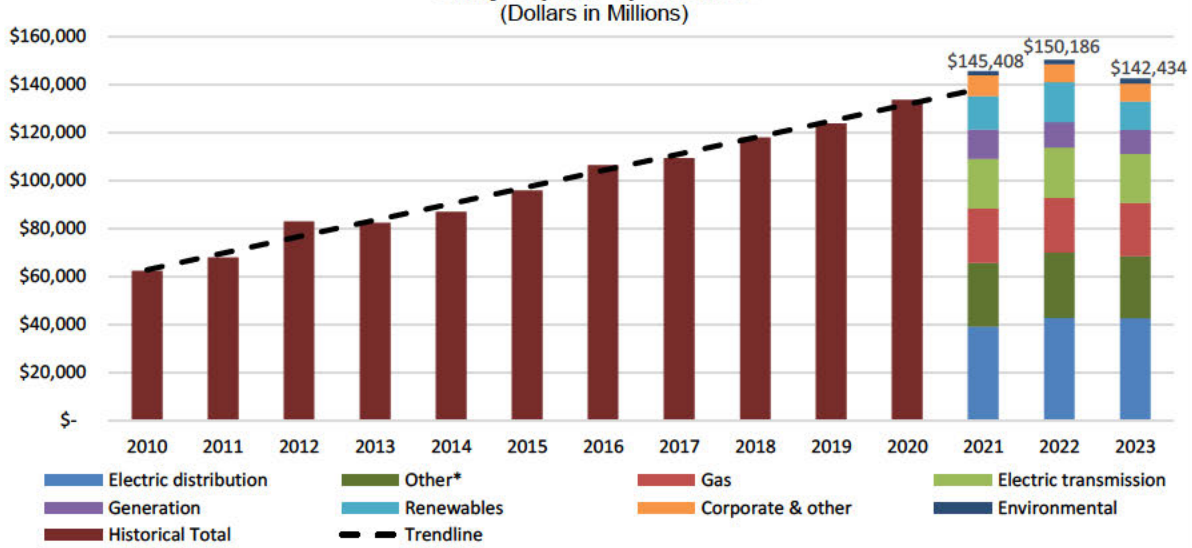
- Projected 2022 capital expenditures[1] for the 47 energy utilities included in the Regulatory Research Associates[2] sample of the

> publicly traded U.S.-based utility universe currently exceeds $146 billion, well above 2021's expected $141 billion investment level, and 2020's $130 billion actual level.
>
> - 2020 energy utility capital expenditures marked a record high and were more than 7.75% above the $120.7 billion that the energy utility industry invested in 2019, despite that the coronavirus pandemic interrupted certain supply chains for a period of months in some instances.
>
> - 2021 is on track to be another record year for energy infrastructure investments. Assuming current projections hold, investment across the RRA-covered energy utility industry may rise by 9% or more by the close of this year.
>
> [Footnotes in quoted material]
> [1]This report is designed to identify capital expenditure trends in the U.S. utility sector using a range of sources of information, including corporate investor presentations, annual reports and other sources. While S&P Global Market Intelligence takes all due care to ensure the data represented is accurate and represents our best interpretation of industry trends, the varying nature of the available sources of information in terms of depth, quality, availability and timeliness means this report should only be used as outlined. Though underlying data is included in this report, those seeking actual company-specific capital expenditure information should use data filed with the U.S. Securities and Exchange Commission.
> [2]Regulatory Research Associates is a group within S&P Global Market Intelligence.[5/]

As shown in Figure 2 below, capital expenditures for electric and natural gas utilities have increased considerably over the period 2020 into 2021, and the forecasted capital expenditures remain elevated through 2022, albeit falling below current levels in 2023.

[5/] *S&P Global Market Intelligence, RRA Financial Focus*: "Utility Capital Expenditures Update," November 30, 2021, at 5.

FIGURE 2



*Other category consists of utilities that do not report capital expenditures by category: Avangrid, Hawaiian Electric, PG&E and Portland General Electric.
Source: *S&P Global Market Intelligence, RRA Financial Focus*, Utility Capital Expenditures Update, November, 29, 2021, Tables 1 and 3.

As outlined in Figure 2 above, and in the comments made by *RRA S&P Global Market Intelligence*, capital investments for the utility industry continue to stay at elevated levels, and these capital expenditures are expected to fuel utilities' profit growth into the foreseeable future. This is clear evidence that the capital investments are enhancing shareholder value, and are attracting both equity and debt capital to the utility industry in a manner that allows for these elevated capital investments. While capital markets embrace these profit-driven capital investments, regulatory commissions also must be careful to maintain reasonable prices and tariff terms and conditions to protect customers' need for reliable utility service but at competitive tariff prices.

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 my Exhibit AWEC-CUB/103, utility valuation metrics show robust valuation of utility securities more recently compared to the historical period extending back to 2002. Specifically, this attachment shows *The Value Line Investment Survey* ("*Value Line*") electric utility industry price-to-earnings ratio of 20.96x, compared to a 20-year average price-to-earnings ratio of around 17.19x.[6/] The current price-to-earnings ratio for gas utilities is 18.03x relative to the 16-year average price-to-earnings ratio of 18.36x.[7/] The market price-to-cash flow for electric utilities is currently 10.33x, compared to the 20-year average of 7.58x.[8/] The market price-to-cash flow for gas utilities is currently 9.50x, compared to the 16-year average of 9.59x. [9/] Finally, the current market-to-book ratio for the electric utility industry is 2.15x, compared to the 17-year average of 1.74x.[10/] The current market-to-book ratio for the gas utility industry is 1.73x, which is comparable to the 16-year average of 1.82x.[11/] The utility industry exhibits strong valuations in the marketplace, which is a clear indication that utilities have access to external capital markets under favorable prices.

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

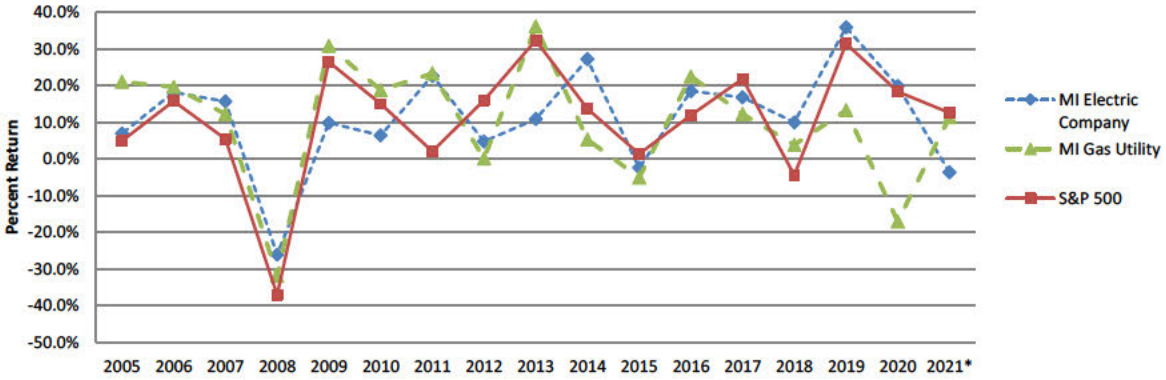
A. As shown in Figure 3 below, S&P Global Market Intelligence ("MI") has recorded utility stock price performance compared to the market. The industry's stock performance data from 2005 through 2021 shows that the MI Electric Company and

6/ Exhibit AWEC-CUB/103, Gorman/Page 1.
7/ *Id*., Gorman/Page 11.
8/ *Id*., Gorman/Page 2.
9/ *Id*., Gorman/Page 11.
10/ *Id*., Gorman/Page 3.
11/ *Id*., Gorman/Page 11.

MI Gas Utility Indexes have followed the market through downturns and recoveries. However, utility investments have been less volatile during extreme market downturns. This more stable price performance for utilities supports my conclusion that market participants regard utility stock sectors as a moderate- to low-risk investment option.

FIGURE 3

Index Comparison



Source: S&P Global Market Intelligence.
***Data through May 2021**

While utility stocks have not exhibited the same volatility as the S&P 500, stock prices have remained strong, relative to the market in general, and support the utilities' access to equity capital markets under reasonable terms and prices.

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

A. Observable market evidence is quite clear that capital market costs are near historically low levels. While authorized returns on equity have fallen to the mid-9% range, utilities continue to have access to large amounts of external capital even as they are funding large capital programs. Furthermore, utilities' investment-grade credit ratings 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 NW Natural.

II.C. Federal Reserve's Impact on Cost of Capital

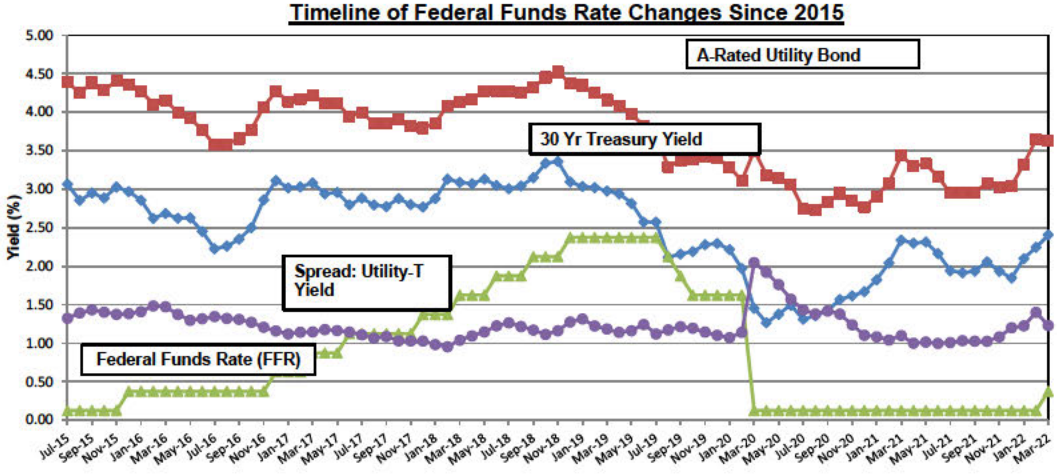
Q. ARE THE FEDERAL RESERVE'S MONETARY OPEN MARKET COMMITTEE ACTIONS KNOWN TO THE MARKET PARTICIPANTS, AND IS IT REASONABLE TO BELIEVE THEY ARE REFLECTED IN THE MARKET'S VALUATION OF BOTH DEBT AND EQUITY SECURITIES?

A. Yes. The Federal Reserve has been quite transparent on its efforts to support the economy to achieve maximum employment, and to manage long-term inflation to around a 2% level. The Federal Reserve has implemented procedures to support the economy's efforts to achieve these policy objectives. Specifically, in March 2020 the Federal Reserve lowered the Federal Overnight Rate for securities, and has engaged once again in a Quantitative Easing program where the Federal Reserve is buying on a monthly basis Treasury and mortgage-backed securities in order to moderate the demand in the marketplaces and support the economy. More recently, on March 16, 2022 at its last meeting the Federal Reserve increased its federal funds rate by a quarter of a percentage point and it expects to begin reducing its holdings of Treasury and mortgage-backed securities. All of these actions are known by market participants because the Federal Reserve is transparent in its monetary policies.

An assessment of the market's reaction to the Federal Reserve's actions on the Federal Funds Rate is shown below in Figure 4.

FIGURE 4

Timeline of Federal Funds Rate Changes Since 2015



Fed FFR Actions:

1	December 2015	0.25	→	0.50	9	December 2018	2.25	→	2.50
2	December 2016	0.50	→	0.75	10	August 2019	2.00	→	2.25
3	March 2017	0.75	→	1.00	11	September 2019	1.75	→	2.00
4	June 2017	1.00	→	1.25	12	October 2019	1.50	→	1.75
5	December 2017	1.25	→	1.50	13	March 2020	1.00	→	1.25
6	March 2018	1.50	→	1.75	14	March 2020	0.00	→	0.25
7	June 2018	1.75	→	2.00	15	March 2022	0.25	→	0.50
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/

The Federal Reserve's recent actions in short-term securities are specifically stated to manage inflation and support employment in the economy. The Federal Reserve's interaction in these marketplaces is not intended to manipulate utility valuation or security valuations, or to drive capital market costs in one direction or the other. Rather, it is strictly for the purpose of supporting the U.S. economy.

Q. HAS THE FEDERAL RESERVE MADE RECENT COMMENTS CONCERNING MONETARY POLICY AND THE POTENTIAL IMPACT ON INTEREST RATES?

A. Yes. The Federal Reserve's monetary policy changed as a result of the COVID-19 pandemic due to the significant impact the pandemic had on the U.S. economy. The initial stages of the COVID-19 pandemic resulted in significant negative U.S. GDP

growth and a significant increase in unemployment. The impact on U.S. GDP real growth and unemployment levels, however, quickly reversed as the economy recovered. Economists' projections anticipate U.S. economic growth to stay robust through 2023, and unemployment levels to stay relatively low. These economic factors influenced the Federal Reserve monetary policy actions throughout this time period. More recently, the Federal Reserve announced a modification of its policy triggered by the significant improvement in strengthening the economy. As discussed above the Federal Reserve announced a 25 basis points increase its federal funds rate from the current 0% to 0.25% level, and start tapering its procurement of Treasuries and mortgage-backed securities ("MBS"). The Federal Reserve noted that it may start to reduce its asset purchases with a monthly cap of $60 billion for Treasuries and $35 billion for MBS.[12/]

The Federal Reserve's monetary actions to support the economy's employment and inflation outlooks are widely disclosed to the investment community, and are reflected in independent economists' projections of Treasury bond yields, inflation outlooks, and other economic factors. Indeed, in the April 2022 *Blue Chip Financial Forecasts* ("*BCFF*"), which reflect consensus economists' outlooks for various economic factors including the impact of inflation on Treasury yields, the *BCFF* stated as follows:

> **Higher Interest Rates, Flatter Yield Curve.**
> With inflation and the fed funds rate rising, other interest rates are rising as well. And the slope of the yield curve is decreasing. The

[12/] Federal Open Market Committee Statement, March 15-16, 2022, Released on April 6, 2022

> 10-year Treasury note averaged 2.37% in the week ended March 25; it is forecast to rise to 2.50% at mid-year and 2.85% late in the year.[13/]

These same Federal Reserve actions are reflected in market valuations as investors use all relevant information in assessing expectations of future interest rates and inflation, and reflect those in security valuations including nominal Treasury bonds and Treasury Inflation-Protected Securities ("TIPS").

Q. DO INDEPENDENT ECONOMISTS' OUTLOOKS FOR FUTURE INTEREST RATES ALIGN WITH THE FED MONETARY POLICY?

A. Yes. Independent economists expect the current low capital costs to prevail over at least the intermediate term. This is illustrated in projections for both short- and long-term changes in interest rates. Further, there is a clear trend in forecasted changes in interest rates over time, indicating that capital market participants are becoming more comfortable with today's low-cost capital market environment and expect it to prevail over at least the intermediate future.

For example, short-term projections suggest that the market expects capital market costs to remain relatively low. Table 1 below shows capital cost projections over the next two years, and demonstrates that projected Treasury bond yields are not expected to increase significantly over this projection period.

13/ *Blue Chip Financial Forecasts*, April 1, 2022.

TABLE 1

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

Publication Date	3Q 2021	4Q 2021	1Q 2022	2Q 2022	3Q 2022	4Q 2022	1Q 2023	2Q 2023	3Q 2023
Federal Funds Rate									
Oct-21	0.1	0.1	0.1	0.1	0.1	0.2	0.3		
Nov-21	0.1	0.1	0.1	0.1	0.1	0.3	0.4		
Dec-21	0.1	0.1	0.1	0.1	0.3	0.4	0.6		
Jan-22		0.1	0.1	0.3	0.5	0.7	0.9	1.1	
Feb-22		0.1	0.2	0.5	0.8	1.0	1.3	1.5	
Mar-22		**0.8**	0.2	0.6	1.0	1.3	1.6	1.8	
Apr-22			0.1	0.8	1.4	1.8	2.2	2.4	2.6
T-Bond, 30 yr.									
Oct-21	1.9	2.2	2.3	2.4	2.5	2.6	2.7		
Nov-21	1.9	2.2	2.3	2.4	2.5	2.6	2.7		
Dec-21	1.9	2.1	2.2	2.3	2.5	2.6	2.7		
Jan-22		2.0	2.1	2.2	2.4	2.5	2.7	2.8	
Feb-22		2.0	2.2	2.3	2.5	2.6	2.7	2.8	
Mar-22		**2.0**	2.2	2.5	2.6	2.7	2.9	3.0	
Apr-22			2.3	2.6	2.8	3.0	3.2	3.3	3.3
GDP Price Index									
Oct-21	4.2	2.9	2.5	2.5	2.5	2.5	2.4		
Nov-21	5.7	3.4	2.7	2.6	2.5	2.4	2.3		
Dec-21	5.9	4.6	3.4	2.8	2.7	2.5	2.5		
Jan-22		4.6	3.7	3.1	2.8	2.6	2.5	2.5	
Feb-22		6.9	4.3	3.4	3.0	2.8	2.6	2.5	
Mar-22		**7.1**	4.8	3.8	3.1	2.8	2.6	2.5	
Apr-22			4.8	5.1	3.7	3.0	2.8	2.6	2.6

Source and Note:
Blue Chip Financial Forecasts, January 2021 through April 2022.
Actual Yields in Bold

Further, the outlook for long-term interest rates in the intermediate to longer term is also impacted by the current Federal Reserve actions and the expectation that eventually the Federal Reserve's monetary actions will return to more normal levels. Long-term interest rate projections are illustrated in Table 2 below.

TABLE 2

30-Year Treasury Bond Yield Actual Vs. Projection

Description	Actual	2-Year Projected*	5- to 10-Year Projected
2015			
Q1	2.55%	3.80%	
Q2	2.89%	3.70%	4.8% - 5.0%
Q3	2.84%	3.90%	
Q4	2.96%	3.80%	4.5% - 4.8%
2016			
Q1	2.72%	3.67%	
Q2	2.64%	3.50%	4.3% - 4.6%
Q3	2.28%	3.20%	
Q4	2.82%	3.20%	4.2% - 4.5%
2017			
Q1	3.04%	3.70%	
Q2	2.91%	3.73%	4.3% - 4.5%
Q3	2.82%	3.66%	
Q4	2.82%	3.60%	4.1% - 4.3%
2018			
Q1	3.02%	3.63%	
Q2	3.09%	3.80%	4.2% - 4.4%
Q3	3.07%	3.73%	
Q4	3.27%	3.67%	3.9% - 4.2%
2019			
Q1	3.01%	3.50%	
Q2	2.78%	3.17%	3.6% - 3.8%
Q3	2.30%	2.70%	
Q4	2.30%	2.50%	3.2% - 3.7%
2020			
Q1	1.88%	2.57%	
Q2	1.38%	1.90%	3.0% - 3.8%
Q3	1.36%	1.87%	
Q4	1.62%	1.97%	2.8% - 3.6%
2021			
Q1	2.07%	2.23%	
Q2	2.26%	2.77%	3.5% - 3.9%
Q3	1.93%	2.63%	
Q4	1.95%	2.70%	3.4% - 3.8%

Source and Note:
Blue Chip Financial Forecasts, January 2015 through December 2021.
*Average of all 3 reports in Quarter.

As outlined in Table 2 above, the outlook for increases in interest rates has jumped more recently relative to 2020, but is still relatively modest compared to time periods prior to the beginning of the worldwide pandemic. Indeed, today's relatively low capital market costs are expected to prevail at least in the short-term out over the next five to ten years. While there may be some upward movement in cost of capital, that upward movement is not expected to be significant. Importantly, the U.S. economy has largely recovered from the severe effects of the COVID-19 pandemic experienced in 2020. Capital markets continues to perform in a rational and economically logical manner at lower capital costs for safe investment sectors such as the utility industry.

Moreover, while economists are projecting a modest increase in interest rates relative to those published in the past, these projections of increases in interest rates are, at best, uncertain. But more importantly, the projected increases relative to the past are relatively modest, and demonstrate that NW Natural's proposal to increase its authorized return on equity in this case to 9.50% is simply not reflective of current market capital costs.

II.D. Market Sentiments and Utility Industry Outlook

Q. PLEASE DESCRIBE THE CREDIT RATING OUTLOOK FOR REGULATED UTILITIES.

A. The global economy has faced the extraordinary challenges of the novel Coronavirus, which led to nearly a complete shutdown of the global economy. This unprecedented event has impacted all sectors and capital markets. However, regulated utilities have

generally performed well during the Covid-19 pandemic with consistent access to capital markets.

Moody's views the regulatory environment for the US utility companies to be supportive and maintains a stable outlook for the industry. Specifically, Moody's states:

> We are maintaining a stable outlook for the US regulated utilities sector based on our expectations that the regulatory environment will remain supportive of rate base growth and infrastructure investments and in mitigating the impact of extreme weather events. We anticipate that the regulated utility sector will remain resilient and benefit from the continuing US economic recovery.
>
> » **Regulatory environment to remain supportive.** We expect average aggregate rate base growth of around 6% in 2022 amid a supportive regulatory environment. Rate case outcomes and other regulatory actions have been remarkably consistent with our expectations over the past few years, despite extreme weather events and economic disruptions caused by the coronavirus pandemic.
>
> » **FFO-to-debt will be steady at current levels.** We estimate that the sector's aggregate industry funds from operations (FFO) to debt ratio will range between 14% and 15%, consistent with our projections last year for 2021. Our FFO-to-debt forecast incorporates our expectations for improving economic conditions in the US.
>
> » **Capital expenditures will remain high**. With a heightened focus on reducing carbon exposure, utilities continue to invest in new renewable generation capacity and to make up for accelerated coal-fired power plant retirements as well as to bolster transmission and distribution networks. Also, the frequency and severity of extreme weather events in 2021 are prompting many utilities to invest more in hardening their systems and enhancing the resilience of their operations amid rising physical climate risk.[14/]

[14/] *Moody's Investors Service Sector Comment*: "2022 Outlook Stable On Sustained Regulatory Support for Robust Investment Cycle," November 4, 2021 at 1 (emphasis added).

Similarly, Fitch states the following:

> Fitch Ratings-New York-02 December 2021: The sector outlook for North American Utilities, Power and Gas in 2022 is neutral, according to Fitch Ratings.
>
> Approximately 81% of rated entities in the sector have Stable Rating Outlooks based on an expectation that retail electricity sales will continue to strengthen and the regulatory environment will remain supportive.
>
> Key rating concerns include high natural gas prices, which will increase the fuel and purchased power costs for utilities and will be directly passed through to customers. Elevated capex, recovery of storm restoration costs and recovery of deferred coronavirus expenses will compound the pressure on customer bills. Declining O&M costs due to cost control initiatives and the ongoing energy transition to lower cost renewables should provide some offset.
>
> Fitch expects median FFO leverage for the sector to modestly improve to 4.5x in 2022 as utilities see a rebound in FFO from growth investments and recovery in retail sales. Parent holding companies will likely continue to look for asset monetization opportunities to supplement or replace equity needs to fund high capex. However, the improvement in leverage may not be enough to reverse the negative ratings trend for utility parent holding companies.
>
> Fitch expects liquidity of regulated utilities and parent holding companies to remain strong. The companies maintain large credit lines and benefit from unfettered access to capital markets. For competitive generators, robust FCF generation supports liquidity.[15/]

[15/] *Fitch Ratings*: "Neutral Outlook for North American Utilities, Power & Gas in 2022," December 9, 2021 at 1-2. (emphasis added).

S&P currently has a negative outlook for the regulated utility industry, because utility companies are operating with minimum financial cushion from their downgrade thresholds and their exposure to environmental, social and governance risk. Specifically, S&P states the following:

> **Key Takeaways**
>
> - For the second consecutive year rating downgrades outpaced upgrades for the investor-owned North American regulated utility industry, causing the median rating on the industry to fall to the 'BBB' category.
> - During 2021, credit quality was primarily pressured by weak financial measures and Environmental, Social, and Governance (ESG) credit risks. We expect that these risks will continue to pressure the credit quality of the industry in 2022.
> - Our outlook on the investor-owned North American regulated utility industry remains negative. We believe that 2022 could be the third consecutive year that downgrades outpace upgrades.
> - Recently, several new credit risks have emerged, including inflation, higher interest rates, and rising commodity prices. Persistent pressure from any of these risks would likely lead to a further weakening of the industry's credit quality in 2022.
>
> * * *
>
> **What's Behind This Fundamental Weakening Of Credit Quality?**
> Utility cash flows tend to be more stable and predictable than most other industries. Strategically, an increasing percentage of the industry has been managing their financial measures with only minimal financial cushion from their downgrade threshold. While this strategy of limiting excess credit capacity works well under ordinary conditions, when unexpected risks occur or base case assumptions deviate from expectations, the utility can become susceptible to a weakening of credit quality. This has been one of the primary drivers of the industry's weakening of credit quality over the past two years.
>
> * * *
>
> **ESG Credit Risks**
> During 2020 and 2021 the industry credit quality was constrained by many ESG-related credit risks. Unexpectedly, the industry faced several governance-related credit risks in 2020. We view these governance events as isolated incidents and do not believe that they

> will have broader implications for the larger utility industry. However, we do expect that physical and environmental risks will continue to constrain the industry's credit quality. Wildfires, severe winter storms, hurricanes, and tornadoes lead to higher costs that are either partially disallowed by regulators or are deferred for future recovery. Similarly, higher environmental costs can also result in higher costs that are either partially disallowed by regulators or are deferred for future recovery. Either outcome for physical and environmental risks typically results in weaker financial measures until the utility fully recovers such costs from customers. Because of climate change, we believe that these risks will continue to negatively affect credit quality in 2022.[16/]

Q. HOW IS THIS OBSERVABLE MARKET DATA USED IN FORMING YOUR RECOMMENDED RETURN ON EQUITY AND OVERALL RATE OF RETURN FOR NW NATURAL?

A. Generally, authorized returns on equity, credit standing, and access to capital have been quite robust for utilities over the last several years. The COVID-19 pandemic has created challenges for the U.S. economy as a whole, including utility companies. However, the U.S. economy has largely recovered and utilities are expected to weather the economic downturn caused by the pandemic, and their financial strength will be restored as the economy recovers. In the meantime, it is critical that the Commission ensure that rates are increased no more than necessary to provide fair compensation and maintain financial integrity, and be especially concerned about rate impacts on the service area economies that are severely constrained due to current economic conditions.

16/ *S&P Global Ratings*: "For the First Time Ever, the Median Investor-Owned Utility Ratings Falls to the 'BBB' Category," January 20, 2022, at 1, 6 and 10. (emphasis added).

II.E. NW Natural's Investment Risk

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

A. The market's assessment of NW Natural's investment risk is described by credit rating analysts' reports. NW Natural's current corporate bond ratings from S&P and Moody's are A+ and Baa1, respectively.[17/] NW Natural's outlook is "Stable" from S&P, and "Negative" from Moody's.

Specifically, S&P states:

> **Outlook: Stable**
>
> The stable rating outlook on NWN reflects S&P Global Ratings' expectation of strong financial and operating performance and effective management of regulatory risk. We expect the company to maintain FFO to debt of 15%-18% over the next two years.
>
> * * *
>
> **Business Risk: Excellent**
>
> We assess NWN's business risk based on the company's very low-risk regulated gas distribution operations, which account for almost 100% of the consolidated cash flows. About 88% of NWN's customers are in Oregon, primarily in the Salem and Portland metropolitan areas; the remainder are in Washington. The company benefits from stable and supportive regulatory environments in both of the jurisdictions it operates in, with purchased gas adjustments and environmental cost deferral in both jurisdictions, and decoupling, a forward-looking test year, and a weather normalization mechanism in Oregon. These mechanisms reduce regulatory lag in the collection of associated costs and help bolster cash flow stability outside of rate cases. A large, stable residential customer base (about 90% of all customers) with limited exposure to more cyclical commercial and industrial customers further stabilizes the utility's cash flows. A history of safe and reliable services also strengthens the company's business profile. Because of these factors, we view the company's business risk profile at the stronger end of the excellent category, supported by the company's ability to effectively manage its regulatory risk.

[17/] NW Natural/200, Wilson/Page 10 and NW Natural/202, Wilson/Page 1.

> The company has continued its strategy to diversify its business operations by purchasing small-regulated water utilities. Given the low-risk nature of water utilities, we view NWN's entry into the regulated water utility space as modestly positive for its business risk profile.
>
> **Financial Risk: Intermediate**
>
> Under our base-case scenario, with about $200 million in annual capital spending, about $55 million in annual dividends, and cost recovery through rate case filings, we expect the company's FFO to debt be in the middle of the range for an intermediate financial risk profile in 2020. Specifically, we expect FFO to debt to be about 15%-18%. We assess NWN's financial risk profile using our low volatility table, reflecting the low-risk nature of the company's natural gas distribution operations and effective management of regulatory risk. We assume NWN will continue to manage regulatory risk well and fully recover its capital spending on a timely basis.'[18/]

II.F. NW Natural's Proposed Capital Structure

Q. WHAT IS NW NATURAL'S PROPOSED CAPITAL STRUCTURE?

A. NW Natural's proposed capital structure is shown below in Table 3. The Company's projected capital structure ending on October 31, 2023 is sponsored by NW Natural witness Mr. Brody Wilson.

[18/] *Standard & Poor's RatingsDirect*®: "Northwest Natural Gas Co.," March 23, 2021 at 4 and 6. (emphasis added).

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TABLE 3

NW Natural's Proposed Capital Structure
(October 31, 2023)

Description	Weight
Long-Term Debt	50.00%
Common Equity	50.00%
Total	100.00%

Source: NW Natural/200, Wilson/Page 3.

I will continue to review NW Natural's proposed capital structure and may address this in future testimony.

II.G. Embedded Cost of Debt

Q. WHAT IS NW NATURAL'S EMBEDDED COST OF LONG-TERM DEBT?

A. NW Natural is proposing an embedded cost of long-term debt of 4.271% as developed on Mr. Wilson's Exhibit NW Natural/203. I have used NW Natural's proposed embedded cost of long-term debt in my calculation of an overall rate of return.

III. 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). In these decisions, the Supreme Court found that just compensation depends on many circumstances and must be determined by fair and enlightened judgments based on relevant facts. The Court found that a utility is entitled to such rates as were permitted to earn a return on a property devoted to the convenience of the public that is generally consistent with the same returns available in other investments of corresponding risk. The Court continued that the utility has no constitutional rights to profits such as those realized or anticipated in highly profitable enterprises or speculative ventures, and defined the ratepayer/investor balance as follows:

> The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[19/]

As such, a fair rate of return is based on the expectation that the utility's costs reflect efficient and economical management, and the return will support its credit standing and access to capital, without being in excess of this level. From these standards, rates to customers will be just and reasonable, and under economic management, compensation to the utility will be fair and support financial integrity and credit standing.

19/ *Bluefield*, 262 U.S. 679, 693 (1923), emphasis added.

III.A. Risk Proxy Group

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

A. I relied on the same water and gas proxy groups developed by NW Natural witnesses Dr. Villadsen and Mr. Figueroa with a few exceptions.

I excluded Artesian Resource Corp., Global Water Resources and Chesapeake Utilities because they do not have a credit rating from S&P and Moody's. Without a published credit rating, there is no independent verification that these three companies reasonably align with the market's perception of comparability of investment risk to NW Natural.

I also eliminated Southwest Energy Gas ("SWX") because it is currently subject to an acquisition proposal by Icahn Enterprises L.P., and at the end of 2021, SWX acquired Questar Pipeline from Dominion Energy. Companies that are involved in mergers and acquisitions ("M&A") are not appropriate risk proxies because their market data may not reflect the investment risk outlooks of the subject company, but rather may be reflective of the proposed acquisition activity.

Finally, I excluded South Jersey Industries because in February 2022 it agreed to be acquired by an Infrastructure Investment Fund (JP Morgan), which significantly increased its stock price. Therefore, this company was eliminated because of its involvement in M&A activity.

Again, excluding companies that are involved in major acquisition or merger activity is appropriate because after these M&A activities are announced the market valuation of the securities may not accurately reflect the stand-alone valuation of the

company, but rather may anticipate enhanced valuation from the proposed M&A transaction. Therefore, removing them from the proxy group is necessary because the resulting market-based return analyses on these specific companies can be distorted and/or would simply be unreliable.

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

A. My gas proxy group is shown in Exhibit AWEC-CUB/104. The gas proxy group has an average credit rating from S&P of A-, which is two notches lower than NW Natural's S&P rating of A+. The gas proxy group has an average Moody's credit rating of A3, which is a notch higher than NW Natural's Moody's rating of Baa1.[20/]

The gas proxy group has an average common equity ratio of 44.3% from S&P (including short-term debt) and a 48.5% equity ratio from *Value Line* (excluding short-term debt). NW Natural's requested equity ratio of 50.0% is slightly higher than, but comparable to, the proxy group average of 48.5%.

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

A. My water proxy group is also shown in Exhibit AWEC-CUB/104. The water proxy group has an average credit rating from S&P of A, which is a notch lower than NW Natural's S&P rating of A+. The water proxy has an average Moody's credit rating of Baa1, which is identical to NW Natural's Moody's rating.[21/]

My water proxy group has an average common equity ratio of 45.9% from S&P (including short-term debt) and a 48.5% equity ratio from *Value Line* (excluding

[20/] NW Natural/202, Wilson/Page 1.
[21/] *Id*.

short-term debt). NW Natural's requested common equity ratio of 50.0% is higher than, but comparable to, the water proxy group average of 48.5%.

In my opinion, my proxy groups produce return on equity estimates that are fair and reasonable.

III.B. DCF 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 DID YOU USE 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 April 1, 2022. 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*.[22/] 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 DID YOU USE 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, to determine the market-required return on common equity, one must attempt to estimate investors' consensus about

22/ *The Value Line Investment Survey*, January 7 and February 25, 2022.

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.[23/] 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.

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 Yahoo! Finance. All such projections were available on April 1, 2022, 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.

[23/] *See, e.g.*, David Gordon, Myron Gordon & Lawrence Gould, "Choice Among Methods of Estimating Share Yield," *The Journal of Portfolio Management*, Spring 1989.

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 AWEC-CUB/105. The average growth rate for my gas proxy group is 5.93%. The average growth rate for my water proxy group is 6.63%.

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

A. As shown in Exhibit AWEC-CUB/106, the average and median constant growth DCF returns for my gas proxy group for the 13-week analysis are 9.40% and 9.12%, respectively. The average and median constant growth DCF returns for my water proxy group for the 13-week analysis are 8.42% and 9.17%, respectively. Further, the DCF results for my water proxy group vary from 3.87% (Middlesex) to 10.87% (California Water) due to the extreme growth rates for these companies. Therefore, I believe the median results better reflect the central tendency of the proxy groups in the presence of outliers.

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

A. Yes. The constant growth DCF analysis for my gas and water proxy groups is based on an average long-term sustainable growth rates of 5.93% and 6.63%, respectively. The three- to five-year growth rate is higher than my estimate of a maximum long-term sustainable growth rate of 4.10%.

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

A. The 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. The long-term maximum

sustainable growth rate for a utility investment is, accordingly, best proxied by the projected long-term Gross Domestic Product ("GDP") growth rate as that reflects the projected long-term growth rate of the economy as a whole. While growth rates on shorter periods can exceed the GDP growth rate, those short-term growth periods are likely followed by other periods where the growth rate is below the GDP. On average over long periods of time, the growth rate is most accurately approximated by the long-term growth rate outlooks of the U.S. 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 2.00% and an inflation outlook of around 2.10% going forward. As such, the average nominal growth rate over the next 10 years is around 4.10%, which I believe is a reasonable proxy of long-term sustainable growth.[24/]

Q. DO YOU CITE ANY INDEPENDENT AUTHORITATIVE SUPPORT FOR USING LONG-TERM GDP GROWTH AS A MAXIMUM SUSTAINABLE GROWTH RATE?

A. Yes. 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. Using the long-term GDP growth rate, however, as a conservative projection for the maximum sustainable growth rate is logical, and is generally consistent with academic and economic practitioner accepted practices.

[24/] *Blue Chip Economic Indicators*, March 11, 2022, at 14.

III.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 by the utility 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 AWEC-CUB/107. 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 NW Natural'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 AWEC-CUB/108, the average sustainable growth rate using this internal growth rate model is 6.15% for my gas proxy group and 7.35% for

my water proxy group. As shown on my exhibit these extremely high growth rates are triggered by selling additional shares to the public. The internal growth rate component (Column 10) of the sustainable growth rate is in line with the long-term sustainable growth outlook as measured by the GDP growth.

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 AWEC-CUB/109. As shown there, the sustainable growth DCF analysis produces gas proxy group average and median DCF results for the 13-week period of 9.63% and 8.95%, respectively. The average and median DCF results for my water proxy group are 9.14% and 8.96%, respectively. Similar to my constant DCF based on analysts' growth rates, I believe the median DCF results better reflect the central tendency of my proxy groups.

III.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 better reflects long-term sustainable growth. Therefore, 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 the pace of rate base growth will slow and because the utility has limited human and capital resources available to expand its construction program. Therefore, the three- to five-year growth rate projection should only be used as a long-term sustainable growth rate in concert with a reasonable, informed judgment as to 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 I used above in 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, which is the projected long-term GDP 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 are 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 utility sales growth tracks U.S. GDP growth, albeit at a lower level, as shown in Exhibit AWEC-CUB/110. 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 reasonable 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 "Fundamentals of Financial Management," a textbook published by Eugene Brigham and Joel F. Houston, the authors state:

> 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).[25/]

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.
>
> * * *
>
> 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.[26/]

25/ *"Fundamentals of Financial Management,"* Eugene F. Brigham & Joel F. Houston, Eleventh Edition 2007, Thomson South-Western, a Division of Thomson Corporation at 298, emphasis added.

26/ *Morningstar, Inc., Ibbotson SBBI 2013 Valuation Yearbook* at 51 and 52.

Q. ARE THERE ACTUAL INVESTMENT RESULTS THAT SUPPORT THE THEORY THAT THE GROWTH ON 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 to the geometric growth of the U.S. stock market. Kroll measures the historical geometric growth of the U.S. stock market over the period 1926-2021 to be approximately 6.4%.[27/] During this same time period, the U.S. nominal compound annual growth of the U.S. GDP was approximately 6.0%.[28/]

As such, over the past 95 years, the geometric average growth of the U.S. nominal GDP has been slightly higher than, but comparable to, the geometric average growth of the U.S. stock market capital appreciation. This historical relationship indicates that the U.S. GDP growth outlook is a reasonable estimate of the long-term sustainable growth of U.S. stock investments.

Q. WHAT IS THE GEOMETRIC AVERAGE AND WHY IS IT APPROPRIATE TO USE THIS MEASURE TO COMPARE GDP GROWTH TO CAPITAL APPRECIATION IN THE STOCK MARKET?

A. The terms geometric average growth rate and compound annual growth rate are used interchangeably. The geometric annual growth rate is the calculated growth rate, or return, that measures the magnitude of growth from start to finish. The geometric average is best, and most often, used as a measurement of performance or growth over a long period of time.[29/] Since I am comparing achieved growth in the stock market to achieved growth in U.S. GDP over a long period of time, the geometric average growth rate is most appropriate.

27/ *Kroll, 2022 SBBI Yearbook* at 145.
28/ U.S. Bureau of Economic Analysis, February 23, 2022.
29/ *New Regulatory Finance*, Roger Morin, PhD, at 133-134.

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

A. I relied on the economic consensus of long-term GDP growth projections. *Blue Chip Economic Indicators* publishes the consensus for GDP growth projections twice a year. These consensus GDP growth outlooks are the best available measure of the market's assessment of long-term GDP growth because the analysts' projections reflect all current outlooks for GDP. They are therefore likely the most influential on investors' expectations of future growth outlooks. The consensus projections published GDP growth rate outlook is 4.10% over the next 10 years. [30/]

I propose to use the consensus for projected five- and ten-year average GDP 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 approximately 2.00% and inflation of 2.10% over the five-year (2024-2028) and ten-year (2029-2033) projection periods, resulting in an average ten-year nominal annual GDP growth projection of 4.10%.[31/] These GDP growth forecasts represent the most likely views of market participants because they are based on published economic consensus projections.

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

A. Yes, and these alternative sources corroborate the consensus analysts' projections I relied on. Various commonly relied upon analysts' projections are shown in Table 4

30/ *Blue Chip Economic Indicators*, March 11, 2022, at 14.
31/ *Id.*

below. (Let's have table 4 to 1 decimals and add columns and line numbers. Miranda should have the new version.)

TABLE 4

GDP Forecasts

	Source	Projected Period (1)	Real GDP (2)	Inflation (3)	Nominal GDP (4)
1	Blue Chip Economic Indicators [1]	5-10 Yrs	2.0%	2.1%	4.1%
2	EIA - Annual Energy Outlook[2]	29 Yrs	2.2%	2.3%	4.5%
3	Congressional Budget Office[3]	30 Yrs	1.7%	2.0%	3.7%
4	Moody's Analytics[4]	31 Yrs	2.1%	1.9%	4.1%
5	Social Security Administration[5]	74 Yrs			4.1%
6	Economist Intelligence Unit[6]	29 Yrs	1.7%	2.1%	3.9%

Sources:
[1]Blue Chip Economic Indicators, March 11, 2022 at 14.
[2]U.S. EnergyInformation Administration (EIA), Annual Energy Outlook 2022, March 3, 2022.
[3]Congressional Budget Office, Long-Term Budget Outlook, March 2021.
[4]Moody's Analytics Forecast, downloaded March 8, 2022.
[5]Social Security Administration, "2021 OASDI Trustees Report," Table VI.G4, August 31, 2021.
[6]S&P MI, Economist Intelligence Unit, downloaded on March 9, 2022.

As shown in the table above, the real GDP and the inflation fall in the range of 1.70% to 2.10% and 1.9% to 2.3%, respectively. This results in a nominal GDP in the range of 3.70% to 4.50%, with a midpoint of 4.10%.

Therefore, the nominal GDP growth projections made by these independent sources support my use of 4.10% as a reasonable estimate of market participants' expectations for long-term GDP growth.

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.

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

A. As shown in Exhibit AWEC-CUB/111, the average and median multi-stage DCF returns on equity for my gas proxy group using the 13-week average stock price are 7.92% and 7.82%, respectively. The average and median DCF returns on equity for my water proxy group are 6.14% and 6.20%, respectively.

III.E. DCF Summary Results

Q. PLEASE SUMMARIZE THE RESULTS FROM YOUR DCF ANALYSES.

A. The results from my DCF analyses are summarized in Table 5 below:

TABLE 5

Summary of DCF Results

Description	Gas		Water	
	Average	Median	Average	Median
Constant Growth DCF Model (Analysts' Growth)	9.40%	9.12%	8.42%	9.17%
Constant Growth DCF Model (Sustainable Growth)	9.63%	8.95%	9.14%	8.96%
Multi-Stage Growth DCF Model	7.92%	7.82%	6.14%	6.20%

As noted earlier, to preserve the central tendency of my proxy group companies I have relied on the median DCF results. My DCF studies indicate a fair return on equity for NW Natural in the range of 9.0% to 9.2%, with a midpoint of 9.1%.

III.F. 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 quantify the difference between regulatory commission-authorized returns on common equity and contemporary U.S. Treasury bonds. The difference between the authorized 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 from 1986 through December 2021. The authorized returns on equity were based on regulatory commission-authorized returns for utility companies. Authorized returns are typically based on expert witnesses' estimates of the investor-required return at the time of the proceeding.

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 1986 through December 2021 because public utility stocks consistently traded at a premium to book value during that period. This is illustrated in Exhibit AWEC-CUB/112, which shows the market-to-book ratio since 1986 for the electric utility industry was consistently above a multiple of 1.0x. Over this period, an analyst can infer that authorized returns on equity were sufficient to support market prices that at least exceeded book value. This is an indication that commission-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 AWEC-CUB/113, the average indicated equity risk premium over U.S. Treasury bond yields has been 5.62%. 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 ten-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 AWEC-CUB/113, the five-year rolling average gas risk premium over Treasury bonds ranged from 4.17% to 7.17%, with an average of 5.56%. The ten-year rolling average gas risk premium ranged from 4.30% to 6.92%, with an average of 5.55%.

As shown on my Exhibit AWEC-CUB/114, the average indicated equity risk premium over contemporary "A" rated Moody's utility bond yields was 4.26% The five-year rolling average gas risk premiums ranged from 2.80% to 5.97%, with an average of 4.21%. The ten-year rolling average gas risk premiums ranged from 3.11% to 5.75%, with an average of 4.18%.

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. Contemporary market conditions can change 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 indicates 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 Kroll, have recommended that the 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 data that inherently relied on investor expectations, not actual investment returns, and, thus, need not encompass a very long historical time period.

Q. WHAT DOES CURRENT OBSERVABLE MARKET DATA SUGGEST ABOUT INVESTOR PERCEPTIONS OF UTILITY INVESTMENTS?

A. The equity risk premium should reflect the relative market perception of risk today in the utility industry. I have gauged investor perceptions in utility risk today in Exhibit AWEC-CUB/115, where I show the yield spread between utility bonds and Treasury bonds over the last 42 years. As shown in this attachment, the average utility bond yield spreads over Treasury bonds for "A" and "Baa" rated utility bonds for this historical period are 1.48% and 1.91%, respectively. The utility bond yield spreads over Treasury bonds for "A" and "Baa" rated utilities for 2019 were 1.18% and 1.61%, respectively. In 2020, the "A" and "Baa" utility spreads are 1.49% and 1.87%, respectively. In 2021, the "A" and "Baa" utility spreads declined to 1.05% and 1.30%, respectively. More recently, for the first three months of 2022, the "A" and "Baa"

utility spreads increased to 1.40% and 1.67%, respectively. Both the current average "A" rated and "Baa" rated utility bond yield spreads over Treasury bond yields are lower or comparable to the respective 42-year average spreads.

The current 13-week average "A" rated utility bond yield of 3.68% when compared to the current Treasury bond yield of 2.26%, as shown in Exhibit AWEC-CUB/116, implies a yield spread of 1.42%. This current utility bond yield spread is significantly lower than the 42-year average spread for "A" rated utility bonds of 1.48%. The current spread for the "Baa" rated utility bond yield of 1.70% is also lower than the 42-year average spread of 1.94%.

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

A. Yes. Market data illustrates 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 6 below summarizes the utility and corporate bond spreads relative to Treasury bond yields.

TABLE 6

Comparison of Yield Spreads Over Treasury Bond Yields

	Utility		Corporate	
Description	**A**	**Baa**	**Aaa**	**Baa**
Average Historical Spread	1.48%	1.91%	0.84%	1.91%
2019 Spread	1.18%	1.61%	0.81%	1.79%
2020 Spread	1.49%	1.87%	0.96%	2.10%
2021 Spread	1.05%	1.30%	0.65%	1.34%
2022 Spread*	1.40%	1.67%	0.95%	1.68%

Source: Moody's Bond Yields
*2022 data through March 2022

As shown in Table 6 above, the long-term historical spread from A and Baa utility bonds and that of corporate bonds relative to Treasuries exceeded the actual spread for utilities and corporates in 2019 and 2021. The spread in 2020 aligned with historical averages. The spread in 2022 is converging back to the historical norm. As such, the risk premiums in 2019 through 2021 appear to have been above normal but risk premiums are converging to more normalized levels based on observable data for calendar year 2022. For these reasons, I believe that a recent increase in short-term and a modest increase in long-term interest rates reflect a reduction in risk premiums demanded by market participants to assume securities of greater investment risk. Stated more specifically, observable risk premiums inherent in securities of different investment risk are starting to converge to more normal levels.

Q. WHAT IS YOUR RECOMMENDED RETURN FOR NW NATURAL 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. As outlined above, I believe the current market is reflecting high

premiums for investing in securities of greater levels of investment risk. Based on this observation, I propose to be conservative in applying a risk premium analysis. For these reasons, I recommend my high-end equity risk premium in forming a return on equity in this proceeding.

For the Treasury bond yields, I relied on an average historical risk premium of approximately 5.60% in combination with a forecasted Treasury bond yield of 3.30%.[32/] A forecasted Treasury bond yield of 3.30% reflects a substantial increase in the Treasury bond yield over a 13-week study period of 2.26%, as shown on my Exhibit AWEC/CUB/116 at 1. Using a Treasury bond risk premium of 5.60% and a projected 30-year Treasury bond yield of 3.30% produces an indicated equity risk premium of 8.90% (5.60% + 3.30%).

A risk premium based on utility bond yields reflects current observable bond yields. Current observable bond yields may increase over time based on economists' projections of changes in interest rates. However, history indicates that economists typically overestimate increases in interest rates. Therefore, current observable rates should also be considered. With current observable rates, I recommend an above average risk premium estimate. Using a five-year risk premium range of 2.80% to 5.97%, applying 75% weight to the high-end and 25% to the low-end, produces a risk premium over utility bond yields of 5.18%.[33/] A risk premium of 5.18% with an A utility yield of 3.68% as shown on my Exhibit AWEC-CUB/116, produces a risk premium return on equity of 8.86% (5.18% + 3.68%), rounded to 8.90%.

[32/] *Blue Chip Financial Forecasts*, April 1, 2022 at 2.

[33/] 75% x 5.97% + 25% x 2.80% = 5.18%.

Based on this methodology, my Treasury bond risk premium and my utility bond risk premium indicate a return on equity for NW Natural of 8.90%.

III.G. 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 portfolio. When stocks are held in a diversified portfolio, stock-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).

Risks that cannot be eliminated when held in a diversified portfolio are non-diversifiable risks. Non-diversifiable risks are related to the market 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, NW Natural'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 3.30%.[34/] The current 30-year Treasury bond yield is 2.26%, as shown in Exhibit AWEC-CUB/116.

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. Therefore, 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. In this regard, a Treasury bond yield is not a risk-free rate. Risk premiums related to unanticipated inflation and interest

34/ *Id*.

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. The average beta of my gas and water proxy groups are 0.86 and 0.78 , respectively.[35/]

I also reviewed the long-term trend of *Value Line* betas reported for the proxy group companies, and the *Value Line* regulated utility industries. The proxy group's betas have generally ranged between 0.65 and 0.75 prior to the elevated betas published after the COVID-19 pandemic commenced.[36/] The historical variability in the proxy group *Value Line* betas is similar to the historical variability in the entire regulated utility industry betas followed by *Value Line*.[37/] On this schedule, similar to the proxy group companies, I show the *Value Line* electric and gas industry historical beta estimates, which also indicate that the current beta is abnormally high, and the long-term historical average beta of the proxy group reasonably aligns with that of the entire industry.

The normalized historical beta estimates for the two proxy groups are 0.74 and 0.72, gas and water proxy groups, respectively. Thus, the current beta estimates of 0.86 (gas) and 0.78 (water) are well above the normalized historical beta for these proxy groups.

35/ Exhibit AWEC-CUB/117, Gorman/Page 1.
36/ *Id.*, Gorman/Page 2.
37/ *Id.*, Gorman/Pages 3-4.

Q. IS IT REASONABLE TO ESTIMATE A CAPM RETURN ON A REGULATED UTILITY BASED ON BETA ESTIMATES THAT ARE CLEARLY OUTLIERS FOR HISTORICAL AVERAGE BETAS?

A. No. Utility company betas have increased from around 0.65 to 0.75 up to a current level around 0.86 (gas) and 0.78 (water) over the last two years. This increase in betas suggests that utility companies' investment risks are increasing relative to the overall general marketplace. The outlook of increasing utility investment risk is simply not supported by a review of other risk measures for utilities including: (a) current robust valuation metrics of utilities as described above; (b) risk spreads of utility stock yields relative to bond yields; (c) sustained investment grade bond ratings for utility companies, and (d) access to significant amount of capital. Again, as shown on Exhibit AWEC-CUB/103, the historically strong valuation metrics of regulated utilities are particularly robust, indicating the market is paying a premium for utility stocks. The fact that utility stocks are trading at a premium is inconsistent with the notion that the market perceives the utility's industry's investment risk to be increasing. It also shows that the market is not demanding a higher rate of return to invest in these securities.

For these reasons, in performing my CAPM I used a more normalized beta, 0.72 to 0.74, with a midpoint of 0.73, and market risk premium factors in order to derive a CAPM return estimate in this proceeding.

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.

Kroll's *2022 SBBI Yearbook* estimates the historical arithmetic average real market return over the period 1926 to 2021 to be 9.2%.[38/] A current consensus for projected inflation, as measured by the Consumer Price Index, is 2.4%.[39/] Using these estimates, the expected market return is 12.04%.[40/] The market risk premium then is the difference between the 12.04% expected market return and my 3.30% risk-free rate estimate, or 8.74%, which I referred to as a normalized market risk premium.

I also developed a current market risk premium based on the difference between the expected return on the market of 12.04% as described above and the current 30-year Treasury yield of 2.26% as shown on my Exhibit AWEC-CUB/116, which produced a current market risk premium of approximately 9.78%.

A historical estimate of the market risk premium was also calculated by using data provided by Kroll in its *2022 SBBI Yearbook*. Over the period 1926 through 2021, the Kroll study estimated that the arithmetic average of the achieved total return on the S&P 500 was 12.3%[41/] and the total return on long-term Treasury bonds was 6.0%.[42/] The indicated market risk premium is 6.3% (12.3% - 6.0% = 6.3%).

38/ Kroll, *2022 SBBI Yearbook at 146.*
39/ *Blue Chip Financial Forecasts*, April 1, 2022 at 2.
40/ { (1 + 0.092) ∗ (1 + 0.026) – 1 } ∗ 100.
41/ *Kroll 2022 SBBI Yearbook* at 145.
42/ *Id.*

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

Q. HOW DOES YOUR ESTIMATED MARKET RISK PREMIUM RANGE COMPARE TO THAT ESTIMATED BY KROLL?

A. Kroll makes several estimates of a forward-looking market risk premium based on actual achieved data from the historical period of 1926 through 2021 as well as normalized data. Using this data, Kroll estimates a market risk premium derived from the total return on the securities that comprise the 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.

Kroll's range is based on several methodologies. First, Kroll estimates a market risk premium of 7.46% based on the difference between the total market return on common stocks (S&P 500) less the income return on 20-year Treasury bond investments over the 1926-2021 period.[43/]

Second, Kroll used the Ibbotson & Chen supply-side model which produced a market risk premium estimate of 6.22%.[44/] Kroll explains that the historical market risk premium based on the S&P 500 was influenced by an abnormal expansion of P/E ratios relative to earnings and dividend growth during the period, primarily over the last 30 years. Kroll believes this abnormal P/E expansion is not sustainable. In order

[43/] *Id*. at 199.
[44/] *Id.* at 207-208.

to control for the volatility of extraordinary events and their impacts on P/E ratios, Kroll takes into consideration the three-year average P/E ratio as the current P/E ratio.[45/]

Finally, Kroll 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 3.0%, Kroll concludes the current expected, or forward-looking, market risk premium is 5.5%, implying an expected return on the market of 8.5%.[46/]

Importantly, Kroll's 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.

Q. WHAT ARE THE RESULTS OF YOUR CAPM ANALYSIS?

A. The normalized beta estimates for both my gas and water proxy groups range from 0.72 to 0.74, with a midpoint of 0.73.

As shown on my Exhibit AWEC-CUB/118, using a current market risk-free rate of 2.26%, a projected market return of 12.04%, produces a market risk premium

45/ *Id.*

46/ Kroll: "U.S. Normalized Risk-Free Rate Increased from 2.5% to 3.0% Effective April 7, 2022."

of approximately 9.78%, combined with the beta of 0.73 indicates a CAPM return estimate of 9.40%.

Using a market return of 12.04%, with a projected risk-free rate of 3.30%, produces a market risk premium of 8.74%. This market risk premium and risk-free rate with a normalized utility beta of 0.73, indicates a CAPM return of about 9.68%.

I find a reasonable return on equity for NW Natural in this case using a CAPM study in the range of 9.40% to 9.70%, with a midpoint of 9.55%.

III.H. 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 NW NATURAL?

A. Based on my analyses, I recommend NW Natural's current market cost of equity be in the range of 8.90% to 9.55%, with an approximate midpoint of 9.20%.

TABLE 7

Return on Common Equity Summary

Description	Results
DCF	9.10%
Risk Premium	8.90%
CAPM	9.55%

My recommended return on common equity of 9.20% falls at the approximate midpoint of the range of 8.90% to 9.55%. The low-end of my range is based on my risk premium analyses, and the high-end is based on my CAPM. My DCF study also falls in this 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.

III.I. Financial Integrity

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

A. Yes. I have reached this conclusion by comparing the key credit rating financial ratios for NW Natural at my proposed return on equity and NW Natural's recommended 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.[47/]

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."

[47/] 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.

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." Based on the most recent S&P report, NW Natural 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 NW Natural'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.[48/]

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 NW Natural's cost of service for its regulated gas utility operations in its Oregon service territory. While S&P would normally look at total consolidated NW Natural financial ratios in its credit review process, my investigation in this proceeding is not the same as S&P's. I am

48/ *Standard & Poor's RatingsDirect*: "Criteria: Corporate Methodology," November 19, 2013.

attempting to judge the reasonableness of my proposed cost of capital for rate-setting in NW Natural's Oregon regulated gas utility operations. Hence, I am attempting to determine whether my proposed rate of return will in turn support cash flow metrics, balance sheet strength, and earnings that will support an investment grade bond rating and NW Natural's financial integrity. However, because I am measuring this based on retail operations for purposes of determining a rate of return that is fair and reasonable, I allocated the total Company adjusted debt leverage to retail operations using a rate base allocation factor. This allocated retail total adjusted debt will then be used to calculate the credit metrics in support of a fair rate of return in this proceeding.

Q. DID YOU INCLUDE ANY OFF-BALANCE SHEET ("OBS") DEBT EQUIVALENTS?

A. No. In response to UG 435 AWEC-CUB DR 13, NW Natural stated that it does not have any off-balance sheet debt equivalents. Therefore, I did not include any in the development of my credit metrics. However, I included NW Natural's short-term debt obligations as provided by the Company in its response to UG 435 SDR 76 Attachment 1.[49/]

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

A. The S&P financial metric calculations for NW Natural at a 9.20% return are developed on Exhibit AWEC-CUB/119, Gorman/Page 1. The credit metrics produced below, with NW Natural's financial risk profile from S&P of "Intermediate" and business risk profile of "Excellent," will be used to assess the strength of the credit metrics based on NW Natural's gas retail operations in the state of Oregon.

49/ Exhibit AWEC-CUB/119, Gorman/Page 3.

The adjusted debt ratio for credit metric purposes at the Company's proposed capital structure is 52%, which is much lower than the adjusted industry median debt ratio for A+ rated utilities of 56.7%.[50/] A lower debt ratio indicates, all else equal, less financial risk. NW Natural's financial risk is significantly lower than the industry.

Based on an equity return of 9.20% and the Company's proposed common equity ratio of 50%, NW Natural will be provided an opportunity to produce a Debt to Earnings Before Interest, Taxes, Depreciation and Amortization ("EBITDA") ratio of 4.2x. This is within S&P's "Significant" guideline range of 3.5x to 4.5x.[51/]

NW Natural's retail utility operations FFO to total debt coverage at a 9.20% equity return and 50.0% equity ratio is 17%, which is within S&P's "Intermediate" metric guideline range of 13% to 23%. This ratio is again within the FFO/total debt range that will support NW Natural's credit rating.

I conclude that NW Natural's core credit metrics ratios based on the Company's proposed capital structure and my return on equity will support its investment grade credit rating of A+. Significantly, my recommended overall rate of return will accomplish these objectives while minimizing NW Natural's cost of service and supporting the most competitive rates that remain just and reasonable from a rate-setting standpoint.

Q. DOES THIS FINANCIAL INTEGRITY ASSESSMENT SUPPORT YOUR RECOMMENDED OVERALL RATE OF RETURN FOR NW NATURAL?

A. Yes. As noted above, I believe my return on equity and the Company's proposed capital structure represent fair compensation in today's very low capital market costs,

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50/ *Id.*, Gorman/Page 4.

51/ *Standard & Poor's RatingsDirect*®: "Criteria: Corporate Methodology," November 19, 2013.

and as outlined above, my overall rate of return will provide NW Natural an opportunity to earn credit metrics that will support its bond rating.

IV. RESPONSE TO DR. BENTE VILLADSEN AND JOSH FIGUEROA

IV.A. Summary of Rebuttal

Q. WHAT RETURN ON EQUITY IS NW NATURAL PROPOSING IN THIS PROCEEDING?

A. NW Natural's proposed return on equity is supported by its witnesses Dr. Bente Villadsen and Mr. Josh Figueroa. They recommend a return on equity for NW Natural in the range of 9.50% to 10.50%, with a point estimate of 9.90%. However, NW Natural is requesting a return on equity of 9.50%.[52/]

Q. PLEASE DESCRIBE DR. VILLADSEN'S AND MR. FIGUEROA'S METHODOLOGY SUPPORTING THEIR RETURN ON EQUITY RECOMMENDATION.

A. Dr. Villadsen and Mr. Figueroa arrived at their estimate using several models that they applied to two sample groups of regulated natural gas and water companies including a traditional CAPM and an empirical CAPM ("ECAPM"), a simple DCF, and a multi-stage growth DCF. Additionally, Dr. Villadsen and Mr. Figueroa performed a risk premium model.

Q. ARE DR. VILLADSEN'S AND MR. FIGUEROA'S ESTIMATED RETURN ON EQUITY AND NW NATURAL'S REQUESTED RETURN ON EQUITY REASONABLE?

A. No. Dr. Villadsen's and Mr. Figueroa's recommended return on equity of 9.9% and NW Natural's requested return on equity of 9.5% are excessive and unreasonable for a low-risk regulated gas utility company such as NW Natural. Further, Dr. Villadsen

52/ NW Natural/300, Villadsen-Figueroa/Pages 5-7.

and Mr. Figueroa assert that NW Natural's higher business risks warrants a return in the upper half of their range.[53/] The unreasonableness of Dr. Villadsen's and Mr. Figueroa's recommendation is evident from a detailed assessment of the models supporting their recommendation in this proceeding.

Q. PLEASE SUMMARIZE DR. VILLADSEN'S AND MR. FIGUEROA'S RETURN ON EQUITY STUDY RESULTS.

A. Dr. Villadsen's and Mr. Figueroa's return on equity study results before and after their financial leverage adjustments are summarized in Table 8 below. As I explain later, the table below clearly demonstrates that without their faulty financial leverage adjustments and misplaced assertion that NW Natural is of higher risk, their recommended range and point estimate are completely unsupported.

53/ *Id.*

TABLE 8

Summary of Dr. Villadsen's and Mr. Figueroa's Sample Results

Model	Dr. Villadsen's and Mr. Figueroa's Results			
	Model Results	ATWACC Adjustment	Recommended ROE	Corrected ROE
	(1)	(2)	(3)	(4)
DCF (Gas Sample)				
Simple DCF	10.1%	0.7%	10.8%	9.7%
Multi-Stage	8.1%	0.5%	8.6%	8.1%
CAPM (Gas Sample)				
Traditional CAPM	8.8% - 10.0%	1.9% - 2.2%	10.7% - 12.2%	9.4%
ECAPM (1.5%)	9.0% - 10.2%	1.9% - 2.2%	10.9% - 12.4%	Reject
Traditional CAPM (Hamada)			10.2% - 12.1%	Reject
ECAPM (1.5%) (Hamada)			10.1% - 11.9%	Reject
DCF (Water Sample)				
Simple DCF	9.6%	3.0%	12.6%	8.5%
Multi-Stage	6.0%	1.6%	7.6%	6.0%
CAPM (Water Sample)				
Traditional CAPM	8.1% - 9.2%	2.5% - 2.9%	10.6% - 12.1%	8.7%
ECAPM (1.5%)	8.4% - 9.5%	2.6% - 3.0%	11.0% - 12.5%	Reject
Traditional CAPM (Hamada)			9.8% - 11.8%	Reject
ECAPM (1.5%) (Hamada)			9.8% - 11.6%	Reject
Risk Premium (Gas)			9.6%	9.2%
Recommended Range			9.5% - 10.5%	8.1% - 9.7%
Recommended ROE			9.9%	9.2%

ROE = Return on Equity
ATWACC = After-Tax Weighted Average Cost of Capital
Dr. Villadsen and Mr. Figueroa recommend a return on equity of 9.90%. However, NW Natural is requesting a return on equity of 9.50%.

As shown in Table 8 above, the return on equity results of Dr. Villadsen's and Mr. Figueroa's studies applied to their gas and water samples indicate that the required return on equity is in the range of 8.1% to 10.1% based on their DCF and CAPM studies with their risk premium study of 9.6% falling in this range.

They then increase their market return on equity estimates by applying various upward leverage adjustments in the range of 0.5% to 2.9%, which increases their recommended range up to 8.6% to 12.2%. Dr. Villadsen and Mr. Figueroa narrows their recommended range to 9.5% to 10.5% and conclude that a reasonable return on equity for NW Natural will fall in the upper half of their range.

Q. DO DR. VILLADSEN'S AND MR. FIGUEROA'S RETURN ON EQUITY MODEL RESULTS SUPPORT THE COMPANY'S REQUESTED 9.5% RETURN ON EQUITY, OR EVEN THE RETURN ON EQUITY OF 9.9% THEY RECOMMEND?

A. No. As described below and illustrated in Table 8 above, Dr. Villadsen's and Mr. Figueroa's own studies, after removing their flawed ATWACC adjustment, would support a return on equity in the range of 8.1% to 10.1%. Reflecting the median results of their DCF models to better capture the central tendency of their proxy samples in the presence of outliers will further reduce this range to 8.1% to 9.7%.

Q. PLEASE DESCRIBE THE ISSUES YOU HAVE WITH DR. VILLADSEN'S AND MR. FIGUEROA'S ANALYSES.

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

1. Their ATWACC adjustment is unnecessary and is not a well-recognized or widely accepted methodology in setting a fair return on equity for regulated utilities in the United States.

2. Their recommended point estimate rests on a faulty assumption that NW Natural is of higher risk relative to their sample companies.

3. In their CAPM analysis, they include both an ATWACC adjustment, and alternatively a leveraged beta adjustment to the CAPM results. Both of these CAPM return on equity adders are flawed and should be rejected.

4. They also rely on an ECAPM analysis and include adjustments for their ATWACC and leveraged beta methods. In addition to my concerns for these two adjustments, Dr. Villadsen's and Mr. Figueroa's ECAPM analysis is flawed because they use adjusted betas in their ECAPM. This is inappropriate because an adjusted beta accomplishes the same thing as an ECAPM analysis. Both flatten the slope of the security market line.

5. Dr. Villadsen's and Mr. Figueroa's constant growth DCF returns are based on growth rates that exceed the long-term sustainable growth rate and can only be used as a high-end return on equity estimate. In addition, their simple DCF is subject to outliers which skew the average DCF results. Therefore, using the median DCF results is a better approach to determine the central tendency of the samples. Further, I recommend the ATWACC return on equity adder they proposed to include with the results of their DCF studies be rejected.

6. Their risk premium is based on an overly simplistic inverse relationship between equity risk premiums and interest rates. Therefore, Dr. Villadsen's and Mr. Figueroa's risk premium model is flawed and overstates a fair return for NW Natural.

IV.B. ATWACC

Q. PLEASE DESCRIBE DR. VILLADSEN'S AND MR. FIGUEROA'S PROPOSED ATWACC RETURN ON EQUITY ADJUSTMENT.

A. Dr. Villadsen and Mr. Figueroa calculate an ATWACC for each of their samples' DCF and CAPM results by using each sample company's market value capital structure, an approximate 3.0% cost of debt and preferred stock and preferred stock. They also assume NW Natural' composite tax rate of 27.0% is applicable to all companies in their sample. Once they calculate the ATWACC, they then back into the return on equity required to produce the same rate of return using NW Natural's book value capital structure and embedded cost of debt.

These ATWACC adjustments to their return on equity estimates are discussed in their Technical Appendix, NW Natural/302, and developed in the workpapers accompanying their schedules for the CAPM and DCF return estimates.

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

A. No. The ATWACC methodology adjusts the market derived return to apply it to book value returns. In effect, it represents a market-to-book ratio adjustment applied to the market return in order to make it appropriate for a book return. The deficiency in the ATWACC adder is that it provides the utility an excess return on incremental plant investment. For example, using Dr. Villadsen's and Mr. Figueroa's DCF return estimate of 10.1%, an ATWACC adder of 0.7% would imply that NW Natural can earn a 10.1% return by buying back its own stock, but could earn a rate of return on incremental plant investment of 10.8%. Because these are comparable risk investments, the rate of return should be the same. However, under Dr. Villadsen's and Mr. Figueroa's ATWACC methodology, NW Natural would be allowed to earn a rate of return on incremental plant investments that is 70 basis points higher than it could earn by buying back its own stock. As such, the ATWACC adder has the effect of incenting the utility to over-invest in utility plant because it will earn an above market rate of return on that investment.

Importantly, this methodology is flawed because the Company only has one level of financial risk, not two. Investors do not assess a different amount of financial risk for market versus book common equity valuations. Rather, financial risk is a singular risk factor, which describes the utility's financial capital structure, and cash flow earnings strength to support its financial obligations.

Further, Dr. Villadsen's and Mr. Figueroa's proposal to use only market data to measure financial risk, rather than book value data, is not consistent with the wealth of market participants that assess a utility's financial risk based on their book value measures. For example, S&P and *Value Line* provide general assessments of the financial and operating (or total investment) risks to the market investors.

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.

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.

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. HAS THE ATWACC METHODOLOGY PROPOSED BY DR. VILLADSEN AND MR. FIGUEROA BEEN ACCEPTED IN RATE-SETTING PROCEEDINGS IN THE UNITED STATES?

A. No. The use of this methodology is not widely accepted by the regulatory commissions. Specifically, the Michigan Public Service Commission has rejected Dr. Villadsen's application of the ATWACC methodology in U-18014, stating: "[…] the Commission does agree with the PFD [proposal for decision] that little or no weight should be given to

the utility's ATWACC calculations."[54/] More recently, the Michigan Public Utility Commission reaffirmed its decision in a DTE Electric Company rate case (U-18255).[55/] Similarly in the most recent Nicor Gas Company rate case (21-0098) the Illinois Commerce Commission stated the following in regard to Dr. Villadsen's ATWACC methodology: "Additionally, the Company's leverage adjustments improperly inflated the Company's return on equity recommendation."[56/]

IV.C. Dr. Villadsen's and Mr. Figueroa's CAPM Analysis

Q. PLEASE DESCRIBE DR. VILLADSEN'S AND MR. FIGUEROA'S CAPM ANALYSIS.

A. Dr. Villadsen and Mr. Figueroa develop two versions of the CAPM model, a traditional CAPM and an ECAPM. In each of their CAPM analyses, Dr. Villadsen and Mr. Figueroa relied upon two different scenarios. In the first scenario, they used a projected risk-free rate of 2.40% with a market risk premium of 7.25%. Dr. Villadsen's and Mr. Figueroa's risk-free rate of 1.9% for 2022 is based on the *Blue Chip Economic Indicators* from August, 2021, including adjustments for term to maturity of 0.50%. In the second scenario, they used the same risk-free rate of 2.40% with a market risk premium of 8.61%.[57/] Applying these inputs with their *Value Line* betas of 0.88 (gas) and 0.79 (water), they produce their bare-bone CAPM estimates of 8.8% to 10.0% for their gas sample and 8.1% to 9.2% for their water sample.

54/ Michigan Public Service Commission, Case No. U-18014, Final Order, page 66, January 31, 2017.

55/ Michigan Public Service Commission, Case No. U-18255, Final Order, page 32, April 18, 2018.

56/ Illinois Commerce Commission, Docket No. 21-0098, Proposed Order at 93, September 30, 2021.

57/ NW Natural/300, Villadsen-Figueroa/51-53 and NW Natural/303 Schedule No. BJV-6.9 at 27.

To these bare-bone or "base" CAPM returns, Dr. Villadsen and Mr. Figueroa propose either one of two return on equity adjustments. First, they propose to increase their base CAPM return estimate through their ATWACC adjustment by approximately 190 to 220 basis points for their gas sample and 250 to 290 basis points for their water sample. This increases their traditional CAPM results to a range of 10.7% to 12.2% for their gas sample and 10.6% to 12.1% for their water sample. For the reasons outlined above, this ATWACC adjustment should be rejected.

Alternatively, Dr. Villadsen and Mr. Figueroa propose a financial risk adjustment (the Hamada adjustment) to reflect a leveraged beta. This leveraged beta adjustment adds approximately 140 to 210 basis points to the base CAPM return estimates for the gas sample and 170 to 260 points for their water sample. This produces a CAPM range of 10.2% to 12.1% for their gas sample and 9.8% to 11.8% for their water sample. Dr. Villadsen's and Mr. Figueroa's CAPM/ECAPM leverage adjusted results fall in the range of 9.8% to 12.5%. However, they use their gas sample results to narrow their range and give more weight to their ECAPM results produced by the Hamada methodology, which fall in the range of 10.5% to 11.25%.[58/]

Similar to their ATWACC adjustment, this Hamada adjustment is not a well-accepted methodology in estimating the cost of equity in utility rate cases in the United States.

Q. PLEASE DESCRIBE DR. VILLADSEN'S AND MR. FIGUEROA'S LEVERAGED BETA ADJUSTMENT.

A. As an alternative to their ATWACC adjustment to their CAPM results, Dr. Villadsen and Mr. Figueroa measure an additional return on equity adjustment based on leveraged

[58/] NW Natural/300, Villadsen-Figueroa/58.

adjustments to the beta component of the CAPM study. In producing this adjustment, they apply the Hamada method to de-lever and re-lever the beta component in both the CAPM and the ECAPM with and without the effect of income taxes.[59/]

Applying the Hamada formula increases the gas sample *Value Line* beta from 0.88[60/] to 1.13 (without taxes) and 1.07 (with taxes).[61/] The Hamada model produces traditional CAPM results in the range of 10.2% to 12.1% and ECAPM results in the range of 10.1% to 11.9% for the gas sample.[62/] Similarly, applying the Hamada formula increases the water sample *Value Line* beta from 0.79[63/] to 1.09 (without taxes) and 1.02 (with taxes).[64/] The Hamada model produces traditional CAPM results in the range of 9.8% to 11.8% and ECAPM results in the range of 9.8% to 11.6% for the water sample.[65/]

Q. IS DR. VILLADSEN'S AND MR. FIGUEROA'S APPLICATION OF THE LEVERAGED BETA ADJUSTMENT REASONABLE?

A. No. Dr. Villadsen's and Mr. Figueroa's application of the Hamada adjustment in their CAPM and ECAPM analyses is inappropriate in determining NW Natural's cost of equity. While the Hamada 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 to my knowledge. While Dr. Villadsen and Mr. Figueroa discuss at length the appropriateness for each individual adjustment they make to the CAPM model and its components, they have not provided empirical support for all the adjustments they make to be used in concert with one another. In other words, this

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59/ Villadsen-Figueroa Technical Appendix, NW Natural/302.
60/ NW Natural/303 Schedule No. BJV-6.13 at 33.
61/ NW Natural/303 Schedule No. BJV-6.15 at 35.
62/ *Id.*
63/ NW Natural/303 Schedule No. BJV-6.13 at 33.
64/ NW Natural/303 Schedule No. BJV-6.15 at 35.
65/ *Id.*

hodgepodge of adjustments do not necessarily work in tandem with one another or coordinate to produce a reliable estimate of measuring investment risk or the current market cost of capital.

Additionally, in similar fashion to their ATWACC adjustment, Dr. Villadsen and Mr. Figueroa deleverage the betas for the sample companies' market value capital structures, and re-leverage them using NW Natural's requested book value capital structure. The resulting adjustment is inaccurately measured and imbalanced because it is not made on an apples-to-apples comparison of either market value measures of debt leverage, or book value measures of debt leverage. Rather, it is a mismatch using market value adjusted debt measures on one hand, and compared to book value measures of debt leverage on the other. This methodology simply is imbalanced and inaccurate.

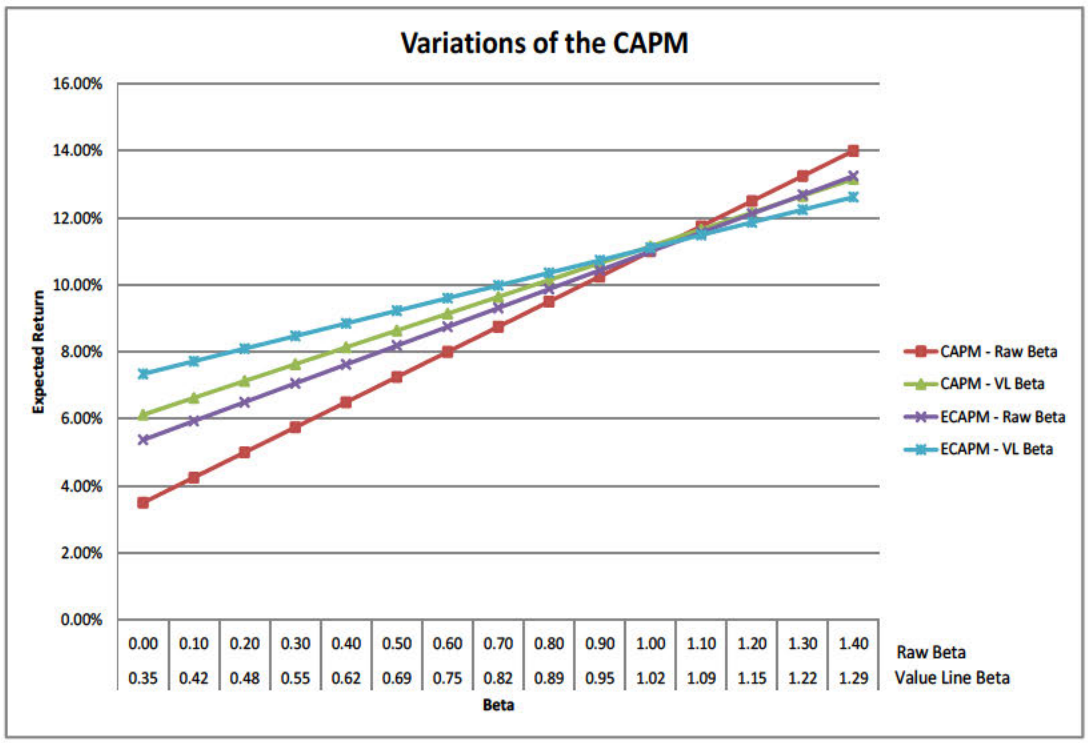
Q. DO YOU HAVE ANY OTHER CONCERNS WITH DR. VILLADSEN'S AND MR. FIGUEROA'S ECAPM RETURN ESTIMATES?

A. Yes. I also have concerns with Dr. Villadsen's and Mr. Figueroa's reliance on their ECAPM return estimates. Specifically, Dr. Villadsen and Mr. Figueroa applied the *Value Line* adjusted beta within their ECAPM studies. This adjustment is inconsistent with the academic research supporting the development of an ECAPM methodology.[66/] 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.

66/ 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.

Dr. Villadsen and Mr. Figueroa discuss the objective of the ECAPM at pages 54-56 of their testimony. As shown in Dr. Villadsen's and Mr. Figueroa's Figure 13, 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 5 below.

Figure 5



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 the CAPM return estimate.

Importantly, 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. As such, the practice of using an adjusted beta in an ECAPM study is simply not supported by academic research and should be rejected.

Q. DO YOU HAVE ANY FURTHER COMMENTS WITH DR. VILLADSEN'S AND MR. FIGUEROA'S CAPM STUDIES?

A. Yes. As discussed in regard to my own CAPM study, the current beta estimates have increased substantially during the COVID-19 pandemic. However, these elevated beta estimates do not represent an increase in utility risk or cost of equity. As discussed above, utility companies are well positioned to weather economic downturns and are considered defensive stocks. Their cash flows strength is consistent and supported by strong valuations. Therefore, it is reasonable to consider a normalized beta estimate of approximately 0.70 in Dr. Villadsen's and Mr. Figueroa's CAPM studies.

Q. CAN DR. VILLADSEN'S AND MR. FIGUEROA'S CAPM STUDIES BE REVISED TO REFLECT MORE REASONABLE INPUTS?

A. Yes. Using the historical beta of approximately 0.70 and Dr. Villadsen's and Mr. Figueroa's market risk premium of 7.25% and 8.61% and an updated risk-free rate of 2.80% will result in a CAPM return in the range of 7.9% (2.80% + 0.70 x 7.25%) to 9.6% (2.80% + 0.70 x 8.61%). Dr. Villadsen's and Mr. Figueroa's traditional CAPM produces a return on equity in the range of 8.1% to 10.0%. Therefore, a reasonable CAPM return without any of Dr. Villadsen's and Mr. Figueroa's flawed adjustments for NW Natural falls in the range of 8.0% to 10.0%.

IV.D. Dr. Villadsen's and Mr. Figueroa's DCF Analyses

Q. PLEASE DESCRIBE DR. VILLADSEN'S AND MR. FIGUEROA'S DCF ANALYSIS.

A. Dr. Villadsen and Mr. Figueroa developed a constant growth DCF model based on a combined growth rate from IBES consensus analysts' and *Value Line*. Dr. Villadsen's and Mr. Figueroa's DCF model results fall in the range of 8.1% to 10.0% for their gas sample and 6.0% to 9.6% for their water sample, with the higher estimates produced by their simple constant growth DCF model. They applied an ATWACC adder to the DCF model results and increased the DCF range to 8.6% - 10.8% for their gas sample and 7.6% - 12.6% for their water sample.[67/] Similar to their CAPM, Dr. Villadsen and Mr. Figueroa uses the results of their gas sample to narrow the range and conclude that a reasonable DCF range is 9.0% to 10.5%.[68/]

67/ Exhibit NW Natural/303 Schedule No. BVJF-6.7 and 6.8 at 24-28.

68/ NW Natural/300, Villadsen-Figueroa/62.

Q. PLEASE DESCRIBE THE ISSUES YOU HAVE WITH DR. VILLADSEN'S AND MR. FIGUEROA'S DCF ANALYSIS.

A. I have three major issues with Dr. Villadsen's and Mr. Figueroa's DCF analysis. First, as I discussed above, the use of the ATWACC methodology is inappropriate and should be rejected. Second, Dr. Villadsen's and Mr. Figueroa's simple DCF model is based on growth rates of 6.5% for their gas sample and 7.9% for their water sample. These growth rates are significantly higher than the long-term sustainable growth rate of 3.9% used in their multi-stage DCF model. As discussed in regard to my own DCF model, such growth rates cannot be sustained indefinitely. Finally, I take issue with Dr. Villadsen's and Mr. Figueroa's interpretation of the central tendency of their DCF results. For both their gas and water samples, the group averages, which they rely on, are skewed by outlier estimates. When outliers are included, the median more accurately represents the central tendency of the proxy groups. The gas average is skewed by two high-end outliers for South Jersey Industries (14.4%) and NiSource (12.4%). Similarly, the water average is skewed by two high-end outliers for Global Water Resources, Inc. (15.6%) and SJW group (13.5%). Hence, I believe the median for both group samples more accurately describes the central tendency of the proxy group results. As shown on my Exhibit AWEC-CUB/120 the median simple DCF results for the gas and water proxy samples are 9.7% and 8.5%, respectively. The average and the median results for Dr. Villadsen's and Mr. Figueroa's multi-stage DCF model are almost identical to each other. For the reasons described above, I believe Dr. Villadsen's and Mr. Figueroa's bare bones DCF study supports a return on equity in the range of 8.5% to 9.7%.

IV.E. Dr. Villadsen's and Mr. Figueroa's Risk Premium Analysis

Q. PLEASE DESCRIBE DR. VILLADSEN'S AND MR. FIGUEROA'S RISK PREMIUM ANALYSIS.

A. Dr. Villadsen's and Mr. Figueroa's risk premium analysis is predicated on an inverse relationship between authorized returns on equity for gas utilities and long-term Treasury yields. They observed the relationship over the periods Q1 1990 to Q3 2021.[69/] Dr. Villadsen and Mr. Figueroa's uses their projected yield of 2.40% as discussed above in regard to their CAPM analyses. They then perform a regression analysis to capture the relationship between bond yields and the equity risk premium. Dr. Villadsen and Mr. Figueroa estimate the equity risk premium of 7.18% by applying the regression formula. Their risk premium analysis produces cost of equity estimate of 9.6%.[70/]

Q. DO YOU HAVE ANY COMMENTS ON DR. VILLADSEN'S AND MR. FIGUEROA'S RISK PREMIUM ANALYSIS?

A. Yes. Dr. Villadsen's and Mr. Figueroa'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 influenced by changes in perception of the investment risk of bond

69/ NW Natural/300, Villadsen-Figueroa/64-65.
70/ Exhibit NW Natural/303 Schedule No. BVJF-6.16 at 37.

investments relative to equity investments, rather than only changes to nominal interest rates.[71/]

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.[72/] 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.

Q. CAN DR. VILLADSEN'S AND MR. FIGUEROA'S RISK PREMIUM ANALYSIS BE MODIFIED TO REFLECT A MORE REASONABLE EQUITY RISK PREMIUM?

A. Yes. Dr. Villadsen's and Mr. Figueroa's risk premium study can be modified to produce a more reasonable DCF result. Disregarding Dr. Villadsen's and Mr. Figueroa's simplistic inverse relationship and using a more recent projected Treasury yield published

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71/ "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.

72/ Kroll, *2022 SBBI Yearbook* 135-138.

by independent economists of 2.8%, and adding an equity risk premium of 6.37% as developed in regard to my risk premium study, produces a risk premium return on equity for NW Natural of 9.2%.

IV.F. Dr. Villadsen's and Mr. Figueroa's Consideration of Additional Risks

Q. DID DR. VILLADSEN AND MR. FIGUEROA OFFER AN ASSESSMENT OF NW NATURAL'S RISK RELATIVE TO THEIR PROXY SAMPLES?

A. Yes. Beginning on page 67 of their testimony, Dr. Villadsen and Mr. Figueroa offer an assessment of the gas utility industry and continue with a few examples of why they believe NW Natural is of higher business risk relative to their sample companies. Dr. Villadsen and Mr. Figueroa assert that, all else equal, NW Natural's decarbonization risk, its smaller size and high capital expenditure level make NW Natural more risky than the sample companies even though they recognize that NW Natural has a comparable credit rating to that of their samples.

Q. DO YOU BELIEVE DR. VILLADSEN AND MR. FIGUEROA ACCURATELY ASSESSED THE RISK OF NW NATURAL RELATIVE TO THE SAMPLES?

A. No. In short, Dr. Villadsen and Mr. Figueroa have cherry-picked risks potentially faced by NW Natural without considering other unique risks faced by the proxy group companies. Dr. Villadsen's and Mr. Figueroa's concerns about these particular risks should be ignored for several reasons.

First, to the extent ratings agencies deemed these particular risks material, ratings agencies would have taken them into consideration and they would be reflected in NW Natural's credit ratings. As I discussed above in detail, and show on my Exhibit AWEC-CUB/104, NW Natural's ratings are comparable to those of the proxy group. The relative risks discussed on pages 67-74 of Dr. Villadsen's and Mr. Figueroa's testimony are

already incorporated in the credit ratings of the proxy group companies. Indeed, S&P and other credit rating agencies go to great detail in assessing a utility's business risk and financial risk in order to evaluate total investment risk. This total investment risk assessment of NW Natural, in comparison to the proxy groups, is fully absorbed into the market's perception of its risk. The use of my proxy groups fully captures the investment risk of NW Natural and is, in fact, conservative, given that the proxy group has a lower credit rating than NW Natural.

Q. HOW DOES S&P ASSIGN CORPORATE CREDIT RATINGS FOR REGULATED UTILITIES?

A. In assigning corporate credit ratings, the credit rating agency considers both business and financial risks. Business risks, among others, include a company's size, competitive position, generation portfolio, and capital expenditure programs, as well as consideration of the regulatory environment, current state of the industry, and the economy as whole. Specifically, S&P states:

> To determine the assessment for a corporate issuer's business risk profile, the criteria combine our assessments of industry risk, country risk, and competitive position. Cash flow/leverage analysis determines a company's financial risk profile assessment. The analysis then combines the corporate issuer's business risk profile assessment and its financial risk profile assessment to determine its anchor. In general, the analysis weighs the business risk profile more heavily for investment-grade anchors, while the financial risk profile carries more weight for speculative-grade anchors.[73/]

Therefore, Dr. Villadsen's and Mr. Figueroa conclusion that NW Natural is of higher risk relative to their sample companies is unfounded and should be rejected.

[73/] *Standard & Poor's RatingsDirect:* "Criteria/Corporates/General: Corporate Methodology," November 19, 2013.

IV.G. Dr. Villadsen's and Mr. Figueroa's Assessment of Capital Market Conditions

Q. PLEASE SUMMARIZE DR. VILLADSEN'S AND MR. FIGUEROA'S COMMENTARY ON CERTAIN MEASURES OF MARKET VOLATILITY AND HOW IT IMPACTS THE REQUIRED RETURN ON EQUITY FOR NW NATURAL.

A. Dr. Villadsen and Mr. Figueroa offered an assessment of the current market conditions. They suggest a few factors that gauge investor sentiment, including interest rates, utility credit spreads, market risk premium and inflation expectation.[74/]

Dr. Villadsen and Mr. Figueroa consistently point out that interest rates are expected to increase and it is important to use forecasted yields in estimating the return on equity for NW Natural.[75/] While the Federal Reserve has changed its policy to allow short-term interest rates to increase, it is simply not known how much, if any, long-term interest rates will increase from current levels. Their reliance on forecasted interest rates is unreasonable because they are not considering the highly likely outcome that current observable interest rates will prevail during the period in which rates determined in this proceeding will be in effect. This is important because while current observable interest rates are actual market data that provide 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 AWEC-CUB/121 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

74/ NW Natural/300, Villadsen-Figueroa/21.
75/ NW Natural/300, Villadsen-Figueroa/26.

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.

Q. DID DR. VILLADSEN AND MR. FIGUEROA OPINE THAT MARKET VOLATILITY HAS INCREASED?

A. Yes. Dr. Villadsen and Mr. Figueroa also reviewed the volatility in the current capital market, which according to them triggered an elevated market risk premium. They reviewed the volatility as measured by the CBOE Implied Volatility Index ("VIX") and SKEW index since the beginning of the pandemic. Dr. Villadsen and Mr. Figueroa state that the VIX index, which generally tracks broader market equity security values, indicates volatility levels not seen since the Financial Crisis.[76/] Similarly, the SKEW

[76] NW Natural/300, Villadsen-Figueroa/30-31.

index, which measures the skewness of the market returns or the investors' perception of extreme negative moves, has increased above its long-term historic average.

Q. ARE THE VIX AND SKEW INDICES ADEQUATE TO SUPPORT THE NOTION THAT THE MARKET PERCEPTION OF THE INVESTMENT RISK OF UTILITIES HAS INCREASED?

A. No. Both the VIX and the SKEW are broader-based market indices of stock price volatility, and not that of subgroups within the market generally, and certainly not applicable to the utility subsector. Utility securities are generally regarded as low-risk investments, and the market generally flocks to low-risk sectors during periods of broader economic distress. The VIX and the SKEW indices may indicate greater risk in the overall market but that does not indicate a similar change in investment risk for lower-risk regulated utility companies.

Further, the VIX and the SKEW indices measure investors' expectations of market volatility over the next 30 days and can change significantly over a short period of time. In fact, the VIX has significantly declined to its long-term average. Similarly, the SKEW index has also declined since its high levels observed by Dr. Villadsen and Mr. Figueroa. These drastic fluctuations of the VIX and the SKEW indices emphasize the fact that they should not be used to measure investors' perception of utility operating risk.

Q. DO YOU BELIEVE THAT DR. VILLADSEN'S AND MR. FIGUEROA'S USE OF THESE MARKET SENTIMENTS SUPPORTS THEIR FINDINGS THAT NW NATURAL'S MARKET COST OF EQUITY IS CURRENTLY 9.9%?

A. No. In many instances Dr. Villadsen's and Mr. Figueroa 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. Again, the current market sentiment toward utility investments, rather than just general corporate investments, is that the market is placing high value on utility securities, recognizing their low risk and stable characteristics. This is illustrated by current utility bond yield spreads as discussed at length previously. The current strong utility bond valuation is an indication of the market's sentiment that utility bonds are lower risk and are generally regarded as a safe haven by the investment industry.

Further, other measures of utility stock valuations also support the conclusion that there is a robust market for utility stocks. As shown on my Exhibit AWEC-CUB/103, financial valuation measures – *e.g.*, P/E ratio and market price to cash flow ratio – show that utility stock valuation measures are robust.

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. DOES THIS CONCLUDE YOUR OPENING TESTIMONY?

A. Yes, it does.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/101

QUALIFICATIONS OF MICHAEL P. GORMAN

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 Corpus Christi, Texas; Detroit, Michigan; Louisville, Kentucky and Phoenix, Arizona.

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: Alaska, Arkansas, Arizona, California, Colorado, Delaware, the District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming, and before the provincial regulatory boards in Alberta, Nova Scotia, and Quebec, 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.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/102

RATE OF RETURN

Northwest Natural Gas Company

Rate of Return

Line	Description	Amount ($000) (1)	Weight (2)	Cost (3)	Weighted Cost (4)
1	Long-Term Debt	$1,164,700	50.00%	4.27%	2.14%
2	Common Equity	$1,164,700	50.00%	**9.20%**	4.60%
3	**Total**	**$2,329,400**	**100.00%**		**6.74%**

Source:
NW Natural/200, Wilson/Page 3.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/103

VALUATION METRICS

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

		Price to Earnings (P/E) Ratio [1]																				
Line	Company	20-Year Average (1)	2021 [2] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)	2005 (18)	2004 (19)	2003 (20)	2002 (21)
1	ALLETE	18.08	16.70	18.28	24.75	22.17	23.05	18.63	15.06	17.23	18.59	15.88	14.66	15.98	16.08	13.95	14.78	16.55	17.91	25.21	N/A	N/A
2	Alliant Energy	16.81	21.90	21.23	21.16	19.14	20.60	22.30	18.07	16.60	15.28	14.50	14.45	12.47	13.86	13.43	15.08	16.82	12.59	14.00	12.69	19.93
3	Ameren Corp.	16.54	21.10	22.23	22.09	18.29	20.60	18.29	17.55	16.71	16.52	13.35	11.93	9.66	9.26	14.21	17.45	19.39	16.72	16.28	13.51	15.78
4	American Electric Power	14.92	17.90	19.57	21.41	18.04	19.33	15.16	15.77	15.88	14.49	13.77	11.92	13.42	10.03	13.06	16.27	12.91	13.70	12.42	10.66	12.68
5	Avangrid, Inc.	26.79	25.30	25.34	22.15	26.05	27.27	20.49	40.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	18.44	20.70	21.18	14.98	24.54	23.37	18.80	17.60	17.28	14.64	19.30	14.08	12.74	11.42	14.97	30.88	15.39	19.45	24.43	13.84	19.27
7	Black Hills	17.74	16.90	17.00	21.18	16.82	19.48	22.29	16.14	19.03	18.24	17.13	31.13	18.10	9.93	N/A	15.02	15.77	17.27	17.13	15.95	12.52
8	CenterPoint Energy	16.63	26.60	15.92	19.45	36.99	17.91	21.91	18.10	16.96	18.75	14.85	14.58	13.78	11.81	11.27	15.00	10.27	19.06	17.84	6.05	5.59
9	CMS Energy Corp.	18.08	23.70	23.32	24.28	20.31	21.32	20.94	18.29	17.30	16.32	15.07	13.62	12.46	13.56	10.87	26.84	22.18	12.60	12.39	N/A	N/A
10	Consol. Edison	16.07	19.50	20.08	21.10	17.10	19.77	18.80	15.59	15.90	14.72	15.39	15.08	13.30	12.55	12.29	13.78	15.49	15.13	18.21	14.30	13.28
11	Dominion Resources	20.50	20.20	43.94	35.21	21.80	22.17	21.33	22.14	22.97	19.25	18.91	17.27	14.35	12.74	13.78	20.63	15.98	24.89	15.07	15.24	12.05
12	DTE Energy	15.90	19.60	16.30	19.88	17.41	18.59	18.97	18.11	14.91	17.92	14.89	13.51	12.27	10.41	14.81	18.27	17.43	13.80	16.04	13.69	11.28
13	Duke Energy	17.63	19.60	22.40	17.71	19.41	19.93	21.25	18.22	17.91	17.45	17.46	13.76	12.69	13.32	17.28	16.13	N/A	N/A	N/A	N/A	N/A
14	Edison Int'l	16.22	34.00	34.93	16.66	N/A	17.23	17.92	14.77	13.05	12.70	9.71	11.81	10.32	9.72	12.36	16.03	12.99	11.74	37.59	6.97	7.78
15	El Paso Electric	17.68	N/A	N/A	N/A	26.85	21.78	18.66	18.33	16.38	15.88	14.47	12.60	10.72	10.79	11.89	15.26	16.92	26.72	22.03	18.26	22.99
16	Entergy Corp.	13.81	15.40	15.26	16.50	13.81	15.01	10.92	12.53	12.89	13.21	11.22	9.06	11.57	11.98	16.56	19.30	14.28	16.28	15.09	13.77	11.53
17	Eversource Energy	18.46	22.80	24.33	22.11	18.73	19.47	18.69	18.11	17.92	16.94	19.86	15.35	13.42	11.96	13.66	18.75	27.07	19.76	20.77	13.35	16.07
18	Evergy, Inc.	21.02	17.90	21.71	21.76	22.71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	14.98	18.10	15.39	15.75	20.09	13.41	18.68	12.58	16.02	13.43	19.08	11.30	10.97	11.49	17.97	18.22	16.53	15.37	12.99	11.77	10.46
20	FirstEnergy Corp.	18.24	17.70	20.24	23.78	26.47	11.41	15.91	17.02	39.79	13.06	21.10	22.39	11.75	13.02	15.64	15.59	14.23	16.07	14.13	22.47	12.95
21	Fortis Inc.	19.29	21.30	20.63	19.22	17.08	16.81	21.60	18.00	24.29	19.97	20.12	18.79	18.22	16.36	17.48	21.14	17.68	N/A	N/A	N/A	N/A
22	Great Plains Energy	15.52	N/A	N/A	N/A	N/A	NMF	17.98	19.37	16.47	14.19	15.53	16.11	12.10	16.03	20.55	16.35	18.30	13.96	12.59	12.23	11.09
23	Hawaiian Elec.	18.60	22.60	21.48	21.27	18.95	20.69	13.56	20.40	15.88	16.21	15.81	17.09	18.59	19.79	23.16	21.57	20.33	18.27	19.18	13.76	13.47
24	IDACORP, Inc.	17.04	23.30	19.88	22.31	20.50	20.60	19.06	16.22	14.67	13.45	12.41	11.54	11.83	10.20	13.93	18.19	15.07	16.70	15.49	26.51	18.88
25	MGE Energy	19.80	25.20	26.41	28.36	25.11	29.36	24.90	20.28	17.19	17.01	17.23	15.82	14.98	15.14	14.22	15.01	15.88	22.40	17.98	17.55	15.96
26	NextEra Energy, Inc.	18.17	26.80	31.75	26.79	24.80	21.65	20.71	16.89	17.25	16.57	14.43	11.54	10.83	13.42	14.48	18.90	13.65	17.88	13.65	17.88	13.60
27	NorthWestern Corp	17.13	17.10	19.49	19.89	16.77	17.85	17.19	18.36	16.24	16.86	15.72	12.62	12.90	11.54	13.87	21.74	25.95	17.09	N/A	N/A	N/A
28	OGE Energy	15.26	15.20	16.25	19.00	16.53	18.32	17.68	17.69	18.27	17.69	15.16	14.37	13.31	10.83	12.41	13.75	13.68	14.95	14.13	11.84	14.12
29	Otter Tail Corp.	23.34	13.80	18.31	23.51	22.25	22.06	20.19	18.20	18.84	21.12	21.75	47.48	55.10	31.16	30.06	19.02	17.35	15.40	17.34	17.77	16.01
30	PG&E Corp.	16.79	N/A	N/A	N/A	N/A	18.28	21.13	26.40	15.00	23.67	20.70	15.46	15.80	13.01	12.08	16.85	14.84	15.37	13.81	9.50	N/A
31	Pinnacle West Capital	15.86	14.80	16.71	19.37	17.82	19.28	18.74	16.04	15.89	15.27	14.35	14.60	12.57	13.74	16.07	14.93	13.69	19.24	15.80	13.96	14.43
32	PNM Resources	18.54	20.00	20.79	21.08	23.39	20.43	19.83	16.85	18.68	16.13	14.97	14.53	14.05	18.09	N/A	35.65	15.57	17.38	15.02	14.73	15.08
33	Portland General	17.47	18.90	26.57	22.31	18.42	20.03	19.06	17.71	15.32	16.88	13.98	12.37	12.00	14.40	16.30	11.94	23.35	N/A	N/A	N/A	N/A
34	PPL Corp.	14.44	21.70	13.94	13.29	11.33	17.65	12.83	13.92	14.08	12.84	10.88	10.52	11.93	25.69	17.64	17.26	14.10	15.12	12.51	10.59	11.06
35	Public Serv. Enterprise	14.02	18.30	14.91	15.10	18.71	16.31	15.35	12.41	12.61	13.50	12.79	10.40	10.37	10.04	13.65	16.54	17.81	16.74	14.26	10.58	10.00
36	SCANA Corp.	13.96	N/A	N/A	N/A	N/A	14.46	16.80	14.67	13.68	14.43	14.80	13.67	12.93	11.63	12.67	14.96	15.42	14.44	13.57	13.05	12.17
37	Sempra Energy	16.66	36.40	19.62	22.50	20.40	24.33	24.37	19.73	21.87	19.68	14.89	11.77	12.60	10.09	11.80	14.01	11.50	11.79	8.65	8.96	8.19
38	Southern Co.	16.03	19.20	17.91	17.58	15.06	15.48	17.76	15.85	16.04	16.19	16.97	15.85	14.90	13.52	16.13	15.95	16.19	15.92	14.68	14.83	14.63
39	Vectren Corp.	17.05	N/A	N/A	N/A	N/A	23.54	19.18	17.92	19.98	20.66	15.02	15.83	15.10	12.89	16.79	15.33	18.92	15.11	17.57	14.80	14.16
40	WEC Energy Group	17.21	21.30	24.89	23.49	19.57	20.01	19.95	21.33	17.71	16.50	15.76	14.25	14.01	13.35	14.77	16.47	15.97	14.46	17.51	12.43	10.46
41	Westar Energy	15.58	N/A	N/A	N/A	N/A	23.40	21.59	18.45	15.36	14.04	13.43	14.78	12.96	14.95	16.96	14.10	12.18	14.79	17.44	10.78	14.02
42	Xcel Energy Inc.	17.82	23.10	23.88	22.34	18.93	20.20	18.48	16.54	15.44	15.04	14.82	14.24	14.13	12.66	13.69	16.65	14.80	15.36	13.65	11.62	40.80
43	Average	17.19	20.96	21.45	21.09	20.34	19.81	18.97	18.00	17.39	16.38	15.69	15.30	14.28	13.56	15.18	17.74	16.47	16.52	16.57	13.70	14.31
44	Median	16.09	20.10	20.43	21.22	19.28	19.97	18.80	17.71	16.54	16.27	15.04	14.31	12.91	12.82	14.21	16.41	15.88	15.92	15.29	13.60	13.47

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

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

Line	Company	20-Year Average (1)	2021 [2/a] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)	2005 (18)	2004 (19)	2003 (20)	2002 (21)
1	ALLETE	9.41	8.75	8.14	11.38	10.16	10.95	8.26	7.49	8.80	9.15	8.18	7.91	8.04	8.51	9.29	10.30	11.06	11.54	11.46	N/A	N/A
2	Alliant Energy	8.08	10.31	10.66	10.74	9.71	13.21	10.67	8.86	8.40	7.52	7.50	7.21	6.59	6.23	7.49	7.92	8.00	5.09	5.52	4.76	5.20
3	Ameren Corp.	7.27	9.03	9.63	9.45	7.95	8.38	7.44	6.87	6.95	6.61	5.48	5.02	4.23	4.25	6.35	7.69	8.57	8.57	8.24	6.74	7.96
4	American Electric Power	6.58	7.57	8.41	9.34	8.03	8.81	7.57	7.09	7.00	6.57	5.93	5.46	5.54	4.71	5.71	6.84	5.54	6.07	5.50	4.69	5.19
5	Avangrid, Inc.	9.87	10.31	9.39	9.11	10.24	10.14	8.56	11.30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	6.86	8.17	7.80	7.34	10.14	9.35	7.63	6.76	7.30	6.21	6.88	6.40	5.80	4.06	5.12	7.58	5.30	6.58	7.58	5.36	5.90
7	Black Hills	7.85	8.46	8.56	10.65	8.83	9.20	9.33	8.06	8.81	8.03	6.04	7.85	6.16	4.25	11.26	7.62	6.92	7.57	6.69	6.89	5.92
8	CenterPoint Energy	5.33	7.75	5.94	7.03	8.45	6.97	5.96	5.75	6.25	6.56	5.15	5.39	4.70	4.05	4.29	5.17	3.94	4.70	4.26	2.08	2.16
9	CMS Energy Corp.	6.27	9.27	9.87	9.85	8.40	8.75	8.50	7.53	7.13	6.68	6.03	5.41	4.48	3.64	3.45	5.57	4.40	4.04	3.20	2.88	NMF
10	Consol. Edison	8.24	7.82	8.35	9.46	8.73	9.64	9.39	7.96	7.89	7.77	8.31	8.15	7.39	6.72	6.89	8.31	8.65	8.59	9.31	7.90	7.64
11	Dominion Resources	9.96	11.35	14.59	13.47	10.94	11.35	11.59	11.84	12.27	10.88	9.92	9.45	8.12	6.98	8.27	8.65	7.81	10.09	7.68	7.51	6.53
12	DTE Energy	6.68	10.72	7.85	9.67	8.54	9.05	8.64	8.52	6.42	6.65	5.91	5.18	4.69	3.59	4.90	5.73	5.21	5.54	6.00	5.62	5.20
13	Duke Energy	7.55	6.69	8.06	7.40	7.65	8.40	8.57	7.95	8.12	8.11	9.53	6.56	6.01	5.96	7.13	7.16	N/A	N/A	N/A	N/A	N/A
14	Edison Int'l	6.01	7.39	7.57	7.25	13.46	7.05	6.77	5.92	5.68	5.46	4.59	4.22	4.11	3.95	5.63	7.01	5.87	5.61	6.84	2.82	2.96
15	El Paso Electric	5.93	N/A	N/A	N/A	9.43	8.54	7.46	6.47	6.33	6.19	5.78	5.16	4.31	3.98	4.95	6.44	6.25	6.67	4.65	3.90	4.39
16	Entergy Corp.	5.72	5.61	5.78	6.05	4.92	4.66	4.01	4.11	4.21	4.03	4.23	3.90	4.66	5.68	7.96	9.21	7.16	8.76	7.12	6.84	5.57
17	Eversource Energy	7.44	11.77	12.53	11.47	9.16	10.36	10.14	10.12	10.14	8.08	9.30	6.99	4.97	4.61	4.12	6.18	6.02	3.55	3.78	2.85	2.75
18	Evergy, Inc.	7.41	7.41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	5.91	4.16	4.44	5.29	5.05	4.45	4.80	4.70	5.09	4.61	5.54	5.86	5.10	5.98	9.65	9.89	8.62	7.97	6.29	5.71	4.97
20	FirstEnergy Corp.	6.89	9.39	9.23	11.09	8.84	4.76	5.12	5.38	7.43	6.15	7.42	7.33	4.49	4.91	7.58	7.89	7.53	6.04	5.15	6.90	5.10
21	Fortis Inc.	8.42	9.38	9.50	9.46	7.97	8.23	10.46	7.29	9.25	7.93	8.09	8.38	7.40	6.76	7.58	9.18	7.89	N/A	N/A	N/A	N/A
22	Great Plains Energy	6.89	N/A	N/A	N/A	N/A	14.62	8.63	6.66	6.45	5.73	6.09	5.74	4.49	5.06	7.71	7.13	7.68	6.70	6.52	5.92	5.14
23	Hawaiian Elec.	8.06	7.98	8.69	9.30	8.34	9.21	7.44	9.25	7.64	8.15	8.05	7.73	7.81	6.95	9.10	7.95	8.47	8.29	8.44	6.12	6.20
24	IDACORP, Inc.	8.67	11.19	11.38	12.75	11.72	11.56	10.95	9.37	8.59	7.78	7.05	6.64	6.52	5.31	7.10	8.23	7.73	7.55	7.15	7.27	7.53
25	MGE Energy	11.69	14.45	14.90	15.58	15.04	17.33	15.66	12.53	11.42	11.20	10.77	9.48	9.05	8.40	8.42	9.23	9.30	11.73	11.04	10.20	8.09
26	NextEra Energy, Inc.	10.70	57.99	15.48	12.33	10.77	11.61	9.24	7.93	7.98	7.60	7.58	5.98	5.33	6.09	7.34	9.02	6.51	6.71	6.71	5.97	5.77
27	NorthWestern Corp	7.85	8.79	8.88	9.93	8.19	8.82	8.65	8.99	9.01	7.61	6.85	5.89	5.79	5.05	5.57	8.45	9.39	7.31	8.13	N/A	N/A
28	OGE Energy	7.91	7.42	8.38	10.58	9.36	10.52	9.03	9.25	10.65	9.93	7.35	7.48	6.61	5.37	6.43	7.58	7.50	7.04	6.73	5.62	5.39
29	Otter Tail Corp.	9.34	7.33	9.99	12.42	11.58	11.09	9.38	9.04	9.45	9.58	8.43	9.04	8.07	8.01	11.65	9.53	8.66	8.18	9.01	8.13	8.33
30	PG&E Corp.	5.55	N/A	N/A	N/A	- 5.65	7.09	7.26	7.24	5.65	6.84	5.86	5.32	5.42	4.71	4.61	5.84	5.28	5.07	5.13	4.05	14.69
31	Pinnacle West Capital	6.27	6.71	7.49	8.30	7.09	8.73	7.89	6.91	7.03	6.85	6.34	5.80	5.65	3.84	4.19	4.76	4.48	7.48	5.88	4.80	5.21
32	PNM Resources	6.89	7.57	7.87	7.92	7.57	7.40	7.64	6.95	7.48	6.47	5.80	4.94	4.58	4.53	7.10	10.67	7.50	7.62	6.84	5.55	5.72
33	Portland General	5.91	6.16	6.72	7.65	6.56	7.45	7.12	6.73	5.49	6.06	5.08	4.86	4.13	4.63	4.81	5.34	5.74	N/A	N/A	N/A	N/A
34	PPL Corp.	7.73	12.48	7.46	7.99	7.02	10.11	8.37	8.73	7.32	6.59	5.87	5.98	7.46	8.82	9.17	8.90	7.58	7.57	6.49	5.41	5.30
35	Public Serv. Enterprise	7.62	8.97	8.22	8.72	9.48	8.67	8.56	6.66	6.48	6.40	6.40	6.03	6.04	6.20	8.46	9.83	8.41	8.59	7.17	6.79	6.24
36	SCANA Corp.	7.09	N/A	N/A	N/A	N/A	8.26	9.59	8.33	7.50	7.49	7.40	6.75	6.52	5.88	6.38	7.15	7.03	5.40	6.86	6.59	6.36
37	Sempra Energy	8.44	14.67	10.40	12.05	10.10	10.65	10.88	9.99	10.77	9.37	7.26	6.13	6.53	6.07	7.07	8.61	7.22	6.96	5.16	4.85	4.00
38	Southern Co.	8.16	7.85	8.34	8.80	7.05	7.49	8.83	8.23	8.42	8.30	8.75	8.22	7.79	7.08	8.18	8.62	8.47	8.41	8.28	8.28	7.83
39	Vectren Corp.	7.08	N/A	N/A	N/A	N/A	10.32	8.60	7.82	7.57	6.82	5.79	5.81	5.58	5.24	6.90	6.53	7.37	7.06	7.63	7.27	6.92
40	WEC Energy Group	9.07	11.99	13.67	12.88	10.82	11.04	10.95	12.90	10.27	9.58	9.24	8.43	8.15	6.87	7.57	7.84	7.27	6.40	6.27	4.91	4.27
41	Westar Energy	6.91	N/A	N/A	N/A	N/A	10.87	10.86	9.05	7.93	7.23	6.71	6.67	5.51	5.32	7.09	6.88	5.81	7.00	6.54	4.24	2.94
42	Xcel Energy Inc.	6.93	9.16	10.07	9.44	7.90	8.50	8.10	7.62	7.31	7.00	6.85	6.47	6.28	5.43	5.71	6.51	5.54	5.62	5.31	4.27	5.46
43	Average	7.58	10.33	9.26	9.78	8.64	9.36	8.65	8.05	7.85	7.39	6.98	6.53	6.00	5.59	6.95	7.72	7.12	7.13	6.77	5.70	5.85
44	Median	7.25	8.77	8.56	9.46	8.73	9.05	8.57	7.93	7.54	7.12	6.85	6.27	5.80	5.35	7.09	7.76	7.37	7.04	6.71	5.62	5.52

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.

Note:
[a] Based on the average of the high and low price and the projected Cash Flow per share.

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

		Market Price to Book Value (MP/BV) Ratio [1]																	
Line	Company	17-Year Average	2021 [2/b]	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1	ALLETE	1.59	1.46	1.39	1.91	1.79	1.78	1.53	1.37	1.42	1.51	1.34	1.35	1.28	1.15	1.55	1.89	2.09	2.22
2	Alliant Energy	1.78	2.26	2.30	2.32	2.16	2.38	2.17	1.86	1.86	1.70	1.57	1.46	1.31	1.04	1.33	1.67	1.52	1.33
3	Ameren Corp.	1.54	2.13	2.21	2.26	1.95	1.93	1.67	1.46	1.45	1.29	1.18	0.90	0.83	0.78	1.25	1.60	1.62	1.68
4	American Electric Power	1.62	1.87	2.09	2.20	1.82	1.88	1.81	1.55	1.54	1.40	1.31	1.23	1.23	1.08	1.48	1.85	1.56	1.57
5	Avangrid, Inc.	0.92	0.93	0.97	1.02	1.02	0.93	0.83	0.72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	1.34	1.43	1.37	1.54	1.88	1.73	1.57	1.36	1.33	1.25	1.21	1.19	1.07	0.94	1.11	1.29	1.30	1.13
7	Black Hills	1.52	1.50	1.55	1.95	1.61	2.06	1.94	1.59	1.79	1.62	1.21	1.14	1.07	0.83	1.22	1.57	1.47	1.63
8	CenterPoint Energy	2.31	1.70	1.90	2.21	2.18	2.59	2.73	2.43	2.27	2.30	1.99	1.87	1.96	1.77	2.49	3.13	2.75	3.06
9	CMS Energy Corp.	2.14	2.69	3.24	3.28	2.81	2.93	2.72	2.43	2.26	2.09	1.91	1.66	1.48	1.10	1.23	1.82	1.42	1.32
10	Consol. Edison	1.41	1.39	1.44	1.59	1.49	1.63	1.58	1.42	1.34	1.38	1.47	1.38	1.22	1.08	1.17	1.47	1.47	1.52
11	Dominion Resources	2.61	2.45	2.72	2.18	2.40	2.94	3.15	3.34	3.55	2.97	2.84	2.37	2.01	1.80	2.42	2.69	2.07	2.50
12	DTE Energy	1.59	2.85	1.80	2.07	1.91	2.01	1.82	1.65	1.62	1.51	1.35	1.20	1.16	0.89	1.10	1.35	1.29	1.39
13	Duke Energy	1.23	1.36	1.47	1.47	1.33	1.41	1.35	1.29	1.28	1.19	1.12	1.11	1.00	0.91	1.06	1.15	N/A	N/A
14	Edison Int'l	1.67	1.61	1.62	1.80	1.97	2.17	1.92	1.76	1.68	1.57	1.53	1.24	1.07	1.04	1.56	2.05	1.80	1.93
15	El Paso Electric	1.56	N/A	N/A	N/A	1.94	1.87	1.68	1.48	1.52	1.49	1.59	1.64	1.17	0.98	1.33	1.69	1.71	1.76
16	Entergy Corp.	1.75	1.75	1.93	2.03	1.74	1.76	1.67	1.40	1.33	1.21	1.31	1.35	1.62	1.66	2.44	2.65	1.89	2.01
17	Eversource Energy	1.52	1.90	2.11	1.99	1.68	1.73	1.64	1.53	1.47	1.38	1.28	1.50	1.31	1.12	1.31	1.60	1.22	1.05
18	Evergy, Inc.	1.50	1.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	2.11	1.17	1.20	1.43	1.31	1.20	1.20	1.14	1.28	1.17	1.46	1.95	2.07	2.57	4.39	4.79	3.89	3.60
20	FirstEnergy Corp.	2.07	2.80	2.81	3.39	2.67	3.53	2.37	1.16	1.15	1.28	1.44	1.33	1.36	1.54	2.52	2.23	1.92	1.64
21	Fortis Inc.	1.47	1.45	1.47	1.41	1.24	1.41	1.26	1.33	1.35	1.45	1.59	1.59	1.56	1.33	1.48	1.63	1.96	N/A
22	Great Plains Energy	1.21	N/A	N/A	N/A	N/A	1.33	1.17	1.12	1.11	1.02	0.96	0.93	0.87	0.80	1.11	1.66	1.77	1.86
23	Hawaiian Elec.	1.66	1.78	1.82	2.02	1.76	1.76	1.63	1.71	1.49	1.54	1.62	1.54	1.44	1.16	1.61	1.57	2.01	1.78
24	IDACORP, Inc.	1.47	1.80	1.84	2.10	1.96	1.94	1.76	1.54	1.45	1.33	1.19	1.17	1.13	0.92	1.09	1.26	1.37	1.22
25	MGE Energy	2.15	2.57	2.54	2.88	2.59	2.88	2.60	2.10	2.10	2.06	1.92	1.75	1.65	1.54	1.62	1.75	1.83	2.09
26	NextEra Energy, Inc.	2.72	12.09	3.58	2.75	2.32	2.35	2.30	2.09	2.15	1.93	1.74	1.55	1.49	1.70	2.06	2.34	1.80	1.93
27	NorthWestern Corp	1.46	1.44	1.45	1.74	1.48	1.64	1.68	1.60	1.54	1.56	1.42	1.35	1.22	1.07	1.15	1.48	1.65	1.42
28	OGE Energy	1.84	1.63	1.86	2.06	1.75	1.82	1.73	1.79	2.22	2.24	1.94	1.90	1.70	1.37	1.52	1.98	1.91	1.80
29	Otter Tail Corp.	1.85	1.98	2.04	2.62	2.49	2.33	1.90	1.78	1.90	1.96	1.58	1.35	1.19	1.18	1.71	1.93	1.76	1.74
30	PG&E Corp.	1.60	N/A	N/A	N/A	1.70	1.71	1.69	1.57	1.39	1.38	1.41	1.46	1.56	1.41	1.50	1.94	1.83	1.84
31	Pinnacle West Capital	1.43	1.52	1.63	1.91	1.74	1.91	1.72	1.52	1.44	1.47	1.39	1.25	1.14	0.95	1.00	1.26	1.26	1.25
32	PNM Resources	1.32	1.92	1.87	2.28	1.83	1.84	1.56	1.33	1.21	1.09	0.98	0.80	0.69	0.56	0.66	1.23	1.21	1.45
33	Portland General	1.35	1.53	1.57	1.84	1.56	1.69	1.56	1.42	1.37	1.28	1.14	1.09	0.94	0.92	1.05	1.32	1.36	N/A
34	PPL Corp.	2.12	2.57	1.63	1.86	1.81	2.40	2.46	2.24	1.64	1.55	1.58	1.47	1.61	2.10	3.19	3.05	2.43	2.50
35	Public Serv. Enterprise	1.89	1.74	1.70	1.97	1.81	1.68	1.67	1.58	1.57	1.44	1.46	1.59	1.67	1.78	2.58	2.99	2.46	2.45
36	SCANA Corp.	1.51	N/A	N/A	N/A	N/A	1.65	1.74	1.47	1.48	1.48	1.48	1.36	1.33	1.20	1.45	1.62	1.64	1.72
37	Sempra Energy	1.80	1.72	1.84	2.22	2.06	2.24	2.00	2.17	2.20	1.84	1.53	1.28	1.35	1.32	1.60	1.87	1.70	1.73
38	Southern Co.	2.07	2.11	2.20	2.13	1.89	2.07	2.01	1.99	2.02	2.04	2.15	1.99	1.83	1.73	2.12	2.24	2.23	2.35
39	Vectren Corp.	1.83	N/A	N/A	N/A	N/A	2.75	2.29	2.11	2.08	1.82	1.57	1.53	1.41	1.34	1.64	1.74	1.77	1.82
40	WEC Energy Group	2.02	2.61	2.84	2.62	2.11	2.10	2.09	1.82	2.34	2.21	2.05	1.81	1.65	1.40	1.57	1.77	1.71	1.62
41	Westar Energy	1.37	N/A	N/A	N/A	N/A	1.94	1.95	1.49	1.44	1.33	1.26	1.20	1.10	0.93	1.10	1.36	1.30	1.41
42	Xcel Energy Inc.	1.69	2.29	2.46	2.34	1.97	2.06	1.88	1.66	1.55	1.50	1.51	1.41	1.32	1.19	1.30	1.53	1.40	1.38
43	Average	1.74	2.15	1.96	2.10	1.88	2.00	1.85	1.67	1.68	1.60	1.51	1.43	1.35	1.25	1.63	1.90	1.78	1.80
44	Median	1.71	1.77	1.84	2.06	1.83	1.91	1.74	1.57	1.53	1.49	1.47	1.37	1.31	1.15	1.48	1.71	1.71	1.73

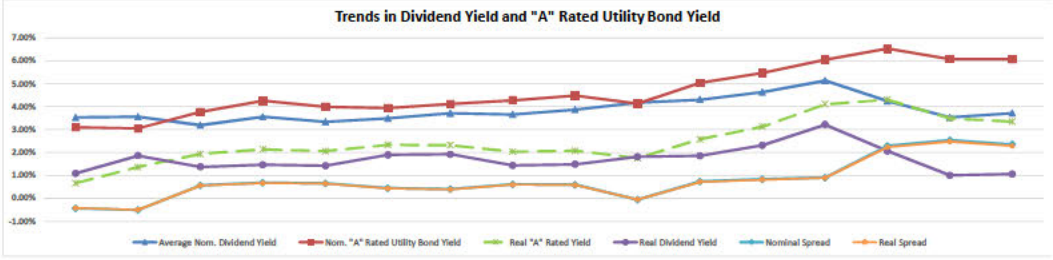
Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.

Notes:
[b] Based on the average of the high and low price and the projected Book Value per share.

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

Line	Company	Dividend Yield[1] 16-Year Average (1)	2021 [2a] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	ALLETE	3.94%	3.82%	4.03%	2.85%	2.99%	2.97%	3.56%	3.97%	3.92%	3.89%	4.49%	4.58%	5.03%	5.79%	4.37%	3.60%	3.16%
2	Alliant Energy	3.65%	2.97%	2.90%	2.88%	3.20%	3.07%	3.21%	3.60%	3.53%	3.74%	4.07%	4.28%	4.61%	5.73%	4.10%	3.13%	3.32%
3	Ameren Corp.	4.26%	2.74%	2.57%	2.59%	3.04%	3.12%	3.50%	3.96%	4.02%	4.61%	4.97%	5.28%	5.76%	5.98%	6.21%	4.88%	4.93%
4	American Electric Power	4.00%	3.61%	3.28%	3.10%	3.60%	3.42%	3.54%	3.80%	3.83%	4.23%	4.58%	4.96%	4.90%	5.50%	4.20%	3.40%	4.06%
5	Avangrid, Inc.	3.76%	3.75%	3.69%	3.52%	3.49%	3.75%	4.26%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	3.77%	3.94%	4.03%	3.48%	2.93%	3.14%	3.39%	3.97%	3.99%	4.51%	4.55%	4.54%	4.76%	4.49%	3.39%	2.68%	2.52%
7	Black Hills	3.72%	3.54%	3.42%	2.74%	3.31%	2.75%	2.87%	3.55%	2.84%	3.19%	4.39%	4.64%	4.79%	6.17%	4.21%	3.40%	3.79%
8	CenterPoint Energy	4.35%	2.84%	4.38%	2.98%	4.09%	4.79%	4.70%	5.06%	3.94%	3.57%	4.04%	4.27%	5.29%	6.37%	4.98%	3.87%	4.39%
9	CMS Energy Corp.	3.20%	2.92%	2.65%	2.64%	3.03%	2.88%	2.99%	3.36%	3.59%	3.76%	4.16%	4.25%	3.98%	3.97%	2.69%	1.16%	N/A
10	Consol. Edison	4.37%	3.95%	3.87%	3.44%	3.68%	3.40%	3.62%	4.12%	4.38%	4.25%	4.07%	4.46%	5.16%	5.99%	5.67%	4.84%	5.04%
11	Dominion Resources	4.01%	3.39%	4.31%	4.76%	4.72%	3.88%	3.82%	3.66%	3.43%	3.78%	4.06%	4.13%	4.41%	5.20%	3.77%	3.32%	3.60%
12	DTE Energy	4.05%	3.03%	3.57%	3.07%	3.34%	3.15%	3.34%	3.53%	3.54%	3.84%	4.19%	4.68%	4.75%	5.29%	5.24%	4.36%	4.86%
13	Duke Energy	4.71%	4.70%	4.35%	4.17%	4.54%	4.15%	4.26%	4.34%	4.26%	4.45%	4.68%	5.21%	5.71%	6.25%	5.16%	4.44%	N/A
14	Edison Int'l	3.24%	4.58%	4.29%	3.73%	3.84%	2.87%	2.81%	2.83%	2.62%	2.85%	2.97%	3.37%	3.66%	3.95%	2.69%	2.21%	2.58%
15	El Paso Electric	2.74%	N/A	N/A	N/A	2.55%	2.49%	2.75%	3.13%	2.97%	2.99%	2.97%	2.11%	N/A	N/A	N/A	N/A	N/A
16	Entergy Corp.	4.04%	3.85%	3.55%	3.52%	4.41%	4.49%	4.55%	4.59%	4.47%	5.07%	4.91%	4.85%	4.20%	3.97%	2.92%	2.39%	2.82%
17	Eversource Energy	3.25%	3.01%	2.63%	2.81%	3.32%	3.14%	3.22%	3.34%	3.40%	3.48%	3.52%	3.23%	3.64%	4.16%	3.25%	2.60%	3.27%
18	Evergy, Inc.	3.59%	3.59%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	3.85%	3.83%	3.82%	3.06%	3.32%	3.51%	3.75%	3.88%	3.69%	4.69%	5.73%	4.96%	4.95%	4.26%	2.78%	2.48%	2.83%
20	FirstEnergy Corp.	4.31%	3.69%	4.17%	3.50%	5.17%	4.62%	4.31%	4.23%	4.26%	4.26%	4.90%	5.23%	5.76%	5.09%	3.21%	3.12%	3.40%
21	Fortis Inc.	3.68%	3.85%	3.66%	3.60%	4.07%	3.69%	3.80%	3.76%	3.88%	3.84%	3.64%	3.58%	3.80%	4.21%	3.76%	3.01%	2.79%
22	Great Plains Energy	4.52%	N/A	N/A	N/A	N/A	3.58%	3.64%	3.76%	3.62%	3.84%	4.08%	4.15%	4.49%	5.03%	6.96%	5.49%	5.60%
23	Hawaiian Elec.	4.47%	3.44%	3.40%	3.02%	3.54%	3.65%	3.99%	4.05%	4.76%	4.72%	4.70%	5.04%	5.51%	6.89%	5.00%	5.18%	4.59%
24	IDACORP, Inc.	3.18%	3.03%	2.92%	2.49%	2.61%	2.58%	2.77%	3.06%	3.12%	3.21%	3.28%	3.10%	3.44%	4.46%	3.95%	3.55%	3.39%
25	MGE Energy	3.05%	2.08%	2.10%	1.94%	2.16%	1.95%	2.23%	2.78%	2.78%	2.91%	3.25%	3.63%	3.98%	4.36%	4.24%	4.14%	4.25%
26	NextEra Energy, Inc.	2.87%	0.67%	2.10%	2.41%	2.68%	2.79%	2.91%	3.01%	3.02%	3.30%	3.65%	3.96%	3.90%	N/A	N/A	N/A	N/A
27	NorthWestern Corp	4.07%	4.00%	4.02%	3.28%	3.86%	3.52%	3.43%	3.61%	3.30%	3.66%	4.17%	4.51%	4.93%	5.75%	5.38%	4.09%	3.65%
28	OGE Energy	3.76%	4.95%	4.68%	3.54%	3.98%	3.61%	3.87%	3.51%	2.63%	2.48%	2.94%	3.06%	3.68%	4.96%	4.52%	3.77%	3.99%
29	Otter Tail Corp.	4.05%	3.30%	3.45%	2.74%	2.92%	3.12%	3.87%	4.33%	4.14%	4.11%	5.21%	5.57%	5.68%	5.38%	3.63%	3.46%	3.92%
30	PG&E Corp.	3.70%	N/A	N/A	N/A	N/A	2.42%	3.22%	3.45%	3.96%	4.20%	4.25%	4.24%	4.08%	4.26%	4.01%	3.07%	3.22%
31	Pinnacle West Capital	4.47%	4.24%	3.97%	3.29%	3.55%	3.16%	3.46%	3.88%	4.09%	3.98%	5.32%	4.81%	5.43%	6.76%	6.17%	4.75%	4.67%
32	PNM Resources	3.15%	2.02%	2.80%	2.45%	2.79%	2.53%	2.69%	2.90%	2.79%	2.99%	2.96%	3.19%	4.09%	4.76%	4.85%	3.36%	3.21%
33	Portland General	3.67%	3.68%	3.47%	2.85%	3.27%	2.92%	3.06%	3.27%	3.34%	3.67%	4.11%	4.37%	5.20%	5.36%	4.28%	3.34%	2.54%
34	PPL Corp.	4.63%	5.05%	5.84%	5.24%	5.61%	4.24%	4.25%	4.55%	4.45%	4.81%	5.07%	5.10%	5.12%	4.51%	3.10%	2.69%	3.41%
35	Public Serv. Enterprise	3.81%	4.21%	3.64%	3.19%	3.49%	3.74%	3.78%	3.81%	3.92%	4.35%	4.55%	4.24%	4.30%	4.30%	3.26%	2.73%	3.47%
36	SCANA Corp.	4.37%	N/A	N/A	N/A	N/A	4.03%	3.29%	3.90%	4.05%	4.15%	4.25%	4.78%	4.93%	5.67%	4.92%	4.29%	4.21%
37	Sempra Energy	2.98%	3.39%	3.24%	2.88%	3.20%	2.92%	2.92%	2.71%	2.61%	3.03%	3.71%	3.65%	3.08%	3.23%	2.62%	2.08%	2.47%
38	Southern Co.	4.68%	4.63%	4.36%	4.41%	5.27%	4.63%	4.42%	4.78%	4.69%	4.61%	4.29%	4.63%	5.13%	5.52%	4.58%	4.39%	4.52%
39	Vectren Corp.	4.38%	N/A	N/A	N/A	N/A	2.79%	3.31%	3.60%	3.62%	4.15%	4.82%	5.06%	5.53%	5.85%	4.79%	4.53%	4.52%
40	WEC Energy Group	3.02%	3.00%	2.68%	2.81%	3.38%	3.31%	3.35%	3.49%	3.40%	3.49%	3.24%	3.35%	2.97%	3.16%	2.41%	2.14%	2.18%
41	Westar Energy	4.37%	N/A	N/A	N/A	N/A	3.00%	2.90%	3.73%	3.88%	4.27%	4.57%	4.84%	5.32%	6.27%	5.22%	4.16%	4.28%
42	Xcel Energy Inc.	3.76%	2.81%	2.58%	2.75%	3.25%	3.10%	3.33%	3.69%	3.83%	3.86%	3.90%	4.20%	4.54%	5.14%	4.70%	4.05%	4.40%
43	**Average**	**3.86%**	**3.63%**	**3.68%**	**3.19%**	**3.68%**	**3.34%**	**3.48%**	**3.71%**	**3.68%**	**3.87%**	**4.18%**	**4.30%**	**4.63%**	**5.13%**	**4.24%**	**3.63%**	**3.72%**
44	Median	3.67%	3.60%	3.57%	3.06%	3.36%	3.15%	3.43%	3.71%	3.76%	3.85%	4.18%	4.42%	4.76%	5.17%	4.22%	3.43%	3.62%
45	20-Yr Treasury Yields[3]	3.18%	1.98%	1.35%	2.40%	3.02%	2.65%	2.23%	2.55%	3.07%	3.12%	2.54%	3.62%	4.03%	4.11%	4.36%	4.91%	4.99%
46	20-Yr TIPS[3]	1.05%	-0.43%	-0.30%	0.60%	0.94%	0.75%	0.66%	0.78%	0.87%	0.75%	0.21%	1.19%	1.73%	2.21%	2.19%	2.36%	2.31%
47	Implied Inflation[b]	2.11%	2.42%	1.66%	1.79%	2.06%	1.89%	1.56%	1.75%	2.19%	2.35%	2.33%	2.40%	2.26%	1.85%	2.13%	2.49%	2.62%
48	**Real Dividend Yield[c]**	**1.71%**	**1.09%**	**1.86%**	**1.37%**	**1.47%**	**1.42%**	**1.90%**	**1.93%**	**1.44%**	**1.49%**	**1.81%**	**1.86%**	**2.32%**	**3.22%**	**2.07%**	**1.01%**	**1.07%**
	A-Rated Utility																	
49	**Nominal "A" Rated Yield[4]**	**4.84%**	**3.10%**	**3.06%**	**3.77%**	**4.26%**	**4.00%**	**3.93%**	**4.12%**	**4.28%**	**4.48%**	**4.13%**	**5.04%**	**6.46%**	**6.04%**	**6.53%**	**6.07%**	**6.07%**
50	**Real "A" Rated Yield**	**2.48%**	**0.67%**	**1.37%**	**1.94%**	**2.14%**	**2.07%**	**2.34%**	**2.33%**	**2.04%**	**2.08%**	**1.76%**	**2.68%**	**3.13%**	**4.11%**	**4.31%**	**3.49%**	**3.38%**
	Baa-Rated Utility																	
51	**Nominal "Baa" Rated Yield**	**6.18%**	**3.38%**	**3.44%**	**4.19%**	**4.67%**	**4.38%**	**4.67%**	**5.03%**	**4.80%**	**4.98%**	**4.83%**	**5.67%**	**6.96%**	**7.06%**	**7.26%**	**6.33%**	**6.32%**
52	**Real "Baa" Rated Yield**	**3.00%**	**0.91%**	**1.74%**	**2.38%**	**2.66%**	**2.44%**	**3.07%**	**3.22%**	**2.66%**	**2.67%**	**2.44%**	**3.08%**	**3.82%**	**5.11%**	**5.01%**	**3.74%**	**3.80%**
	Spreads (A-Rated Utility Bond - Stock)																	
53	**Nominal Spread[d]**	**0.78%**	**-0.43%**	**-0.60%**	**0.68%**	**0.69%**	**0.86%**	**0.44%**	**0.40%**	**0.81%**	**0.81%**	**-0.06%**	**0.74%**	**0.84%**	**0.91%**	**2.29%**	**2.54%**	**2.36%**
54	**Real Spread[e]**	**0.78%**	**-0.42%**	**-0.48%**	**0.67%**	**0.68%**	**0.86%**	**0.44%**	**0.40%**	**0.80%**	**0.69%**	**-0.06%**	**0.72%**	**0.82%**	**0.89%**	**2.24%**	**2.48%**	**2.29%**
	Spreads (Baa-Rated Utility Bond - Stock)																	
55	**Nominal Spread[f]**	**1.32%**	**-0.18%**	**-0.12%**	**1.00%**	**1.11%**	**1.04%**	**1.18%**	**1.31%**	**1.14%**	**1.11%**	**0.86%**	**1.28%**	**1.34%**	**1.82%**	**3.00%**	**2.80%**	**2.80%**
56	**Real Spread[g]**	**1.30%**	**-0.17%**	**-0.12%**	**0.98%**	**1.09%**	**1.02%**	**1.17%**	**1.29%**	**1.11%**	**1.09%**	**0.83%**	**1.23%**	**1.31%**	**1.89%**	**2.94%**	**2.73%**	**2.63%**
	Spreads (Treasury Bond - Stock)																	
57	**Nominal[f]**	**-0.87%**	**-1.55%**	**-2.20%**	**-0.79%**	**-0.64%**	**-0.89%**	**-1.28%**	**-1.17%**	**-0.68%**	**-0.76%**	**-1.84%**	**-0.88%**	**-0.80%**	**-1.02%**	**0.12%**	**1.38%**	**1.27%**
58	**Real[g]**	**-0.88%**	**-1.62%**	**-2.17%**	**-0.77%**	**-0.63%**	**-0.88%**	**-1.24%**	**-1.16%**	**-0.68%**	**-0.73%**	**-1.80%**	**-0.87%**	**-0.68%**	**-1.01%**	**0.12%**	**1.34%**	**1.24%**



Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.
[3] St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org.
[4] www.moodys.com, Bond Yields and Key Indicators, through December 31, 2021.

Notes:
[a] Based on the average of the high and low price and the projected Dividends Declared per share, published in the Value Line Investment Survey.
[b] Line 47 = (1 + Line 45) / (1 + Line 46) - 1.
[c] Line 48 = (1 + Line 43) / (1 +Line 47) - 1.
[d] The spread being measured here is the nominal A-rated utility bond yield over the average nominal utility dividend yield; (Line 49 - Line 43).
[e] The spread being measured here is the real A-rated utility bond yield over the average real utility dividend yield; Line 50 - Line 48)
[f] The spread being measured here is the nominal 20-Year Treasury yield over the average nominal utility dividend yield; (Line 45 - Line 43).
[g] The spread being measured here is the real 20-Year TIPS yield over the average real utility dividend yield; Line 48 - Line 46)

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

Line	Company	Dividend per Share[1] 16-Year Average (1)	2021[2] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	ALLETE	1.98	2.52	2.47	2.35	2.24	2.14	2.08	2.02	1.96	1.90	1.84	1.78	1.76	1.76	1.72	1.64	1.45
2	Alliant Energy	1.04	1.61	1.52	1.42	1.34	1.26	1.18	1.10	1.02	0.94	0.90	0.85	0.79	0.75	0.70	0.64	0.58
3	Ameren Corp.	1.89	2.20	2.00	1.92	1.85	1.78	1.72	1.66	1.61	1.60	1.60	1.56	1.54	1.54	2.54	2.54	2.54
4	American Electric Power	2.10	3.00	2.84	2.71	2.53	2.39	2.27	2.15	2.03	1.95	1.88	1.85	1.71	1.64	1.64	1.58	1.50
5	Avangrid, Inc.	1.75	1.76	1.76	1.76	1.74	1.73	1.73	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	1.18	1.69	1.62	1.55	1.49	1.43	1.37	1.32	1.27	1.22	1.16	1.10	1.00	0.81	0.69	0.60	0.57
7	Black Hills	1.66	2.29	2.17	2.05	1.93	1.81	1.68	1.62	1.56	1.52	1.48	1.46	1.44	1.42	1.40	1.37	1.32
8	CenterPoint Energy	0.87	0.66	0.90	0.86	1.12	1.35	1.03	0.99	0.95	0.83	0.81	0.79	0.78	0.76	0.73	0.68	0.60
9	CMS Energy Corp.	1.05	1.74	1.63	1.53	1.43	1.33	1.24	1.16	1.08	1.02	0.96	0.84	0.66	0.50	0.36	0.20	N/A
10	Consol. Edison	2.60	3.10	3.06	2.96	2.86	2.76	2.68	2.60	2.52	2.46	2.42	2.40	2.38	2.36	2.34	2.32	2.30
11	Dominion Resources	2.38	2.52	3.45	3.67	3.34	3.04	2.80	2.59	2.40	2.25	2.11	1.97	1.83	1.75	1.58	1.46	1.38
12	DTE Energy	2.83	3.88	4.12	3.85	3.59	3.36	3.06	2.84	2.69	2.59	2.42	2.32	2.18	2.12	2.12	2.12	2.08
13	Duke Energy	3.23	3.90	3.82	3.75	3.64	3.49	3.36	3.24	3.15	3.09	3.03	2.97	2.91	2.82	2.70	2.58	N/A
14	Edison Int'l	1.72	2.69	2.58	2.48	2.43	2.23	1.98	1.73	1.48	1.37	1.31	1.29	1.27	1.25	1.23	1.18	1.10
15	El Paso Electric	1.11	N/A	N/A	N/A	1.42	1.32	1.23	1.17	1.11	1.05	0.97	0.66	N/A	N/A	N/A	N/A	N/A
16	Entergy Corp.	3.27	3.86	3.74	3.66	3.58	3.50	3.42	3.34	3.32	3.32	3.32	3.32	3.24	3.00	3.00	2.58	2.16
17	Eversource Energy	1.50	2.41	2.27	2.14	2.02	1.90	1.78	1.67	1.57	1.47	1.32	1.10	1.03	0.95	0.83	0.78	0.73
18	Evergy, Inc.	2.18	2.18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	1.64	1.53	1.53	1.45	1.38	1.31	1.26	1.24	1.24	1.46	2.10	2.10	2.10	2.10	2.05	1.82	1.64
20	FirstEnergy Corp.	1.80	1.56	1.56	1.53	1.82	1.44	1.44	1.44	1.44	1.65	2.20	2.20	2.20	2.20	2.20	2.05	1.85
21	Fortis Inc.	1.37	2.08	1.97	1.86	1.75	1.65	1.55	1.43	1.30	1.25	1.21	1.17	1.12	1.04	1.00	0.82	0.67
22	Great Plains Energy	1.11	N/A	N/A	N/A	N/A	1.10	1.06	1.00	0.94	0.88	0.86	0.84	0.83	0.83	1.66	1.66	1.66
23	Hawaiian Elec.	1.26	1.36	1.32	1.28	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
24	IDACORP, Inc.	1.79	2.88	2.72	2.56	2.40	2.24	2.08	1.92	1.76	1.57	1.37	1.20	1.20	1.20	1.20	1.20	1.20
25	MGE Energy	1.14	1.52	1.45	1.38	1.32	1.26	1.21	1.16	1.11	1.07	1.04	1.01	0.99	0.97	0.96	0.94	0.93
26	NextEra Energy, Inc.	0.79	1.54	1.40	1.25	1.11	0.98	0.87	0.77	0.73	0.66	0.60	0.55	0.50	0.47	0.45	0.41	0.38
27	NorthWestern Corp	1.75	2.48	2.40	2.30	2.20	2.10	2.00	1.92	1.60	1.52	1.48	1.44	1.36	1.34	1.32	1.28	1.24
28	OGE Energy	1.03	1.63	1.58	1.51	1.40	1.27	1.16	1.05	0.95	0.85	0.80	0.76	0.73	0.71	0.70	0.68	0.67
29	Otter Tail Corp.	1.26	1.56	1.48	1.40	1.34	1.28	1.25	1.23	1.21	1.19	1.19	1.19	1.19	1.19	1.19	1.17	1.15
30	PG&E Corp.	1.70	N/A	N/A	N/A	N/A	1.55	1.93	1.82	1.82	1.82	1.82	1.82	1.82	1.68	1.56	1.44	1.32
31	Pinnacle West Capital	2.50	3.36	3.23	3.04	2.87	2.70	2.56	2.44	2.33	2.23	2.67	2.10	2.10	2.10	2.10	2.10	2.03
32	PNM Resources	0.82	0.98	1.25	1.18	1.09	0.99	0.88	0.80	0.76	0.68	0.58	0.50	0.50	0.50	0.61	0.91	0.86
33	Portland General	1.19	1.70	1.59	1.52	1.43	1.34	1.26	1.18	1.12	1.10	1.08	1.06	1.04	1.01	0.97	0.93	0.68
34	PPL Corp.	1.47	1.66	1.66	1.65	1.64	1.58	1.52	1.50	1.49	1.47	1.44	1.40	1.40	1.38	1.34	1.22	1.10
35	Public Serv. Enterprise	1.54	2.04	1.96	1.88	1.80	1.72	1.64	1.56	1.48	1.44	1.42	1.37	1.37	1.33	1.29	1.17	1.14
36	SCANA Corp.	2.00	N/A	N/A	N/A	N/A	2.45	2.30	2.18	2.10	2.03	1.98	1.94	1.90	1.88	1.84	1.76	1.68
37	Sempra Energy	2.60	4.40	4.18	3.87	3.58	3.29	3.02	2.80	2.64	2.52	2.40	1.92	1.56	1.56	1.37	1.24	1.20
38	Southern Co.	2.06	2.62	2.54	2.46	2.38	2.30	2.22	2.15	2.08	2.01	1.94	1.87	1.80	1.73	1.66	1.60	1.54
39	Vectren Corp.	1.42	N/A	N/A	N/A	N/A	1.71	1.62	1.54	1.46	1.43	1.41	1.39	1.37	1.35	1.31	1.27	1.23
40	WEC Energy Group	1.49	2.71	2.53	2.36	2.21	2.08	1.98	1.74	1.56	1.45	1.20	1.04	0.80	0.68	0.54	0.50	0.46
41	Westar Energy	1.30	N/A	N/A	N/A	N/A	1.60	1.52	1.44	1.40	1.36	1.32	1.28	1.24	1.20	1.16	1.08	0.98
42	Xcel Energy Inc.	1.24	1.83	1.72	1.62	1.52	1.44	1.36	1.28	1.20	1.11	1.07	1.03	1.00	0.97	0.94	0.91	0.88
43	**Average**	**1.69**	**2.26**	**2.23**	**2.14**	**2.03**	**1.90**	**1.79**	**1.70**	**1.62**	**1.56**	**1.55**	**1.47**	**1.43**	**1.39**	**1.39**	**1.32**	**1.24**
44	**Industry Average Growth**	**4.09%**	**1.52%**	**4.36%**	**5.29%**	**6.91%**	**5.79%**	**5.44%**	**5.20%**	**3.38%**	**0.98%**	**5.59%**	**2.36%**	**3.30%**	**-0.25%**	**4.98%**	**6.51%**	

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.
Notes:
PG&E is excluded from 2017, 2018 and 2019 average calculations due to their Dividend Suspension.

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

Line	Company	Earnings per Share[1] 16-Year Average (1)	2021[2] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	ALLETE	2.90	3.23	3.35	3.33	3.38	3.13	3.14	3.38	2.90	2.63	2.58	2.65	2.19	1.89	2.82	3.08	2.77
2	Alliant Energy	1.70	2.63	2.47	2.33	2.19	1.99	1.65	1.69	1.74	1.65	1.53	1.38	1.38	0.95	1.27	1.35	1.03
3	Ameren Corp.	2.83	3.84	3.50	3.35	3.32	2.77	2.68	2.38	2.40	2.10	2.41	2.47	2.77	2.78	2.88	2.98	2.66
4	American Electric Power	3.48	4.96	4.42	4.08	3.90	3.62	4.23	3.59	3.34	3.18	2.98	3.13	2.60	2.97	2.99	2.86	2.86
5	Avangrid, Inc.	1.80	2.05	1.88	2.26	1.92	1.67	1.98	0.86	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	1.78	2.05	1.90	2.97	2.07	1.95	2.15	1.89	1.84	1.85	1.32	1.72	1.65	1.58	1.36	0.72	1.47
7	Black Hills	2.57	3.95	3.73	3.53	3.47	3.38	2.63	2.83	2.89	2.61	1.97	1.01	1.66	2.32	0.18	2.68	2.21
8	CenterPoint Energy	1.20	0.94	1.29	1.49	0.74	1.57	1.00	1.08	1.42	1.24	1.35	1.27	1.07	1.01	1.30	1.17	1.33
9	CMS Energy Corp.	1.70	2.58	2.64	2.39	2.32	2.17	1.98	1.89	1.74	1.66	1.53	1.45	1.33	0.93	1.23	0.64	0.64
10	Consol. Edison	3.78	4.45	3.94	4.08	4.55	4.10	3.94	4.05	3.62	3.93	3.86	3.57	3.47	3.14	3.36	3.48	2.95
11	Dominion Resources	2.83	3.10	1.82	2.19	3.25	3.53	3.44	3.20	3.05	3.09	2.75	2.76	2.89	2.64	3.04	2.13	2.40
12	DTE Energy	4.37	4.10	7.08	6.31	6.17	5.73	4.83	4.44	5.10	3.76	3.88	3.67	3.74	3.24	2.73	2.66	2.45
13	Duke Energy	3.93	4.95	3.92	5.07	4.13	4.22	3.71	4.10	4.13	3.98	3.71	4.14	4.02	3.39	3.03	3.60	2.73
14	Edison Int'l	3.21	1.60	1.72	3.98	-1.26	4.51	3.94	4.15	4.33	3.78	4.55	3.23	3.35	3.24	3.68	3.32	3.28
15	El Paso Electric	2.02	N/A	N/A	N/A	2.07	2.42	2.39	2.03	2.27	2.20	2.26	2.48	2.07	1.50	1.73	1.63	1.27
16	Entergy Corp.	6.14	6.87	6.90	6.30	5.88	5.19	6.88	5.81	5.77	4.96	6.02	7.55	6.66	6.30	6.20	5.60	5.36
17	Eversource Energy	2.50	3.45	3.55	3.45	3.25	3.11	2.96	2.76	2.58	2.49	1.89	2.22	2.10	1.91	1.86	1.59	0.82
18	Evergy, Inc.	3.83	3.83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	2.95	2.60	2.60	3.01	2.07	2.78	1.80	2.54	2.10	2.31	1.92	3.75	3.87	4.29	4.10	4.03	3.50
20	FirstEnergy Corp.	2.57	2.40	1.85	1.84	1.33	2.73	2.10	2.00	0.85	2.97	2.13	1.88	3.25	3.32	4.38	4.22	3.82
21	Fortis Inc.	1.92	2.61	2.60	2.68	2.52	2.66	1.89	2.11	1.38	1.63	1.65	1.74	1.62	1.51	1.52	1.29	1.36
22	Great Plains Energy	1.33	N/A	N/A	N/A	N/A	-0.06	1.61	1.37	1.57	1.62	1.35	1.25	1.53	1.03	1.16	1.85	1.62
23	Hawaiian Elec.	1.58	2.15	1.81	1.99	1.85	1.64	2.29	1.50	1.64	1.62	1.67	1.44	1.21	0.91	1.07	1.11	1.33
24	IDACORP, Inc.	3.56	4.90	4.69	4.61	4.49	4.21	3.94	3.87	3.85	3.64	3.37	3.36	2.95	2.64	2.18	1.86	2.35
25	MGE Energy	2.04	2.92	2.60	2.51	2.43	2.20	2.18	2.06	2.32	2.16	1.86	1.76	1.67	1.47	1.59	1.51	1.37
26	NextEra Energy, Inc.	1.37	1.81	2.10	1.94	1.67	1.63	1.45	1.52	1.40	1.21	1.14	1.21	1.19	0.99	1.02	0.82	0.81
27	NorthWestern Corp	2.64	3.65	3.06	3.53	3.40	3.34	3.39	2.90	2.99	2.46	2.26	2.53	2.14	2.02	1.77	1.44	1.31
28	OGE Energy	1.76	2.36	2.08	2.24	2.12	1.92	1.69	1.69	1.98	1.94	1.79	1.73	1.50	1.33	1.25	1.32	1.23
29	Otter Tail Corp.	1.62	4.23	2.34	2.17	2.06	1.86	1.60	1.56	1.55	1.37	1.05	0.45	0.38	0.71	1.09	1.78	1.69
30	PG&E Corp.	1.49	N/A	N/A	N/A	-13.25	3.50	2.83	2.00	3.06	1.83	2.07	2.78	2.82	3.03	3.22	2.78	2.76
31	Pinnacle West Capital	3.70	5.45	4.87	4.77	4.54	4.43	3.95	3.92	3.58	3.66	3.50	2.99	3.08	2.26	2.12	2.96	3.17
32	PNM Resources	1.43	2.35	2.15	2.28	1.66	1.92	1.65	1.64	1.45	1.41	1.31	1.08	0.87	0.58	0.11	0.76	1.72
33	Portland General	1.96	2.75	1.72	2.39	2.37	2.29	2.16	2.04	2.18	1.77	1.87	1.95	1.66	1.31	1.39	2.33	1.14
34	PPL Corp.	2.23	0.60	2.04	2.37	2.58	2.11	2.79	2.37	2.38	2.38	2.61	2.61	2.29	1.19	2.45	2.63	2.29
35	Public Serv. Enterprise	2.87	2.30	3.61	3.90	2.76	2.82	2.83	3.30	2.99	2.45	2.44	3.11	3.07	3.08	2.90	2.59	1.85
36	SCANA Corp.	3.30	N/A	N/A	N/A	N/A	4.20	4.16	3.81	3.79	3.39	3.15	2.97	2.98	2.85	2.95	2.74	2.59
37	Sempra Energy	4.67	3.25	6.58	5.97	5.48	4.63	4.24	5.23	4.63	4.22	4.35	4.47	4.02	4.78	4.43	4.26	4.23
38	Southern Co.	2.74	3.50	3.25	3.17	3.00	3.21	2.83	2.84	2.77	2.70	2.67	2.55	2.36	2.32	2.25	2.28	2.10
39	Vectren Corp.	1.94	N/A	N/A	N/A	N/A	2.60	2.55	2.39	2.02	1.66	1.94	1.73	1.64	1.79	1.63	1.83	1.44
40	WEC Energy Group	2.54	4.11	3.79	3.58	3.34	3.14	2.96	2.34	2.59	2.51	2.35	2.18	1.92	1.60	1.52	1.42	1.32
41	Westar Energy	1.96	N/A	N/A	N/A	N/A	2.27	2.43	2.09	2.35	2.27	2.15	1.79	1.80	1.28	1.31	1.84	1.88
42	Xcel Energy Inc.	2.01	2.95	2.79	2.64	2.47	2.30	2.21	2.10	2.03	1.91	1.85	1.72	1.56	1.49	1.46	1.35	1.35
43	**Average**	**2.63**	**3.21**	**3.16**	**3.28**	**2.87**	**2.90**	**2.81**	**2.67**	**2.66**	**2.50**	**2.43**	**2.44**	**2.36**	**2.19**	**2.21**	**2.26**	**2.11**
44	**Industry Average Growth**	**2.92%**	**1.47%**	**-3.54%**	**14.00%**	**-0.78%**	**3.24%**	**5.25%**	**0.08%**	**6.36%**	**3.26%**	**-0.70%**	**3.61%**	**7.71%**	**-1.07%**	**-2.17%**	**7.14%**	

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.
Notes:
PG&E is excluded from 2017, 2018, and 2019 average calculations due to their Dividend Suspension.

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

Line	Company	Cash Flow / Capital Spending 2019 (1)	2020 (2)	2021 (3)	2022 (4)	3 - 5 yr Projection (5)
1	ALLETE	0.63x	0.74x	0.80x	2.26x	1.33x
2	Alliant Energy	0.73x	0.82x	0.97x	0.94x	1.12x
3	Ameren Corp.	0.79x	0.51x	0.59x	0.72x	0.90x
4	American Electric Power	0.75x	0.74x	0.69x	0.73x	0.98x
5	Avangrid, Inc.	0.70x	0.56x	0.62x	0.57x	0.63x
6	Avista Corp.	0.89x	0.85x	0.87x	0.83x	1.04x
7	Black Hills	0.51x	0.72x	0.76x	0.85x	0.97x
8	CenterPoint Energy	0.83x	0.88x	0.62x	0.62x	0.62x
9	CMS Energy Corp.	0.79x	0.82x	0.77x	0.78x	0.90x
10	Consol. Edison	0.79x	0.82x	0.89x	0.89x	1.00x
11	Dominion Resources	0.81x	1.00x	0.89x	0.87x	0.77x
12	DTE Energy	0.83x	0.67x	0.70x	0.75x	0.92x
13	Duke Energy	0.78x	0.86x	0.93x	0.80x	1.06x
14	Edison Int'l	0.69x	0.67x	0.74x	0.69x	0.71x
15	El Paso Electric	0.96x	1.00x	0.83x	N/A	N/A
16	Entergy Corp.	0.79x	0.81x	1.05x	0.98x	1.08x
17	Eversource Energy	0.78x	0.95x	0.74x	0.74x	1.09x
18	Evergy, Inc.	1.34x	1.06x	0.96x	0.94x	1.05x
19	Exelon Corp.	1.18x	1.30x	1.32x	0.96x	1.03x
20	FirstEnergy Corp.	0.74x	0.96x	0.91x	0.82x	0.96x
21	Fortis Inc.	0.68x	0.60x	0.74x	0.75x	0.97x
22	Hawaiian Elec.	1.12x	1.10x	1.42x	1.20x	1.22x
23	IDACORP, Inc.	1.25x	1.25x	1.16x	1.14x	1.00x
24	MGE Energy	0.97x	0.73x	0.87x	0.93x	1.09x
25	NextEra Energy, Inc.	0.67x	0.58x	0.69x	0.62x	0.65x
26	NorthWestern Corp	1.07x	0.98x	0.82x	0.68x	1.11x
27	OGE Energy	1.26x	1.43x	1.13x	0.99x	1.32x
28	Otter Tail Corp.	0.80x	0.45x	1.42x	1.45x	1.04x
29	Pinnacle West Capital	0.98x	0.98x	0.85x	0.77x	1.04x
30	PNM Resources	0.72x	0.59x	0.51x	0.75x	1.03x
31	Portland General	0.99x	0.75x	0.97x	1.05x	1.44x
32	PPL Corp.	0.92x	1.06x	1.12x	1.47x	2.14x
33	Public Serv. Enterprise	1.07x	1.00x	1.05x	0.92x	1.14x
34	Sempra Energy	0.66x	0.92x	0.78x	0.93x	1.42x
35	Southern Co.	0.88x	1.01x	0.93x	1.13x	1.44x
36	WEC Energy Group	0.91x	0.70x	0.75x	0.87x	1.16x
37	Xcel Energy Inc.	0.69x	0.99x	0.86x	0.78x	0.90x
38	Average	0.86x	0.86x	0.88x	0.92x	1.06x
39	Median	0.80x	0.85x	0.86x	0.86x	1.04x

Source:
The Value Line Investment Survey, January 21, February 11, and March 11, 2022.
Notes:
Based on the projected Cash Flow per share and Capital Spending per share.

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

Line	Company	Percent Dividends to Book Value [1] 16-Year Average (1)	2021 [2/a] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	ALLETE	5.95%	5.56%	5.61%	5.44%	5.35%	5.29%	5.45%	5.45%	5.59%	5.86%	6.04%	6.18%	6.46%	6.67%	6.78%	6.80%	6.62%
2	Alliant Energy	6.33%	6.73%	6.68%	6.68%	6.90%	7.32%	6.96%	6.70%	6.56%	6.36%	6.37%	6.26%	6.06%	5.98%	5.48%	5.23%	5.04%
3	Ameren Corp.	6.02%	5.84%	5.67%	5.87%	5.92%	6.01%	5.86%	5.78%	5.82%	5.93%	5.87%	4.76%	4.79%	4.66%	7.74%	7.84%	7.97%
4	American Electric Power	6.28%	6.74%	6.86%	6.82%	6.56%	6.43%	6.42%	5.90%	5.91%	5.91%	5.99%	6.10%	6.04%	5.97%	6.23%	6.28%	6.32%
5	Avangrid, Inc.	3.04%	3.52%	3.58%	3.57%	3.57%	3.54%	3.53%	0.00%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	4.99%	5.63%	5.53%	5.37%	5.52%	5.41%	5.33%	5.38%	5.33%	5.65%	5.51%	5.42%	5.07%	4.23%	3.77%	3.44%	3.26%
7	Black Hills	5.33%	5.32%	5.32%	5.34%	5.31%	5.67%	5.55%	5.66%	5.06%	5.17%	5.31%	5.30%	5.14%	5.10%	5.15%	5.34%	5.58%
8	CenterPoint Energy	9.85%	4.82%	8.35%	6.59%	8.94%	12.39%	12.82%	12.30%	8.96%	8.23%	8.05%	7.97%	10.36%	11.28%	12.40%	12.12%	12.09%
9	CMS Energy Corp.	6.56%	7.87%	8.57%	8.66%	8.52%	8.43%	8.14%	8.16%	8.10%	7.86%	7.94%	7.05%	5.90%	4.38%	3.31%	2.11%	0.00%
10	Consol. Edison	6.05%	5.48%	5.56%	5.46%	5.49%	5.55%	5.72%	5.84%	5.87%	5.88%	5.97%	6.15%	6.27%	6.47%	6.60%	7.12%	7.40%
11	Dominion Resources	10.37%	8.29%	11.72%	10.39%	11.31%	11.41%	12.04%	12.20%	12.16%	11.24%	11.50%	9.81%	8.86%	9.38%	9.14%	8.95%	7.46%
12	DTE Energy	6.11%	8.64%	6.43%	6.34%	6.38%	6.34%	6.09%	5.81%	5.72%	5.79%	5.66%	5.60%	5.49%	5.59%	5.76%	5.91%	6.28%
13	Duke Energy	5.37%	6.40%	6.39%	6.12%	6.04%	5.85%	5.73%	5.61%	5.45%	5.28%	5.22%	5.81%	5.72%	5.66%	5.45%	5.12%	0.00%
14	Edison Int'l	5.26%	7.39%	6.96%	6.73%	7.56%	6.23%	5.39%	4.97%	4.41%	4.48%	4.54%	4.16%	3.90%	4.12%	4.19%	4.53%	4.65%
15	El Paso Electric	2.94%	N/A	5.13%	N/A	4.94%	4.67%	4.62%	4.63%	4.53%	4.46%	4.72%	3.47%	0.00%	0.00%	0.00%	0.00%	0.00%
16	Entergy Corp.	6.72%	6.72%	6.85%	7.13%	7.65%	7.90%	7.58%	6.44%	5.95%	6.15%	6.42%	6.53%	6.82%	6.59%	7.13%	6.34%	5.34%
17	Eversource Energy	4.95%	5.71%	5.54%	5.59%	5.57%	5.43%	5.27%	5.12%	4.99%	4.82%	4.49%	4.86%	4.75%	4.66%	4.26%	4.16%	4.00%
18	Evergy, Inc.	5.37%	5.41%	5.32%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	7.22%	4.49%	4.62%	4.38%	4.34%	4.23%	4.51%	4.42%	4.72%	5.49%	8.38%	9.68%	10.25%	10.96%	12.21%	11.87%	11.02%
20	FirstEnergy Corp.	8.80%	10.33%	11.70%	11.86%	13.82%	16.34%	10.21%	4.91%	4.88%	5.44%	7.03%	6.93%	7.85%	7.84%	8.10%	6.96%	6.54%
21	Fortis Inc.	5.36%	5.59%	5.39%	5.08%	5.03%	5.19%	4.80%	5.00%	5.22%	5.58%	5.81%	5.70%	5.91%	5.60%	5.55%	4.90%	5.47%
22	Great Plains Energy	5.31%	N/A	N/A	N/A	N/A	4.78%	4.27%	4.21%	4.02%	3.91%	3.93%	3.84%	3.90%	4.03%	7.76%	9.13%	9.94%
23	Hawaiian Elec.	7.22%	6.14%	6.17%	6.12%	6.24%	6.43%	6.51%	6.91%	7.10%	7.27%	7.62%	7.77%	7.91%	7.96%	8.08%	8.11%	9.22%
24	IDACORP, Inc.	4.59%	5.45%	5.36%	5.24%	5.11%	5.02%	4.87%	4.70%	4.53%	4.26%	3.91%	3.62%	3.87%	4.11%	4.32%	4.48%	4.66%
25	MGE Energy	6.16%	5.35%	5.22%	5.59%	5.60%	5.61%	5.79%	5.82%	5.84%	6.01%	6.22%	6.36%	6.56%	6.72%	6.87%	7.24%	7.77%
26	NextEra Energy, Inc.	6.49%	8.13%	7.51%	6.61%	6.22%	6.55%	6.69%	6.29%	6.49%	6.36%	6.34%	6.12%	5.82%	5.99%	6.30%	6.22%	6.21%
27	NorthWestern Corp	5.84%	5.77%	5.84%	5.69%	5.70%	5.76%	5.77%	5.78%	5.08%	5.71%	5.90%	6.08%	6.01%	6.13%	6.21%	6.06%	6.00%
28	OGE Energy	6.78%	8.04%	8.71%	7.28%	6.96%	6.59%	6.70%	6.30%	5.84%	5.56%	5.70%	5.81%	6.24%	6.79%	6.89%	7.47%	7.61%
29	Otter Tail Corp.	7.19%	6.54%	7.05%	7.19%	7.29%	7.27%	7.34%	7.70%	7.86%	8.07%	8.25%	7.52%	6.77%	6.33%	6.22%	6.67%	6.90%
30	PG&E Corp.	4.91%	N/A	N/A	0.00%	0.00%	4.15%	5.44%	5.40%	5.50%	5.80%	6.00%	6.20%	6.38%	6.03%	6.01%	5.96%	5.88%
31	Pinnacle West Capital	6.19%	6.47%	6.47%	6.29%	6.16%	6.03%	5.93%	5.91%	5.89%	5.84%	7.38%	6.00%	6.20%	6.42%	6.15%	5.98%	5.87%
32	PNM Resources	3.83%	3.88%	5.23%	5.59%	5.12%	4.67%	4.18%	3.85%	3.37%	3.26%	2.89%	2.55%	2.84%	2.65%	3.20%	4.13%	3.89%
33	Portland General	4.79%	5.63%	5.45%	5.24%	5.09%	4.94%	4.78%	4.64%	4.56%	4.70%	4.70%	4.78%	4.90%	4.93%	4.48%	4.42%	3.45%
34	PPL Corp.	9.38%	15.51%	9.55%	9.74%	10.13%	10.18%	10.44%	10.19%	7.28%	7.43%	8.00%	7.48%	8.24%	9.47%	9.89%	8.20%	8.27%
35	Public Serv. Enterprise	6.91%	7.34%	6.18%	6.28%	6.31%	6.27%	6.31%	6.03%	6.14%	6.28%	6.66%	6.75%	7.20%	7.66%	8.40%	8.15%	8.54%
36	SCANA Corp.	6.44%	N/A	N/A	N/A	N/A	6.67%	5.74%	5.72%	6.01%	6.14%	6.29%	6.48%	6.54%	6.80%	7.12%	6.94%	6.89%
37	Sempra Energy	5.34%	5.84%	5.96%	6.39%	6.59%	6.53%	5.83%	5.89%	5.74%	5.60%	5.66%	4.68%	4.16%	4.27%	4.18%	3.89%	4.19%
38	Southern Co.	9.54%	9.79%	9.59%	9.42%	9.95%	9.59%	8.89%	9.53%	9.48%	9.39%	9.22%	9.22%	9.38%	9.55%	9.74%	9.83%	10.07%
39	Vectren Corp.	7.71%	N/A	N/A	N/A	N/A	7.67%	7.60%	7.57%	7.51%	7.55%	7.57%	7.74%	7.78%	7.84%	7.85%	7.86%	7.97%
40	WEC Energy Group	6.20%	7.83%	7.62%	7.36%	7.12%	6.94%	7.00%	6.35%	7.96%	7.71%	6.65%	6.05%	4.92%	4.42%	3.78%	3.77%	3.72%
41	Westar Energy	5.71%	N/A	N/A	N/A	N/A	5.82%	5.66%	5.57%	5.60%	5.70%	5.77%	5.81%	5.84%	5.83%	5.75%	5.64%	5.56%
42	Xcel Energy Inc.	6.15%	6.43%	6.34%	6.42%	6.39%	6.38%	6.26%	6.13%	5.94%	5.78%	5.88%	5.91%	5.97%	6.09%	6.13%	6.19%	6.16%
43	Average	6.31%	6.68%	6.65%	6.39%	6.51%	6.67%	6.44%	6.12%	6.07%	6.10%	6.28%	6.11%	6.08%	6.13%	6.36%	6.28%	6.10%
44	Median	6.14%	6.27%	6.18%	6.29%	6.22%	6.23%	5.83%	5.81%	5.83%	5.82%	5.99%	6.09%	6.02%	6.01%	6.21%	6.21%	6.19%

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.
[a] Based on the projected 2019 Dividend Declared per share and Book Value per share, published in The Value Line Investment Survey, January 24, February 14, and March 13, 2020.

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

Line	Company	Dividends to Earnings Ratio [1] 16-Year Average (1)	2021 [2/b] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	ALLETE	0.69	0.78	0.74	0.71	0.66	0.68	0.66	0.60	0.68	0.72	0.71	0.67	0.80	0.93	0.61	0.53	0.52
2	Alliant Energy	0.61	0.61	0.62	0.61	0.61	0.63	0.72	0.65	0.59	0.57	0.59	0.62	0.57	0.79	0.55	0.47	0.56
3	Ameren Corp.	0.67	0.57	0.57	0.57	0.56	0.64	0.64	0.70	0.67	0.76	0.66	0.63	0.56	0.55	0.88	0.85	0.95
4	American Electric Power	0.60	0.60	0.64	0.66	0.65	0.66	0.54	0.60	0.61	0.61	0.63	0.59	0.66	0.55	0.55	0.55	0.52
5	Avangrid, Inc.	0.90	0.86	0.94	0.78	0.91	1.03	0.87	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	0.67	0.82	0.85	0.52	0.72	0.73	0.64	0.70	0.69	0.66	0.88	0.64	0.61	0.51	0.51	0.83	0.39
7	Black Hills	1.11	0.58	0.58	0.58	0.56	0.54	0.64	0.57	0.54	0.58	0.75	1.45	0.87	0.61	7.78	0.51	0.60
8	CenterPoint Energy	0.75	0.70	0.70	0.58	1.51	0.86	1.03	0.92	0.67	0.67	0.60	0.62	0.73	0.75	0.56	0.58	0.45
9	CMS Energy Corp.	0.57	0.67	0.62	0.64	0.62	0.61	0.63	0.61	0.62	0.61	0.63	0.58	0.50	0.54	0.29	0.31	N/A
10	Consol. Edison	0.69	0.70	0.78	0.73	0.63	0.67	0.68	0.64	0.70	0.63	0.63	0.67	0.69	0.75	0.70	0.67	0.78
11	Dominion Resources	0.87	0.81	1.90	1.68	1.03	0.86	0.81	0.81	0.79	0.73	0.77	0.71	0.63	0.66	0.52	0.69	0.58
12	DTE Energy	0.67	0.95	0.58	0.61	0.58	0.59	0.63	0.64	0.53	0.69	0.62	0.63	0.58	0.65	0.78	0.80	0.85
13	Duke Energy	0.81	0.79	0.97	0.74	0.88	0.83	0.91	0.79	0.76	0.78	0.82	0.72	0.72	0.83	0.89	0.72	N/A
14	Edison Int'l	0.40	1.68	1.50	0.62	- 1.93	0.50	0.50	0.42	0.34	0.36	0.29	0.40	0.38	0.38	0.33	0.35	0.34
15	El Paso Electric	0.50	N/A	N/A	N/A	0.68	0.54	0.51	0.57	0.49	0.48	0.43	0.27	N/A	N/A	N/A	N/A	N/A
16	Entergy Corp.	0.54	0.56	0.54	0.58	0.61	0.67	0.50	0.57	0.58	0.67	0.55	0.44	0.49	0.48	0.48	0.46	0.40
17	Eversource Energy	0.60	0.70	0.64	0.62	0.62	0.61	0.60	0.61	0.61	0.59	0.70	0.50	0.49	0.50	0.44	0.49	0.88
18	Evergy, Inc.	0.57	0.57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	0.58	0.59	0.59	0.48	0.67	0.47	0.70	0.49	0.59	0.63	1.09	0.56	0.54	0.49	0.50	0.45	0.47
20	FirstEnergy Corp.	0.81	0.65	0.84	0.83	1.37	0.53	0.69	0.72	1.69	0.56	1.03	1.17	0.68	0.66	0.50	0.49	0.48
21	Fortis Inc.	0.71	0.80	0.76	0.69	0.69	0.62	0.82	0.68	0.94	0.77	0.73	0.67	0.69	0.69	0.66	0.64	0.49
22	Great Plains Energy	- 0.82	N/A	N/A	N/A	N/A	-18.33	0.66	0.73	0.60	0.54	0.63	0.67	0.54	0.81	1.43	0.90	1.02
23	Hawaiian Elec.	0.85	0.63	0.73	0.64	0.67	0.76	0.54	0.83	0.76	0.77	0.74	0.86	1.02	1.36	1.16	1.12	0.93
24	IDACORP, Inc.	0.50	0.59	0.58	0.56	0.53	0.53	0.53	0.50	0.46	0.43	0.41	0.36	0.41	0.45	0.55	0.65	0.51
25	MGE Energy	0.57	0.52	0.56	0.55	0.54	0.57	0.56	0.56	0.48	0.50	0.56	0.57	0.60	0.66	0.60	0.62	0.68
26	NextEra Energy, Inc.	0.56	0.85	0.67	0.64	0.66	0.60	0.60	0.51	0.52	0.55	0.53	0.45	0.42	0.47	0.44	0.50	0.47
27	NorthWestern Corp	0.68	0.68	0.78	0.65	0.65	0.63	0.59	0.66	0.54	0.62	0.65	0.57	0.64	0.66	0.75	0.89	0.95
28	OGE Energy	0.58	0.69	0.76	0.67	0.66	0.66	0.68	0.62	0.48	0.44	0.45	0.44	0.49	0.54	0.56	0.52	0.55
29	Otter Tail Corp.	1.08	0.37	0.63	0.65	0.65	0.69	0.78	0.79	0.78	0.87	1.13	2.64	3.13	1.68	1.09	0.66	0.68
30	PG&E Corp.	0.65	N/A	N/A	N/A	N/A	0.44	0.68	0.91	0.59	0.99	0.88	0.65	0.65	0.55	0.48	0.52	0.48
31	Pinnacle West Capital	0.69	0.62	0.66	0.64	0.63	0.61	0.65	0.62	0.65	0.61	0.76	0.70	0.68	0.93	0.99	0.71	0.64
32	PNM Resources	0.89	0.42	0.58	0.52	0.65	0.52	0.53	0.49	0.52	0.48	0.44	0.46	0.57	0.86	5.50	1.20	0.50
33	Portland General	0.62	0.62	0.92	0.64	0.60	0.59	0.58	0.58	0.51	0.62	0.57	0.54	0.62	0.77	0.70	0.40	0.59
34	PPL Corp.	0.78	2.77	0.81	0.70	0.64	0.75	0.54	0.63	0.63	0.62	0.55	0.54	0.61	1.16	0.55	0.46	0.48
35	Public Serv. Enterprise	0.55	0.89	0.54	0.48	0.65	0.61	0.58	0.47	0.49	0.59	0.58	0.44	0.45	0.43	0.44	0.45	0.62
36	SCANA Corp.	0.61	N/A	N/A	N/A	N/A	0.58	0.55	0.57	0.55	0.60	0.63	0.65	0.64	0.66	0.62	0.64	0.65
37	Sempra Energy	0.56	1.35	0.64	0.65	0.65	0.71	0.71	0.54	0.57	0.60	0.55	0.43	0.39	0.33	0.31	0.29	0.28
38	Southern Co.	0.75	0.75	0.78	0.78	0.79	0.72	0.79	0.76	0.75	0.75	0.73	0.73	0.76	0.75	0.74	0.70	0.73
39	Vectren Corp.	0.75	N/A	N/A	N/A	N/A	0.66	0.64	0.64	0.72	0.86	0.72	0.80	0.84	0.75	0.80	0.69	0.85
40	WEC Energy Group	0.55	0.66	0.67	0.66	0.66	0.66	0.67	0.74	0.60	0.58	0.51	0.48	0.42	0.42	0.36	0.35	0.35
41	Westar Energy	0.68	N/A	N/A	N/A	N/A	0.70	0.63	0.69	0.60	0.60	0.61	0.72	0.69	0.94	0.89	0.59	0.52
42	Xcel Energy Inc.	0.62	0.62	0.62	0.61	0.62	0.63	0.62	0.61	0.59	0.58	0.58	0.60	0.64	0.65	0.64	0.67	0.65
43	Average	0.65	0.78	0.75	0.66	0.64	0.18	0.65	0.64	0.64	0.63	0.66	0.67	0.68	0.70	0.95	0.61	0.61
44	Median	0.63	0.68	0.67	0.64	0.65	0.63	0.64	0.63	0.60	0.61	0.63	0.62	0.62	0.66	0.60	0.59	0.56

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.
Note:
[b] Based on the projected 2019 Dividends Declared per share and Earnings per share, published in The Value Line Investment Survey, January 24, February 14, and March 13, 2020.

Northwest Natural Gas Company

Electric Utilities
(Valuation Metrics)

Line	Company	Cash Flow to Capital Spending Ratio [1] 16-Year Average (1)	2021 [2/c] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	ALLETE	0.80	0.55	0.55	0.63	1.22	1.61	1.32	1.16	0.45	0.67	0.49	0.77	0.63	0.39	0.46	0.65	1.23
2	Alliant Energy	0.80	0.95	N/A	N/A	N/A	0.49	N/A	0.81	0.91	1.01	0.57	0.91	0.67	0.39	0.57	1.04	1.27
3	Ameren Corp.	0.88	0.62	0.62	0.79	0.80	0.75	0.75	0.75	0.75	0.89	1.07	1.31	1.36	0.81	0.66	0.97	1.21
4	American Electric Power	0.87	0.81	0.81	0.75	0.68	0.67	0.85	0.85	0.87	0.91	1.07	1.19	1.24	1.02	0.70	0.77	0.75
5	Avangrid, Inc.	0.70	0.56	0.56	0.62	0.85	0.57	0.86	0.89	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corp.	0.90	0.88	0.88	0.92	0.78	0.77	0.84	0.76	0.80	0.86	0.80	0.90	0.99	1.15	0.97	0.73	1.36
7	Black Hills	0.65	0.61	0.61	0.53	0.87	1.17	0.71	0.64	0.70	0.74	0.71	0.40	0.41	0.61	0.35	0.76	0.55
8	CenterPoint Energy	1.03	0.73	0.73	0.83	0.98	1.22	1.12	0.92	1.20	1.18	1.37	1.12	0.88	0.99	1.16	0.98	1.08
9	CMS Energy Corp.	0.87	0.78	0.78	0.79	0.77	0.89	0.81	0.81	0.74	0.82	0.82	1.05	1.13	0.97	1.11	0.55	1.07
10	Consol. Edison	0.82	0.83	0.83	0.87	0.82	0.76	0.65	0.76	0.88	0.86	1.01	0.98	0.90	0.75	0.70	0.81	0.74
11	Dominion Resources	0.78	0.73	0.73	0.96	1.04	0.81	0.65	0.64	0.63	0.77	0.73	0.79	0.87	0.75	0.83	0.74	0.85
12	DTE Energy	1.00	0.74	0.74	0.83	0.84	0.94	0.93	0.84	1.02	0.96	0.93	1.09	1.51	1.50	0.98	1.07	1.03
13	Duke Energy	0.89	0.85	0.85	0.80	0.81	0.87	0.82	0.96	1.20	1.09	0.87	0.89	0.78	0.77	0.71	1.09	0.97
14	Edison Int'l	0.74	0.55	0.55	0.68	0.34	0.94	0.91	0.80	0.83	0.80	0.76	0.61	0.60	0.79	0.93	0.88	0.93
15	El Paso Electric	0.87	0.83	N/A	N/A	0.86	1.04	0.85	0.67	0.69	0.79	0.85	1.03	0.98	0.68	0.78	0.84	1.26
16	Entergy Corp.	0.98	0.74	0.74	0.79	0.73	0.76	1.08	1.05	1.19	1.03	0.88	1.15	1.24	1.02	0.93	1.14	1.13
17	Eversource Energy	0.85	0.80	0.80	0.75	0.83	0.79	0.87	0.91	0.90	1.13	0.86	0.80	1.05	0.96	0.77	0.68	0.67
18	Evergy, Inc.	1.03	1.03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Exelon Corp.	1.24	1.09	1.09	1.20	1.05	1.06	0.76	0.82	0.93	1.07	0.98	1.19	1.66	1.66	1.61	1.84	1.86
20	FirstEnergy Corp.	1.02	0.83	0.83	0.80	0.76	1.03	0.94	0.93	0.54	0.91	0.85	1.05	1.32	1.22	0.95	1.56	1.75
21	Fortis Inc.	0.68	0.65	0.65	0.68	0.72	0.76	0.76	0.65	0.60	0.77	0.72	0.66	0.68	0.63	0.66	0.57	0.63
22	Great Plains Energy	0.79	N/A	N/A	N/A	N/A	0.78	1.17	0.90	0.79	0.91	0.86	1.03	0.86	0.50	0.35	0.69	0.64
23	Hawaiian Elec.	1.09	1.27	1.27	1.08	0.85	0.81	1.37	0.98	1.03	0.92	0.99	1.30	1.50	0.79	0.87	1.15	1.23
24	IDACORP, Inc.	1.12	1.33	1.33	1.46	1.42	1.33	1.16	1.15	1.21	1.34	1.24	0.86	0.78	0.96	0.82	0.64	0.89
25	MGE Energy	1.08	0.82	0.82	0.97	0.66	1.19	1.44	1.60	1.31	0.96	1.05	1.56	1.57	1.13	0.87	0.59	0.80
26	NextEra Energy, Inc.	0.62	0.58	0.58	0.67	0.56	0.53	0.63	0.71	0.77	0.68	0.39	0.58	0.69	0.60	0.63	0.56	0.73
27	NorthWestern Corp	1.04	0.84	0.84	1.13	1.23	1.21	1.13	1.01	0.93	0.92	0.88	1.04	0.76	0.88	1.27	1.23	1.29
28	OGE Energy	0.91	1.24	1.24	1.27	1.30	0.81	1.00	1.18	1.19	0.69	0.63	0.51	0.69	0.61	0.60	0.79	0.84
29	Otter Tail Corp.	0.84	0.48	0.48	0.80	1.49	1.10	0.84	0.74	0.70	0.67	0.85	1.16	1.09	0.56	0.37	0.65	1.44
30	PG&E Corp.	0.58	N/A	0.28	- 0.70	- 0.58	0.82	0.73	0.69	0.80	0.56	0.68	0.83	0.85	0.78	0.84	1.02	1.12
31	Pinnacle West Capital	0.95	0.91	0.91	1.03	1.06	0.76	0.81	0.92	0.97	0.87	0.96	0.91	0.97	1.06	0.86	0.99	1.28
32	PNM Resources	0.71	0.72	0.72	0.78	0.82	0.84	0.57	0.57	0.63	0.80	0.87	0.77	0.82	0.70	0.44	0.43	0.89
33	Portland General	0.84	0.78	0.78	1.03	1.00	1.07	0.88	0.80	0.47	0.59	1.28	1.25	0.81	0.44	0.77	0.72	0.78
34	PPL Corp.	0.96	0.90	0.90	0.98	0.93	0.82	1.00	0.72	0.75	0.69	0.91	1.07	1.11	1.07	1.25	1.13	1.18
35	Public Serv. Enterprise	1.12	1.13	1.13	1.08	0.70	0.64	0.61	0.80	1.04	0.93	0.96	1.30	1.23	1.41	1.34	1.64	1.94
36	SCANA Corp.	0.86	N/A	N/A	N/A	N/A	0.86	0.66	0.83	0.90	0.83	0.77	0.88	0.86	0.76	0.76	0.92	1.26
37	Sempra Energy	0.81	0.77	0.77	0.88	0.80	0.67	0.56	0.81	0.74	0.84	0.73	0.72	0.90	1.02	0.87	0.90	0.93
38	Southern Co.	0.89	0.99	0.99	0.88	0.83	0.90	0.77	0.88	0.80	0.86	0.93	0.94	0.93	0.78	0.87	0.91	1.00
39	Vectren Corp.	1.00	N/A	N/A	N/A	N/A	0.82	0.87	0.95	0.98	1.05	1.13	1.20	1.31	0.83	0.82	0.98	1.00
40	WEC Energy Group	0.98	0.97	0.97	0.91	0.90	0.92	1.20	0.97	1.37	1.42	1.30	1.02	0.97	0.89	0.61	0.56	0.69
41	Westar Energy	0.72	N/A	N/A	N/A	N/A	0.91	0.63	0.86	0.70	0.72	0.67	0.71	0.88	0.68	0.36	0.48	1.00
42	Xcel Energy Inc.	0.75	0.66	0.66	0.78	0.77	0.84	0.79	0.63	0.68	0.60	0.76	0.83	0.76	0.89	0.75	0.71	0.90
43	Average	0.88	0.83	0.80	0.84	0.85	0.89	0.88	0.86	0.87	0.88	0.88	0.96	0.98	0.86	0.80	0.88	1.05
44	Median	0.83	0.81	0.78	0.83	0.83	0.84	0.84	0.83	0.82	0.86	0.87	0.96	0.90	0.80	0.80	0.82	1.00

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, January 21, February 11, and March 11, 2022.
Notes:
[c] Based on the projected Cash Flow per share and Capital Spending per share

Northwest Natural Gas Company

Natural Gas Utilities
(Valuation Metrics)

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

Line	Company	16-Year Average (1)	2021 [2] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	Atmos Energy	17.37	19.30	22.30	23.22	21.75	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	18.86	26.30	21.57	24.74	22.94	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	17.29	17.50	17.70	24.33	15.64	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.	19.86	19.50	18.67	21.32	19.34	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	20.91	17.60	24.96	30.85	26.63	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.	21.56	18.60	21.71	25.27	23.06	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.	18.55	14.30	14.89	28.28	22.64	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	17.57	15.30	16.80	21.30	20.61	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.	18.96	19.00	51.12	22.79	16.74	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.	15.75	12.90	13.80	23.40	17.77	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	N/A	N/A	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	18.36	18.03	22.35	24.55	20.71	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	17.47	18.10	20.12	23.87	21.18	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	16-Year Average (1)	2021 [2/a] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
14	Atmos Energy	9.04	10.97	13.11	13.35	12.02	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	10.12	13.41	12.31	14.17	12.24	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	12.00	11.56	11.10	15.98	11.44	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.	7.86	7.69	7.83	8.81	8.91	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	12.66	8.57	10.10	13.13	11.75	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.	10.67	9.59	10.85	12.75	11.85	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.	10.57	9.26	7.54	12.38	10.72	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	6.44	6.87	7.05	8.92	9.32	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.	9.80	7.55	14.01	11.27	9.60	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.	8.04	9.56	7.39	12.95	9.01	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	N/A	N/A	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	9.59	9.50	10.13	12.37	10.69	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	8.75	9.41	10.47	12.85	11.08	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]

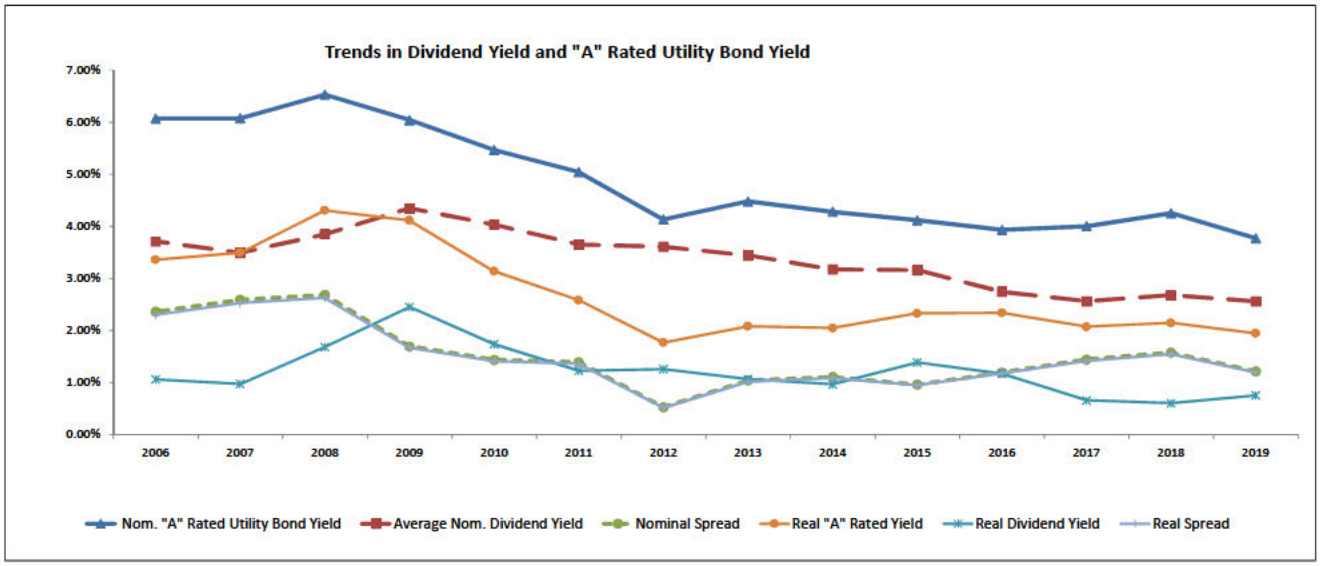
Line	Company	16-Year Average (1)	2021 [2/b] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
27	Atmos Energy	1.58	1.59	1.95	2.10	2.03	2.16	2.11	1.72	1.55	1.39	1.28	1.30	1.18	1.05	1.20	1.40	1.34
28	Chesapeake Utilities	2.02	2.62	2.27	2.69	2.50	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	2.26	2.26	1.90	2.75	2.63	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.	1.53	1.81	1.95	2.09	1.92	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	1.87	1.45	1.98	2.38	2.35	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.	1.69	1.61	1.90	2.20	1.93	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.	2.05	1.54	1.52	2.06	2.11	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	1.32	1.49	1.84	1.79	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.	1.57	1.47	1.67	1.78	1.63	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.	2.03	1.64	1.87	2.92	2.30	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	N/A	N/A	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	1.82	1.73	1.85	2.28	2.12	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	1.69	1.60	1.90	2.15	2.07	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 18, 2021.
[2] The Value Line Investment Survey, February 25, 2022
Notes:
[a] Based on the average of the high and low price for year and the projected Cash Flow per share, published in The Value Line Investment Survey.
[b] Based on the average of the high and low price for the year and the projected Book Value per share, published in The Value Line Investment Survey.

Northwest Natural Gas Company

Natural Gas Utilities
(Valuation Metrics)

Line	Company	Dividend Yield[1] 16-Year Average (1)	2021 [2a] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	Atmos Energy	3.45%	2.64%	2.19%	2.08%	2.23%	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	2.75%	1.59%	1.86%	1.68%	1.76%	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	3.21%	3.50%	3.47%	2.50%	2.61%	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.	4.00%	3.69%	3.41%	2.86%	3.10%	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	3.56%	3.90%	3.33%	2.81%	3.05%	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.	2.53%	3.12%	2.70%	2.25%	2.46%	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.	3.48%	4.88%	4.76%	3.66%	3.62%	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	2.92%	3.65%	3.28%	2.60%	2.74%	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.	3.78%	3.79%	3.38%	2.95%	3.10%	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.	2.86%	3.25%	3.56%	2.16%	2.09%	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	N/A	N/A	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**	**3.35%**	**3.40%**	**3.19%**	**2.56%**	**2.68%**	**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	3.39%	3.57%	3.35%	2.55%	2.68%	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]	3.18%	1.98%	1.35%	2.40%	3.02%	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]	1.05%	-0.43%	-0.30%	0.60%	0.94%	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]	2.11%	2.42%	1.66%	1.79%	2.06%	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]**	**1.21%**	**0.96%**	**1.51%**	**0.75%**	**0.60%**	**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]**	**4.64%**	**3.10%**	**3.05%**	**3.77%**	**4.25%**	**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**	**2.48%**	**0.67%**	**1.37%**	**1.94%**	**2.14%**	**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]**	**1.30%**	**-0.30%**	**-0.14%**	**1.21%**	**1.57%**	**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]**	**1.27%**	**-0.29%**	**-0.14%**	**1.19%**	**1.54%**	**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]**	**-0.16%**	**-1.42%**	**-1.84%**	**-0.15%**	**0.34%**	**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]**	**-0.16%**	**-1.39%**	**-1.81%**	**-0.15%**	**0.34%**	**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 18, 2021.
[2] The Value Line Investment Survey, February 25, 2022
[3] St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org.
[4] www.moodys.com, Bond Yields and Key Indicators, through December 31, 2021.

Notes:
[a] Based on the average of the high and low price for the year and the projected Dividends Declared per share published in the Value Line Investment Survey.
[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)

Northwest Natural Gas Company

Natural Gas Utilities
(Valuation Metrics)

Line	Company	Dividend per Share[1] 16-Year Average (1)	2021 [2] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)	2018 CAGR (18)	2017 CAGR (19)
1	Atmos Energy	1.53	2.30	1.56	1.48	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	2.89%	3.30%
2	Chesapeake Utilities	1.05	1.69	1.12	1.07	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	3.97%	4.58%
3	New Jersey Resources	0.82	1.27	0.93	0.86	1.11	1.04	0.98	0.93	0.86	0.81	0.77	0.72	0.68	0.62	0.56	0.51	0.48	5.70%	7.28%
4	NiSource Inc.	0.88	0.84	0.83	1.02	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	-1.08%	-2.45%
5	Northwest Nat. Gas	1.75	1.91	1.86	1.85	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	2.05%	2.78%
6	ONE Gas Inc.	1.40	2.16	1.20	0.84	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	11.58%	25.99%
7	South Jersey Inds.	0.86	1.19	1.02	0.96	1.13	1.10	1.06	1.02	0.96	0.90	0.83	0.75	0.68	0.61	0.56	0.51	0.46	6.11%	8.25%
8	Southwest Gas	1.40	2.26	1.62	1.46	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	6.33%	8.34%
9	Spire Inc.	1.78	2.49	1.84	1.76	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	3.18%	3.75%
10	UGI Corp.	0.77	1.32	0.89	0.79	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	5.47%	7.02%
11	WGL Holdings Inc.	1.64	N/A	1.83	1.72	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	N/A	3.77%
12	**Average**	**1.25**	**1.74**	**1.34**	**1.25**	**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**	**4.62%**	**6.60%**
13	**Industry Average Growth**	**4.67%**	**30.43%**	**6.50%**	**-18.69%**	**2.76%**	**6.99%**	**5.03%**	**6.50%**	**1.58%**	**4.67%**	**4.35%**	**4.34%**	**4.47%**	**4.20%**	**3.83%**	**3.13%**			

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, February 25, 2022

Northwest Natural Gas Company

Natural Gas Utilities
(Valuation Metrics)

Line	Company	Earnings per Share[1] 16-Year Average	2021 [2]	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1	Atmos Energy	3.01	5.12	4.72	4.35	4.00	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	2.50	4.70	4.21	3.72	3.45	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	1.60	2.16	2.07	1.96	2.72	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.	1.16	1.35	1.32	1.31	1.30	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	2.11	2.50	2.30	2.19	2.33	-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.	3.03	3.85	3.68	3.51	3.25	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	1.65	1.68	1.12	1.38	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	2.89	3.80	4.14	3.94	3.68	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.	2.92	4.96	1.44	3.52	4.33	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.	1.86	2.96	2.67	2.28	2.74	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	N/A	N/A	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**	**2.23**	**3.31**	**2.82**	**2.79**	**2.92**	**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 Average Growth**	**5.40%**	**17.07%**	**1.18%**	**-4.39%**	**38.59%**	**-13.26%**	**6.50%**	**0.54%**	**10.67%**	**2.13%**	**4.13%**	**1.87%**	**2.61%**	**4.79%**	**6.67%**	**1.82%**	

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, February 25, 2022

Northwest Natural Gas Company

Natural Gas Utilities
(Valuation Metrics)

Line	Company	Cash Flow / Capital Spending 2019 (1)	2020 (2)	2021 (3)	3 - 5 yr Projection (4)
1	Atmos Energy	0.53x	0.53x	0.53x	0.68x
2	Chesapeake Utilities	0.66x	0.64x	0.82x	0.88x
3	New Jersey Resources	1.41x	0.65x	0.72x	0.98x
4	NiSource Inc.	0.66x	0.65x	0.69x	0.94x
5	Northwest Nat. Gas	0.77x	0.75x	0.61x	0.73x
6	ONE Gas Inc.	0.78x	0.88x	0.86x	1.02x
7	South Jersey Inds.	0.48x	0.47x	0.49x	0.50x
8	Southwest Gas	0.62x	0.53x	0.61x	0.53x
9	Spire Inc.	0.65x	0.65x	0.70x	0.90x
10	UGI Corp.	1.33x	1.54x	1.66x	1.75x
11	Average	0.79x	0.73x	0.77x	0.89x
12	Median	0.66x	0.65x	0.69x	0.89x

Sources:
The Value Line Investment Survey Investment Analyzer Software, downloaded on June 17, 2021.
The Value Line Investment Survey, Feb 26, 2021.
Notes:
Based on the projected Cash Flow per share and Capital Spending per share.

Northwest Natural Gas Company

Natural Gas Utilities
(Valuation Metrics)

Percent Dividends to Book Value [1]

Line	Company	16-Year Average (1)	2021 [2/a] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
1	Atmos Energy	5.10%	4.19%	4.26%	4.36%	4.53%	4.90%	5.04%	4.96%	4.81%	4.92%	5.28%	5.44%	5.55%	5.61%	5.75%	5.82%	6.25%
2	Chesapeake Utilities	5.21%	4.15%	4.23%	4.53%	4.39%	4.23%	4.35%	4.78%	5.18%	5.25%	5.39%	5.42%	5.49%	5.60%	6.71%	6.66%	6.95%
3	New Jersey Resources	7.19%	7.92%	6.60%	6.85%	6.87%	7.26%	7.21%	7.16%	7.45%	7.60%	7.86%	7.69%	7.72%	7.48%	6.42%	6.54%	6.40%
4	NiSource Inc.	5.59%	6.69%	6.64%	5.99%	5.96%	5.46%	5.08%	6.89%	5.22%	5.22%	5.25%	5.19%	5.22%	5.25%	5.34%	4.97%	5.02%
5	Northwest Nat. Gas	6.53%	5.66%	6.57%	6.69%	7.16%	7.27%	6.30%	6.53%	6.58%	6.59%	6.57%	6.55%	6.44%	6.43%	6.41%	6.39%	6.32%
6	ONE Gas Inc.	4.26%	5.04%	5.14%	4.96%	4.73%	4.48%	3.88%	3.41%	2.44%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	South Jersey Inds.	6.99%	7.53%	7.21%	7.53%	7.63%	7.34%	6.53%	6.98%	7.04%	7.12%	7.09%	7.26%	7.13%	6.69%	6.40%	6.22%	6.09%
8	Southwest Gas	4.42%	4.80%	4.87%	4.79%	4.90%	5.25%	5.14%	4.82%	4.57%	4.33%	4.16%	3.98%	3.90%	3.89%	3.83%	3.74%	3.80%
9	Spire Inc.	5.89%	5.56%	5.63%	5.25%	5.06%	5.09%	5.06%	5.07%	5.04%	5.31%	6.22%	6.30%	6.53%	6.56%	6.74%	7.33%	7.43%
10	UGI Corp.	5.62%	5.34%	6.65%	6.30%	4.82%	5.28%	5.65%	5.72%	5.14%	5.07%	5.35%	5.77%	5.41%	5.35%	5.72%	5.82%	6.54%
11	WGL Holdings Inc.	6.86%	N/A	N/A	N/A	N/A	6.88%	7.21%	7.33%	7.14%	6.73%	6.45%	6.60%	6.57%	6.72%	6.71%	6.88%	7.13%
12	Average	5.84%	5.69%	5.78%	5.72%	5.60%	5.77%	5.59%	5.78%	5.51%	5.82%	5.96%	6.02%	6.00%	5.96%	6.00%	6.04%	6.19%
13	Median	5.76%	5.45%	6.10%	5.62%	4.98%	5.28%	5.14%	5.72%	5.18%	5.28%	5.80%	6.03%	5.99%	6.02%	6.41%	6.30%	6.36%

Dividends to Earnings Ratio [1]

Line	Company	16-Year Average (1)	2021 [2/b] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
14	Atmos Energy	0.56	0.49	0.49	0.48	0.49	0.50	0.50	0.50	0.50	0.56	0.66	0.60	0.62	0.67	0.65	0.66	0.63
15	Chesapeake Utilities	0.48	0.39	0.40	0.42	0.40	0.47	0.42	0.42	0.43	0.45	0.48	0.48	0.48	0.58	0.58	0.61	0.67
16	New Jersey Resources	0.55	0.63	0.61	0.61	0.41	0.60	0.61	0.52	0.41	0.59	0.57	0.56	0.55	0.52	0.41	0.65	0.51
17	NiSource Inc.	0.83	0.65	0.64	0.61	0.60	1.79	0.64	1.32	0.61	0.62	0.69	0.88	0.87	1.10	0.69	0.81	0.81
18	Northwest Nat. Gas	0.64	0.77	0.83	0.87	0.81	- 0.97	0.88	0.95	0.86	0.82	0.81	0.73	0.62	0.57	0.59	0.52	0.59
19	ONE Gas Inc.	0.54	0.60	0.59	0.57	0.57	0.56	0.53	0.54	0.41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	South Jersey Inds.	0.65	0.74	0.71	1.04	0.82	0.89	0.79	0.71	0.61	0.59	0.54	0.52	0.50	0.51	0.49	0.48	0.37
21	Southwest Gas	0.51	0.63	0.55	0.55	0.57	0.55	0.57	0.55	0.49	0.42	0.41	0.44	0.44	0.49	0.65	0.44	0.41
22	Spire Inc.	0.68	0.52	1.73	0.67	0.52	0.61	0.60	0.58	0.75	0.84	0.59	0.56	0.65	0.52	0.56	0.63	0.59
23	UGI Corp.	0.44	0.46	0.49	0.50	0.37	0.42	0.45	0.44	0.41	0.46	0.60	0.50	0.38	0.33	0.38	0.41	0.41
24	WGL Holdings Inc.	0.64	N/A	N/A	N/A	N/A	0.65	0.59	0.58	0.64	0.72	0.59	0.69	0.66	0.58	0.58	0.65	0.69
25	Average	0.59	0.59	0.70	0.63	0.55	0.55	0.60	0.65	0.56	0.61	0.59	0.59	0.58	0.59	0.56	0.59	0.57
26	Median	0.59	0.61	0.60	0.59	0.54	0.56	0.59	0.55	0.50	0.59	0.59	0.56	0.58	0.54	0.58	0.62	0.59

Cash Flow to Capital Spending Ratio [1]

Line	Company	16-Year Average (1)	2021 [2/c] (2)	2020 (3)	2019 (4)	2018 (5)	2017 (6)	2016 (7)	2015 (8)	2014 (9)	2013 (10)	2012 (11)	2011 (12)	2010 (13)	2009 (14)	2008 (15)	2007 (16)	2006 (17)
27	Atmos Energy	0.66	0.58	0.52	0.53	0.55	0.62	0.59	0.60	0.65	0.55	0.59	0.68	0.77	0.78	0.81	0.94	0.82
28	Chesapeake Utilities	0.73	0.81	0.78	0.62	0.39	0.50	0.50	0.53	0.71	0.65	0.79	1.12	1.10	1.14	0.83	0.82	0.45
29	New Jersey Resources	1.26	0.62	0.71	0.51	0.85	0.70	0.59	0.67	1.79	1.46	1.48	1.51	1.55	1.75	2.11	1.67	2.14
30	NiSource Inc.	0.76	0.68	0.66	0.61	0.58	0.41	0.59	0.53	0.56	0.57	0.65	0.75	1.11	1.06	0.94	1.11	1.37
31	Northwest Nat. Gas	0.94	0.68	0.66	0.69	0.71	0.14	1.01	1.12	1.15	0.98	1.01	1.33	0.55	1.02	1.35	1.21	1.34
32	ONE Gas Inc.	0.86	0.86	0.83	0.89	0.84	0.87	0.92	0.86	0.79	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
33	South Jersey Inds.	0.82	0.55	0.54	0.40	0.73	0.81	0.76	0.50	0.53	0.51	0.58	0.70	0.75	1.01	1.67	1.70	1.40
34	Southwest Gas	0.86	0.86	0.69	0.53	0.56	0.68	0.83	0.84	0.99	1.05	0.90	0.82	1.37	1.28	0.85	0.78	0.72
35	Spire Inc.	1.07	0.75	0.42	0.44	0.77	0.72	0.96	0.92	0.98	0.78	0.95	1.53	1.61	1.93	1.64	1.42	1.28
36	UGI Corp.	1.47	1.32	1.59	1.22	1.64	1.29	1.35	1.48	1.53	1.32	1.52	1.28	1.36	1.52	1.72	1.62	1.69
37	WGL Holdings Inc.	1.02	N/A	N/A	N/A	N/A	0.61	0.56	0.60	0.63	0.71	0.93	1.02	1.60	1.60	1.60	1.17	1.18
38	Average	0.96	0.77	0.74	0.64	0.76	0.67	0.79	0.79	0.94	0.86	0.94	1.07	1.18	1.31	1.35	1.24	1.24
39	Median	0.78	0.72	0.67	0.57	0.72	0.68	0.76	0.67	0.79	0.74	0.92	1.07	1.23	1.21	1.48	1.19	1.31

Sources:
[1] The Value Line Investment Survey Investment Analyzer Software, downloaded on June 18, 2021.
[2] The Value Line Investment Survey, February 25, 2022
Notes:
[a] Based on the projected Dividends Declared per share and Book Value per share, published in The Value Line Investment Survey.
[b] Based on the projected Dividends Declared per share and Earnings per share, published in The Value Line Investment Survey.
[c] Based on the projected Cash Flow per share and Capital Spending per share, published in The Value Line Investment Survey.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
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EXHIBIT AWEC-CUB/104

PROXY GROUP

Northwest Natural Gas Company

Proxy Group

Line	Company	Credit Ratings[1] S&P (1)	Moody's (2)	Common Equity Ratios MI[1&2] (3)	Value Line[3] (4)
	Gas/Water				
1	Atmos Energy Corporation	A-	A1	58.7%	60.0%
2	New Jersey Resources Corporation	NR	A1	39.5%	44.9%
3	NiSource Inc.	BBB+	Baa2	31.2%	32.9%
4	ONE Gas, Inc.	BBB+	A3	52.3%	58.5%
5	Spire Inc.	A-	Baa2	39.8%	46.1%
6	American States Water Company	A+	NR	51.2%	52.8%
7	American Water Works Company, Inc.	A	Baa1	39.8%	40.9%
8	California Water Service Group	A+	NR	47.9%	54.1%
9	Essential Utilities, Inc.	A	Baa2	46.7%	46.0%
10	Middlesex Water Company	A	NR	52.2%	55.7%
11	SJW Group	A-	NR	37.7%	41.6%
12	**Gas Average**	**A-**	**A3**	**44.3%**	**48.5%**
13	**Water Average**	**A**	**Baa1**	**45.9%**	**48.5%**
14	**Northwest Natural Gas Company**	**A+**	**Baa1**		**50.0%[4]**

Note: If credit rating/common equity ratio unavailable for utility, subsidary data used.

Sources:

[1] S&P Global Market Intelligence, Downloaded on April 4, 2022.

[2] S&P Capital IQ, Downloaded on April 4, 2022.

[3] *The Value Line Investment Survey* , January 7, and February 25, 2022.

[4] NW Natural/200, Wilson/Page 3.

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EXHIBIT AWEC-CUB/105

CONSENSUS ANALYSTS' GROWTH RATES

Northwest Natural Gas Company

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)	Yahoo! Finance Estimated Growth %[3] (5)	Yahoo! Finance Number of Estimates (6)	Average of Growth Rates (7)
	Gas/Water							
1	Atmos Energy Corporation	7.28%	N/A	7.19%	3	7.30%	N/A	7.26%
2	New Jersey Resources Corporation	6.00%	N/A	9.90%	3	6.00%	N/A	7.30%
3	NiSource Inc.	7.19%	N/A	6.28%	5	3.52%	N/A	5.66%
4	ONE Gas, Inc.	5.00%	N/A	6.00%	3	2.90%	N/A	4.63%
5	Spire Inc.	5.30%	N/A	4.77%	3	4.30%	N/A	4.79%
6	American States Water Company	N/A	N/A	5.50%	2	4.90%	N/A	5.20%
7	American Water Works Company, Inc.	8.08%	N/A	7.61%	5	8.30%	N/A	8.00%
8	California Water Service Group	N/A	N/A	6.70%	2	11.70%	N/A	9.20%
9	Essential Utilities, Inc.*	6.08%	N/A	6.58%	2	6.40%	N/A	6.35%
10	Middlesex Water Company	N/A	N/A	N/A	N/A	2.70%	N/A	2.70%
11	SJW Group	N/A	N/A	7.00%	1	9.70%	N/A	8.35%
12	**Gas Average**	**6.15%**	**N/A**	**6.83%**	**3**	**4.80%**	**N/A**	**5.93%**
13	**Water Average**	**7.08%**	**N/A**	**6.68%**	**2**	**7.28%**	**N/A**	**6.63%**

Sources:

[1] Zacks, http://www.zacks.com/, downloaded on April 1, 2022.

[2] S&P Global Market Intelligence, https://platform.mi.spglobal.com, downloaded on April 1, 2022.

[3] Yahoo! Finance, https://finance.yahoo.com/, downloaded on April 1, 2022.

* Growth rates were obtained on April 5, 2022.

BEFORE THE

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EXHIBIT AWEC-CUB/106

CONSTANT GROWTH DCF MODEL (CONSENSUS ANALYSTS' GROWTH RATES)

Northwest Natural Gas Company

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)
	Gas/Water					
1	Atmos Energy Corporation	$109.11	7.26%	$2.72	2.67%	9.93%
2	New Jersey Resources Corporation	$41.68	7.30%	$1.45	3.73%	11.03%
3	NiSource Inc.	$29.06	5.66%	$0.94	3.42%	9.08%
4	ONE Gas, Inc.	$80.47	4.63%	$2.48	3.22%	7.86%
5	Spire Inc.	$66.31	4.79%	$2.74	4.33%	9.12%
6	American States Water Company	$89.19	5.20%	$1.46	1.72%	6.92%
7	American Water Works Company, Inc.	$158.77	8.00%	$2.41	1.64%	9.64%
8	California Water Service Group	$60.20	9.20%	$0.92	1.67%	10.87%
9	Essential Utilities, Inc.	$48.34	6.35%	$1.07	2.36%	8.71%
10	Middlesex Water Company	$102.07	2.70%	$1.16	1.17%	3.87%
11	SJW Group	$67.27	8.35%	$1.36	2.19%	10.54%
	Gas					
12	**Average**	**$65.32**	**5.93%**	**$2.07**	**3.48%**	**9.40%**
13	**Median**	**$66.31**	**5.66%**	**$2.48**	**3.42%**	**9.12%**
	Water					
14	**Average**	**$87.64**	**6.63%**	**$1.40**	**1.79%**	**8.42%**
15	**Median**	**$78.23**	**7.18%**	**$1.26**	**1.70%**	**9.17%**

Sources:
[1] Yahoo Finance, Downloaded on April 4, 2022.
[2] Exhibit AWEC-CUB/105.
[3] *The Value Line Investment Survey* , January 7, and February 25, 2022.

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EXHIBIT AWEC-CUB/107

PAYOUT RATIOS

Northwest Natural Gas Company

Payout Ratios

Line	Company	Dividends Per Share 2020 (1)	Dividends Per Share Projected (2)	Earnings Per Share 2020 (3)	Earnings Per Share Projected (4)	Payout Ratio 2020 (5)	Payout Ratio Projected (6)
	Gas/Water						
1	Atmos Energy Corporation	$2.30	$3.50	$4.72	$7.30	48.7%	47.9%
2	New Jersey Resources Corporation	$1.27	$1.70	$2.07	$2.70	61.4%	63.0%
3	NiSource Inc.	$0.84	$1.08	$1.32	$2.40	63.6%	45.0%
4	ONE Gas, Inc.	$2.16	$3.12	$3.68	$5.30	58.7%	58.9%
5	Spire Inc.	$2.49	$3.30	$1.44	$5.50	172.9%	60.0%
6	American States Water Company	$1.28	$2.00	$2.33	$3.05	54.9%	65.6%
7	American Water Works Company, Inc.	$2.15	$3.10	$3.91	$5.50	55.0%	56.4%
8	California Water Service Group	$0.85	$1.15	$1.97	$2.55	43.1%	45.1%
9	Essential Utilities, Inc.	$0.97	$1.40	$1.12	$2.00	86.6%	70.0%
10	Middlesex Water Company	$1.04	$1.35	$2.18	$2.75	47.7%	49.1%
11	SJW Group	$1.28	$1.72	$2.14	$3.65	59.8%	47.1%
12	**Gas Average**	**$1.81**	**$2.54**	**$2.65**	**$4.64**	**81%**	**55%**
13	**Water Average**	**$1.26**	**$1.79**	**$2.28**	**$3.25**	**58%**	**56%**

Source:
The Value Line Investment Survey, January 7, and February 25, 2022.

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EXHIBIT AWEC-CUB/108

SUSTAINABLE GROWTH RATE

Northwest Natural Gas Company

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)
	Gas/Water											
1	Atmos Energy Corporation	$3.50	$7.30	$82.85	7.41%	8.81%	1.04	9.13%	47.95%	52.05%	4.75%	8.36%
2	New Jersey Resources Corporation	$1.70	$2.70	$22.80	2.85%	11.84%	1.01	12.01%	62.96%	37.04%	4.45%	5.28%
3	NiSource Inc.	$1.08	$2.40	$17.70	5.74%	13.56%	1.03	13.94%	45.00%	55.00%	7.67%	8.92%
4	ONE Gas, Inc.	$3.12	$5.30	$71.60	9.29%	7.40%	1.04	7.73%	58.87%	41.13%	3.18%	4.25%
5	Spire Inc.	$3.30	$5.50	$67.10	7.21%	8.20%	1.03	8.48%	60.00%	40.00%	3.39%	3.93%
6	American States Water Company	$2.00	$3.05	$23.20	5.93%	13.15%	1.03	13.53%	65.57%	34.43%	4.66%	6.01%
7	American Water Works Company, Inc.	$3.10	$5.50	$50.00	7.04%	11.00%	1.03	11.37%	56.36%	43.64%	4.96%	8.22%
8	California Water Service Group	$1.15	$2.55	$22.70	4.40%	11.23%	1.02	11.48%	45.10%	54.90%	6.30%	9.55%
9	Essential Utilities, Inc.	$1.40	$2.00	$24.15	4.81%	8.28%	1.02	8.48%	70.00%	30.00%	2.54%	5.50%
10	Middlesex Water Company	$1.35	$2.75	$22.20	2.30%	12.39%	1.01	12.53%	49.09%	50.91%	6.38%	8.87%
11	SJW Group	$1.72	$3.65	$40.85	4.93%	8.94%	1.02	9.15%	47.12%	52.88%	4.84%	5.92%
12	**Gas Average**	**$2.54**	**$4.64**	**$52.41**	**6.50%**	**9.96%**	**1.03**	**10.26%**	**54.96%**	**45.04%**	**4.69%**	**6.15%**
13	**Water Average**	**$1.79**	**$3.25**	**$30.52**	**4.90%**	**10.83%**	**1.02**	**11.09%**	**55.54%**	**44.46%**	**4.95%**	**7.35%**

Sources and Notes:
Cols. (1), (2) and (3): *The Value Line Investment Survey* , January 7, and February 25, 2022.
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).

Northwest Natural Gas Company

Sustainable Growth Rate

Line	Company	13-Week Average Stock Price[1] (1)	2020 Book Value Per Share[2] (2)	Market to Book Ratio (3)	Common Shares Outstanding (in Millions)[2] 2020 (4)	Common Shares Outstanding (in Millions)[2] 3-5 Years (5)	Growth (6)	S Factor[3] (7)	V Factor[4] (8)	S * V (9)
	Gas/Water									
1	Atmos Energy Corporation	$109.11	$53.95	2.02	125.88	155.00	3.53%	7.14%	50.55%	3.61%
2	New Jersey Resources Corporation	$41.68	$19.26	2.16	95.80	100.00	0.72%	1.55%	53.79%	0.84%
3	NiSource Inc.	$29.06	$12.66	2.30	391.76	415.00	0.97%	2.22%	56.43%	1.25%
4	ONE Gas, Inc.	$80.47	$42.01	1.92	53.17	57.00	1.17%	2.23%	47.80%	1.07%
5	Spire Inc.	$66.31	$44.19	1.50	51.60	55.00	1.07%	1.60%	33.35%	0.54%
6	American States Water Company	$89.19	$17.39	5.13	36.89	37.50	0.33%	1.69%	80.50%	1.36%
7	American Water Works Company, Inc.	$158.77	$35.58	4.46	181.30	190.00	0.94%	4.20%	77.59%	3.26%
8	California Water Service Group	$60.20	$18.30	3.29	50.33	54.00	1.42%	4.66%	69.60%	3.25%
9	Essential Utilities, Inc.	$48.34	$19.09	2.53	245.39	270.00	1.93%	4.89%	60.51%	2.96%
10	Middlesex Water Company	$102.07	$19.81	5.15	17.47	18.00	0.60%	3.09%	80.59%	2.49%
11	SJW Group	$67.27	$32.12	2.09	28.56	30.00	0.99%	2.07%	52.25%	1.08%
12	**Gas Average**	**$65.32**	**$34.41**	**1.98**	**143.64**	**156.40**	**1.49%**	**2.95%**	**48.39%**	**1.46%**
13	**Water Average**	**$87.64**	**$23.72**	**3.78**	**93.32**	**99.92**	**1.03%**	**3.43%**	**70.17%**	**2.40%**

Sources and Notes:
[1] Yahoo Finance, Downloaded on April 4, 2022.
[2] *The Value Line Investment Survey* , January 7, and February 25, 2022.
[3] Expected Growth in the Number of Shares, Column (3) * Column (6).
[4] Expected Profit of Stock Investment, [1 - 1 / Column (3)].

BEFORE THE

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UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
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EXHIBIT AWEC-CUB/109

CONSTANT GROWTH DCF MODEL (SUSTAINABLE GROWTH RATE)

Northwest Natural Gas Company

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)
	Gas/Water					
1	Atmos Energy Corporation	$109.11	8.36%	$2.72	2.70%	11.06%
2	New Jersey Resources Corporation	$41.68	5.28%	$1.45	3.66%	8.95%
3	NiSource Inc.	$29.06	8.92%	$0.94	3.52%	12.44%
4	ONE Gas, Inc.	$80.47	4.25%	$2.48	3.21%	7.46%
5	Spire Inc.	$66.31	3.93%	$2.74	4.29%	8.22%
6	American States Water Company	$89.19	6.01%	$1.46	1.74%	7.75%
7	American Water Works Company, Inc.	$158.77	8.22%	$2.41	1.64%	9.87%
8	California Water Service Group	$60.20	9.55%	$0.92	1.67%	11.22%
9	Essential Utilities, Inc.	$48.34	5.50%	$1.07	2.34%	7.84%
10	Middlesex Water Company	$102.07	8.87%	$1.16	1.24%	10.10%
11	SJW Group	$67.27	5.92%	$1.36	2.14%	8.06%
	Gas					
12	**Average**	**$65.32**	**6.15%**	**$2.07**	**3.48%**	**9.63%**
13	**Median**	**$66.31**	**5.28%**	**$2.48**	**3.52%**	**8.95%**
	Water					
14	**Average**	**$87.64**	**7.35%**	**$1.40**	**1.80%**	**9.14%**
15	**Median**	**$78.23**	**7.12%**	**$1.26**	**1.70%**	**8.96%**

Sources:
[1] Yahoo Finance, Downloaded on April 4, 2022.
[2] Exhibit AWEC-CUB/108.
[3] *The Value Line Investment Survey*, January 7, and February 25, 2022.

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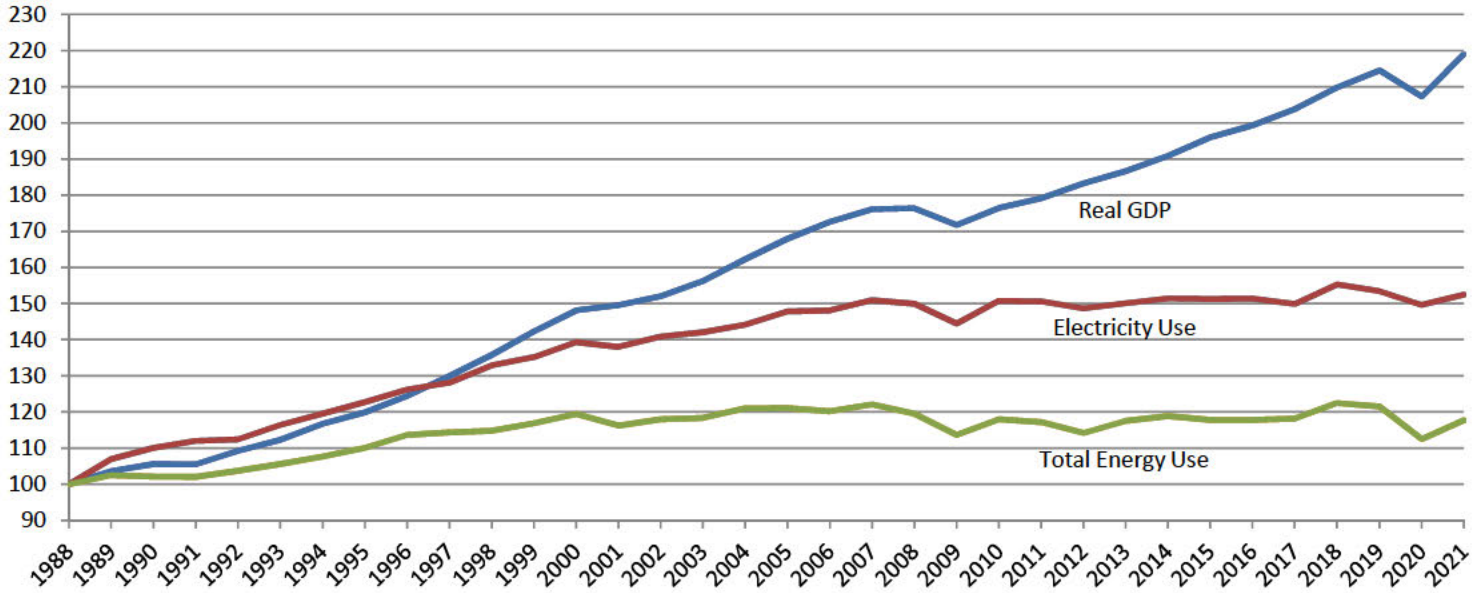
EXHIBIT AWEC-CUB/110

ELECTRICITY SALES ARE LINKED TO U.S. ECONOMIC GROWTH

Northwest Natural Gas Company

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

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EXHIBIT AWEC-CUB/111

MULTI-STAGE GROWTH DCF MODEL

Northwest Natural Gas Company

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)
	Gas/Water										
1	Atmos Energy Corporation	$109.11	$2.72	7.26%	6.73%	6.20%	5.68%	5.15%	4.63%	4.10%	7.27%
2	New Jersey Resources Corporation	$41.68	$1.45	7.30%	6.77%	6.23%	5.70%	5.17%	4.63%	4.10%	8.52%
3	NiSource Inc.	$29.06	$0.94	5.66%	5.40%	5.14%	4.88%	4.62%	4.36%	4.10%	7.82%
4	ONE Gas, Inc.	$80.47	$2.48	4.63%	4.54%	4.46%	4.37%	4.28%	4.19%	4.10%	7.41%
5	Spire Inc.	$66.31	$2.74	4.79%	4.67%	4.56%	4.44%	4.33%	4.21%	4.10%	8.59%
6	American States Water Company	$89.19	$1.46	5.20%	5.02%	4.83%	4.65%	4.47%	4.28%	4.10%	5.87%
7	American Water Works Company, Inc.	$158.77	$2.41	8.00%	7.35%	6.70%	6.05%	5.40%	4.75%	4.10%	6.10%
8	California Water Service Group	$60.20	$0.92	9.20%	8.35%	7.50%	6.65%	5.80%	4.95%	4.10%	6.29%
9	Essential Utilities, Inc.	$48.34	$1.07	6.35%	5.98%	5.60%	5.23%	4.85%	4.48%	4.10%	6.76%
10	Middlesex Water Company	$102.07	$1.16	2.70%	2.93%	3.17%	3.40%	3.63%	3.87%	4.10%	4.97%
11	SJW Group	$67.27	$1.36	8.35%	7.64%	6.93%	6.23%	5.52%	4.81%	4.10%	6.86%
	Gas										
12	**Average**	**$65.32**	**$2.07**	**5.93%**	**5.62%**	**5.32%**	**5.01%**	**4.71%**	**4.40%**	**4.10%**	**7.92%**
13	**Median**	**$66.31**	**$2.48**	**5.66%**	**5.40%**	**5.14%**	**4.88%**	**4.62%**	**4.36%**	**4.10%**	**7.82%**
	Water										
14	**Average**	**$87.64**	**$1.40**	**6.63%**	**6.21%**	**5.79%**	**5.37%**	**4.94%**	**4.52%**	**4.10%**	**6.14%**
15	**Median**	**$78.23**	**$1.26**	**7.18%**	**6.66%**	**6.15%**	**5.64%**	**5.13%**	**4.61%**	**4.10%**	**6.20%**

Sources:
[1] Yahoo Finance, Downloaded on April 4, 2022.
[2] *The Value Line Investment Survey*, January 7, and February 25, 2022.
[3] Exhibit AWEC-CUB/105.
[4] Blue Chip Economic Indicators, March 11, 2022 at page 14.

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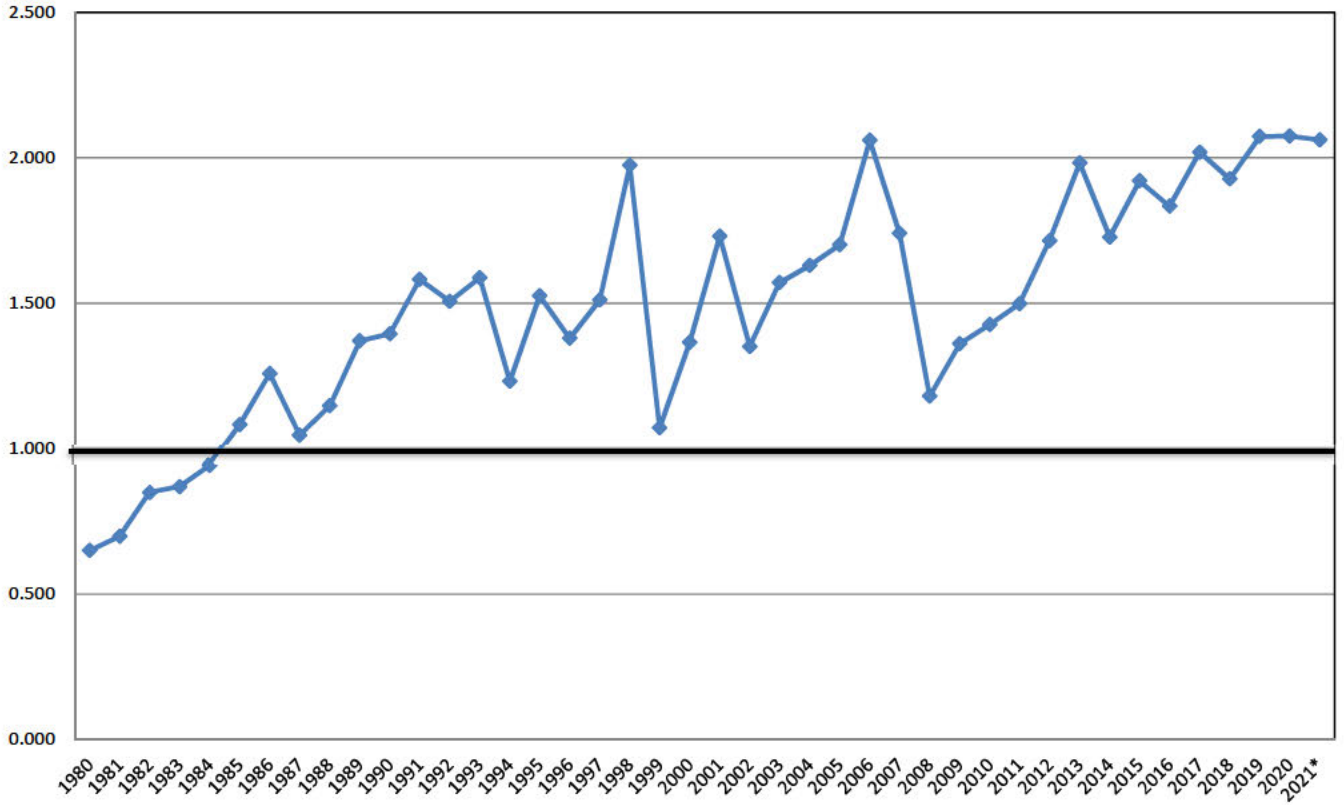
In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/112

COMMON STOCK MARKET/BOOK RATIO

Northwest Natural Gas Company

Common Stock Market/Book Ratio



Source:
1980 - 2000: Mergent Public Utility Manual.
2001 - 2015: AUS Utility Reports, multiple dates.
2016 - 2020: Value Line Investment Survey, multiple dates.
* Value Line Investment Survey Reports, January 21, February 11, February 25, and March 11, 2022.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/113

EQUITY RISK PREMIUM – TREASURY BOND

Northwest Natural Gas Company

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%	4.87%	5.53%	5.70%	5.48%
22	2007	10.22%	4.83%	5.39%	5.66%	5.55%
23	2008	10.39%	4.28%	6.11%	5.68%	5.57%
24	2009	10.22%	4.07%	6.15%	5.80%	5.71%
25	2010	10.15%	4.25%	5.90%	5.81%	5.75%
26	2011	9.92%	3.91%	6.01%	5.91%	5.81%
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	9.59%	3.11%	6.48%	6.69%	6.48%
34	2019	9.71%	2.58%	7.13%	6.83%	6.57%
35	2020	9.46%	1.56%	7.90%	7.05%	6.77%
36	2021 [3]	9.56%	2.05%	7.51%	7.17%	6.92%
37	**Average**	**10.86%**	**5.25%**	**5.62%**	**5.56%**	**5.55%**
38	**Minimum**				**4.17%**	**4.30%**
39	**Maximum**				**7.17%**	**6.92%**

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 - December 2021, February 10, 2022, p. 1.

[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 represents January - December, 2021.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
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Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/114

EQUITY RISK PREMIUM – UTILITY BOND

Northwest Natural Gas Company

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	9.59%	4.25%	5.34%	5.53%	5.24%
34	2019	9.71%	3.77%	5.94%	5.62%	5.42%
35	2020	9.46%	3.05%	6.41%	5.80%	5.59%
36	2021 [3]	9.56%	3.10%	6.46%	5.97%	5.75%
37	**Average**	**10.86%**	**6.60%**	**4.26%**	**4.21%**	**4.18%**
38	**Minimum**				**2.80%**	**3.11%**
39	**Maximum**				**5.97%**	**5.75%**

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 - March 2021, April 28, 2021, p. 1.

[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 represents January - December, 2021.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/115

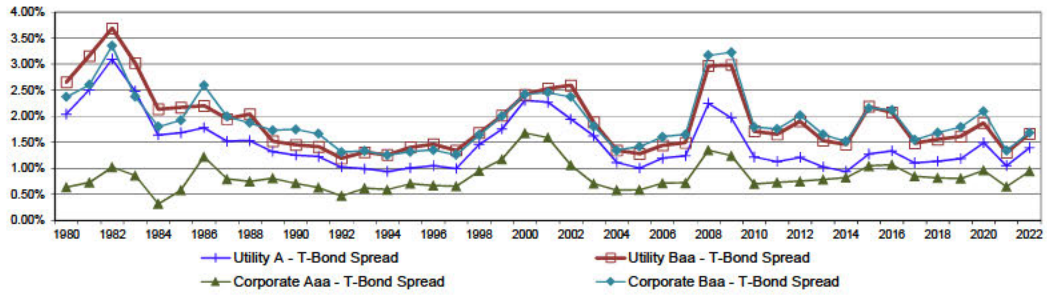
BOND YIELD SPREADS

Northwest Natural Gas Company

Bond Yield Spreads

			Public Utility Bond				Corporate Bond				Utility to Corporate	
Line	Year	T-Bond Yield[1] (1)	A[2] (2)	Baa[2] (3)	A-T-Bond Spread (4)	Baa-T-Bond Spread (5)	Aaa[3] (6)	Baa[3] (7)	Aaa-T-Bond Spread (8)	Baa-T-Bond Spread (9)	Baa Spread (10)	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	4.87%	6.07%	6.32%	1.20%	1.44%	5.59%	6.48%	0.71%	1.61%	-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	3.11%	4.25%	4.67%	1.14%	1.56%	3.93%	4.80%	0.82%	1.69%	-0.13%	0.32%
40	2019	2.58%	3.77%	4.19%	1.18%	1.61%	3.39%	4.38%	0.81%	1.79%	-0.18%	0.38%
41	2020	1.56%	3.05%	3.44%	1.49%	1.87%	2.53%	3.66%	0.96%	2.10%	-0.22%	0.53%
42	2021	2.05%	3.10%	3.36%	1.05%	1.30%	2.70%	3.39%	0.65%	1.34%	-0.04%	0.40%
43	2022[4]	2.25%	3.65%	3.92%	1.40%	1.67%	3.20%	3.94%	0.94%	1.69%	-0.02%	0.45%
44	Average	6.12%	7.60%	8.02%	1.48%	1.91%	6.96%	8.03%	0.84%	1.91%	0.00%	0.64%

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 2010-2021 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 2010-2021 were obtained from http://credittrends.moodys.com/.
[4] Data represents January - March, 2022.
Note: The yields for the period 3/3/2022-3/10/2022 were unavailable.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
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Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/116

TREASURY AND UTILITY BOND YIELDS

Northwest Natural Gas Company

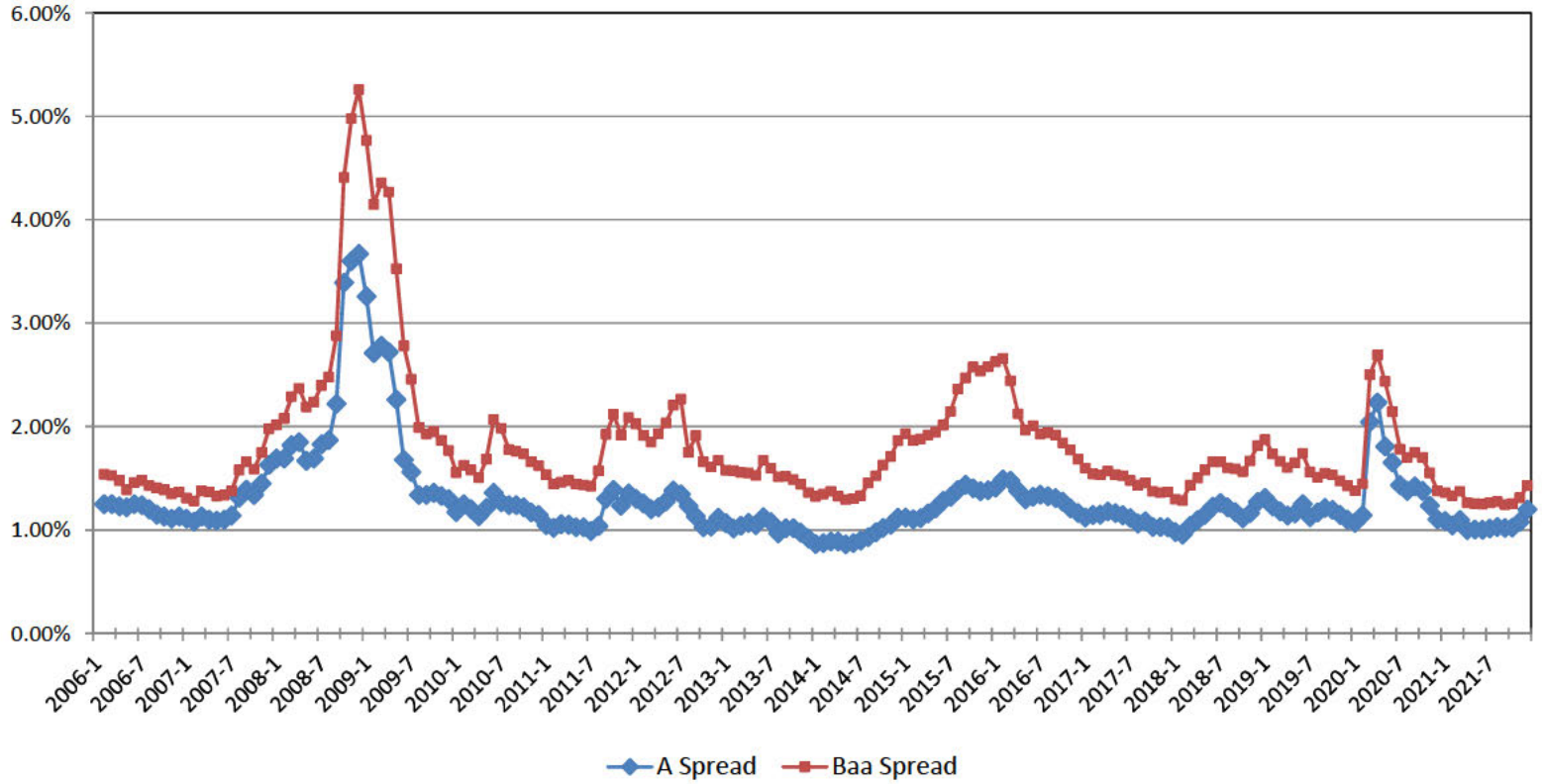
Treasury and Utility Bond Yields

Line	Date	Treasury Bond Yield[1] (1)	"A" Rated Utility Bond Yield[2] (2)	"Baa" Rated Utility Bond Yield[2] (3)
1	04/01/22	2.44%	3.92%	4.18%
2	03/25/22	2.60%	4.14%	4.43%
3	03/18/22	2.42%	3.95%	4.26%
4	03/11/22	2.36%	4.02%	4.32%
5	03/04/22	2.16%	3.74%	4.03%
6	02/25/22	2.29%	3.86%	4.16%
7	02/18/22	2.24%	3.74%	4.02%
8	02/11/22	2.24%	3.63%	3.89%
9	02/04/22	2.23%	3.55%	3.83%
10	01/28/22	2.07%	3.41%	3.65%
11	01/21/22	2.07%	3.34%	3.58%
12	01/14/22	2.12%	3.30%	3.56%
13	01/07/22	2.11%	3.30%	3.54%
14	**Average**	**2.26%**	**3.68%**	**3.96%**
15	**Spread To Treasury**		**1.42%**	**1.70%**

Sources:
[1] St. Louis Federal Reserve: Economic Research, http://research.stlouisfed.org.
[2] http://credittrends.moodys.com/.
Note: Week 03/04/22 and 03/11/22 yields are based on a weekly average.

Northwest Natural Gas Company

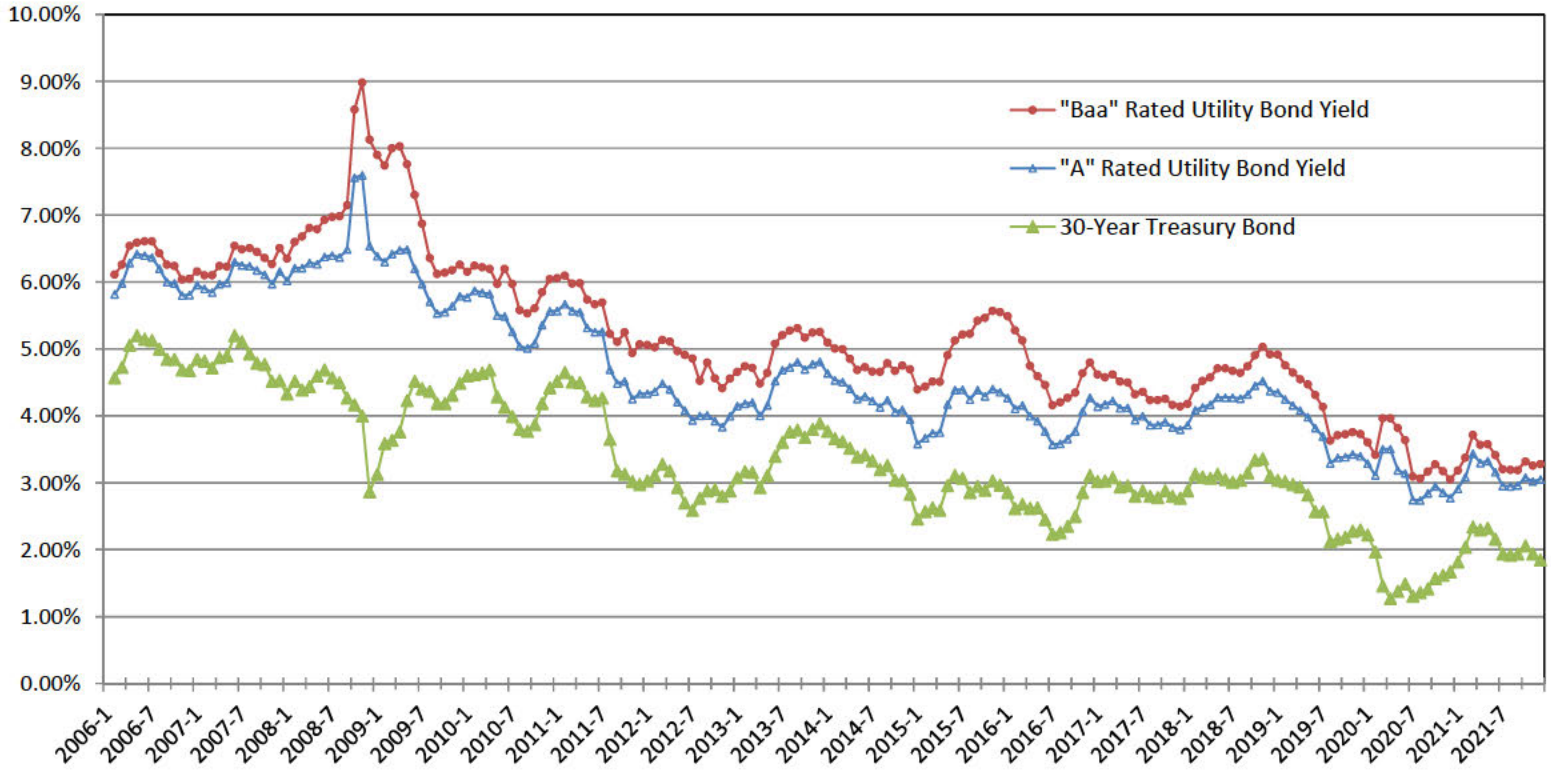
Yield Spread Between Utility Bonds and 30-Year Treasury Bonds



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

Northwest Natural Gas Company

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/

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
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Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/117

VALUE LINE BETA

Northwest Natural Gas Company

Value Line Beta

Line	Company	Beta
	Gas/Water	
1	Atmos Energy Corporation	0.80
2	New Jersey Resources Corporation	1.00
3	NiSource Inc.	0.85
4	ONE Gas, Inc.	0.80
5	Spire Inc.	0.85
6	American States Water Company	0.65
7	American Water Works Company, Inc.	0.85
8	California Water Service Group	0.70
9	Essential Utilities, Inc.	0.95
10	Middlesex Water Company	0.70
11	SJW Group	0.80
12	**Gas Average**	**0.86**
13	**Water Average**	**0.78**

Source:
The Value Line Investment Survey,
January 7, and February 25, 2022.

Northwest Natural Gas Company

Value Line
Historical Betas

Line	Company	Average	4Q21	3Q21	2Q21	1Q21	4Q20	3Q20	2Q20	1Q20	4Q19	3Q19	2Q19	1Q19	4Q18	3Q18	2Q18	1Q18	4Q17	3Q17	2Q17	1Q17	4Q16	3Q16	2Q16	1Q16	4Q15	3Q15	2Q15	1Q15	4Q14	3Q14
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
	Gas/Water																															
1	Atmos Energy Corporation	0.73	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.55	0.60	0.60	0.65	0.60	0.60	0.60	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.80	0.80	0.85	0.85	0.85	0.80	0.80
2	New Jersey Resources Corporation	0.81	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.85	0.80	0.80	0.80	0.80
3	NiSource Inc.	0.71	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.55	0.55	0.55	0.55	0.55	0.50	0.55	0.60	0.60	0.60	NMF	0.65	NMF	NMF	NMF	NMF	NMF	NMF	NMF	0.85	0.85	0.85	0.80
4	ONE Gas, Inc.	0.72	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Spire Inc.	0.72	0.85	0.85	0.85	0.85	1.00	0.80	0.80	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
6	American States Water Company	0.70	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
7	American Water Works Company, Inc.	0.70	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70	0.70
8	California Water Service Group	0.72	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.70	0.70
9	Essential Utilities, Inc.	0.76	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.90	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.70	0.70
10	Middlesex Water Company	0.73	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.70	0.70
11	SJW Group	0.73	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.75	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.85	0.85
12	**Gas Average**	0.74	0.86	0.86	0.86	0.85	0.88	0.83	0.83	0.59	0.63	0.63	0.64	0.63	0.62	0.63	0.70	0.68	0.70	0.73	0.71	0.73	0.73	0.75	0.75	0.77	0.77	0.80	0.80	0.80	0.79	0.78
13	**Water Average**	0.72	0.77	0.77	0.77	0.77	0.76	0.76	0.76	0.76	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.73	0.73	0.73	0.73	0.73	0.73

Source: Value Line Software Analyzer

Northwest Natural Gas Company

Value Line Industry Historical Betas

Line	Company	Average	4Q21	3Q21	2Q21	1Q21	4Q20	3Q20	2Q20	1Q20	4Q19	3Q19	2Q19	1Q19	4Q18	3Q18	2Q18	1Q18	4Q17	3Q17	2Q17	1Q17	4Q16	3Q16	2Q16	1Q16	4Q15	3Q15	2Q15	1Q15	4Q14	3Q14
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
	Electric																															
1	ALLETE, Inc.	0.78	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.60	N/A	N/A	0.65	0.65	0.65	0.70	0.75	0.75	0.80	0.75	0.80	0.80	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80
2	Alliant Energy Corporation	0.74	0.85	0.85	0.85	0.85	0.85	0.85	0.80	0.55	0.60	0.60	0.60	0.65	0.60	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80
3	Ameren Corporation	0.70	0.80	0.85	0.80	0.80	0.85	0.80	0.80	0.50	0.55	0.55	0.60	0.60	0.55	0.60	0.65	0.65	0.70	0.65	0.65	0.70	0.65	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
4	American Electric Power Company, Inc.	0.66	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.50	0.55	0.55	0.55	0.55	0.55	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
5	Avangrid, Inc.	0.56	0.85	0.85	0.85	N/A	0.85	0.80	0.80	0.40	0.40	0.40	0.40	0.40	0.30	0.30	0.40	0.35	NMF	NMF	NMF	NMF	NMF	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Avista Corporation	0.76	0.95	0.95	0.95	0.95	0.90	0.95	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.70	0.70	0.75	0.75	0.70	0.70	0.70	0.70	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.75
7	Black Hills Corporation	0.88	1.00	1.00	1.00	1.00	0.95	1.00	0.65	0.70	0.70	0.75	0.80	0.75	0.80	0.85	0.90	0.90	0.90	0.85	0.85	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95	0.90	0.90	0.85
8	CenterPoint Energy, Inc.	0.90	1.15	1.15	1.15	1.15	1.15	1.10	1.15	0.70	0.80	0.80	0.80	0.80	0.85	0.85	0.90	0.85	0.90	0.90	0.85	0.85	0.85	0.80	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75
9	CMS Energy Corporation	0.68	0.80	0.80	0.80	0.75	0.80	0.80	0.80	0.50	0.50	0.55	0.55	0.55	0.55	0.55	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.75	0.75	0.70	0.75	0.75	0.70	0.75
10	Consolidated Edison, Inc.	0.57	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.40	0.45	0.45	0.45	0.45	0.45	0.45	0.50	0.50	0.50	0.50	0.50	0.55	0.55	0.55	0.55	0.55	0.60	0.60	0.60	0.60	0.60	0.60
11	Dominion Resources, Inc.	0.69	0.85	0.85	0.85	0.80	0.80	0.80	0.80	0.50	0.55	0.55	0.55	0.55	0.60	0.60	0.65	0.65	0.65	0.65	0.65	0.70	0.65	0.70	0.70	0.70	0.78	0.70	0.70	0.70	0.70	0.70
12	DTE Energy Company	0.72	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.50	0.55	0.55	0.55	0.55	0.55	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.75
13	Duke Energy Corporation	0.65	0.85	0.90	0.85	0.85	0.85	0.85	0.85	0.45	N/A	N/A	0.50	0.50	0.55	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.65	0.50	0.60	0.60	0.60	0.60	0.60
14	Edison International	0.71	1.00	0.95	0.95	0.95	0.90	0.90	0.55	0.55	0.60	0.60	0.60	0.55	0.60	0.60	0.60	0.65	0.65	0.60	0.60	0.65	0.65	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.75
15	Entergy Corporation	0.72	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.65	0.70	0.70	0.70	0.70
16	Evergy, Inc.	0.98	0.95	0.95	0.95	0.95	1.00	1.00	1.05	NMF	NMF	NMF	NMF	NMF	NMF	NMF	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	Eversource Energy	0.73	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.55	0.55	0.60	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
18	Exelon Corporation	0.75	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.65	N/A	N/A	0.70	0.70	0.65	0.65	0.70	0.70	0.70	0.70	0.65	0.70	0.65	0.70	0.65	0.70	0.70	0.65	0.70	0.70	0.70	0.70
19	FirstEnergy Corp.	0.70	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.60	0.65	0.60	0.65	0.65	0.60	0.60	0.65	0.70	0.70	0.65	0.65	0.65	0.65	0.65	0.70	0.65	0.70	0.65	0.70	0.70	0.70	0.70
20	Fortis Inc.	0.69	0.75	0.75	0.75	0.75	N/A	0.80	0.80	0.60	0.60	0.65	0.65	0.65	0.60	0.65	0.70	0.70	0.70	0.70	0.65	0.65	0.65	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	Hawaiian Electric Industries, Inc.	0.71	0.85	0.80	0.80	0.80	0.80	0.80	0.55	0.55	0.55	0.55	0.60	0.60	0.60	0.65	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.75
22	IDACORP, Inc.	0.72	0.85	0.85	0.80	0.80	0.80	0.80	0.50	0.55	0.55	0.60	0.60	0.55	0.60	0.65	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
23	MGE Energy, Inc.	0.69	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.50	0.55	0.55	0.55	0.60	0.60	0.65	0.70	0.70	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.70	0.70	0.70
24	NextEra Energy, Inc.	0.71	0.90	0.95	0.90	0.90	0.90	0.85	0.85	0.50	0.55	0.55	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.75	0.70	0.75	0.70	0.70	0.70
25	NorthWestern Corporation	0.72	0.95	0.95	0.95	0.95	0.90	0.90	0.55	0.60	0.60	0.60	0.60	0.55	0.60	0.65	0.65	0.70	0.70	0.65	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.70	0.70	0.70	0.70
26	OGE Energy Corp.	0.93	1.05	1.05	1.05	1.05	1.10	1.05	1.05	0.70	0.75	0.80	0.80	0.85	0.85	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.95	0.95	0.95	0.90	0.90	0.90	0.90	0.85
27	Otter Tail Corporation	0.84	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.70	0.70	0.65	0.70	0.70	0.75	0.80	0.85	0.85	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.85	0.85	0.85	0.90	0.90	0.90	0.95
28	Pinnacle West Capital Corporation	0.70	0.95	0.90	0.90	0.90	0.85	0.85	0.45	0.50	0.55	0.55	0.55	0.55	0.60	0.65	0.65	0.70	0.70	0.65	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.70
29	PNM Resources, Inc.	0.79	0.95	0.95	0.95	0.95	0.95	0.90	0.50	0.60	N/A	N/A	0.65	0.65	0.60	0.75	0.70	0.75	0.75	0.75	0.70	0.75	0.75	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85
30	Portland General Electric Company	0.73	0.90	0.90	0.90	0.85	0.85	0.85	0.55	0.55	0.60	0.60	0.60	0.60	0.60	0.65	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.75
31	PPL Corporation	0.79	1.10	1.10	1.10	1.10	1.15	1.10	1.05	0.65	0.70	0.65	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.65
32	Public Service Enterprise Group Incorporated	0.75	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.65	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
33	Sempra Energy	0.81	1.00	N/A	0.95	1.00	0.95	0.95	0.65	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.85	0.80	0.80	0.80	0.80	0.75	0.75	0.75
34	Southern Company	0.64	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.55	0.65	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.60	0.60	0.55	0.60	0.55	0.55	0.60
35	WEC Energy Group, Inc.	0.65	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.45	0.50	0.50	0.50	0.55	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.65	0.65	0.70	0.70	0.70	0.70	0.65	0.65	0.65
36	Xcel Energy Inc.	0.63	0.80	0.80	0.80	0.80	0.80	0.75	0.45	0.50	0.50	0.50	0.50	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.65
37	**Electric Average**	0.73	0.90	0.90	0.89	0.89	0.89	0.88	0.77	0.56	0.59	0.59	0.61	0.61	0.61	0.64	0.68	0.69	0.71	0.69	0.69	0.70	0.69	0.71	0.73	0.74	0.75	0.74	0.75	0.74	0.74	0.73

Source: Value Line Software Analyzer

Northwest Natural Gas Company

Value Line Industry Historical Betas

Line	Company	Average	4Q21	3Q21	2Q21	1Q21	4Q20	3Q20	2Q20	1Q20	4Q19	3Q19	2Q19	1Q19	4Q18	3Q18	2Q18	1Q18	4Q17	3Q17	2Q17	1Q17	4Q16	3Q16	2Q16	1Q16	4Q15	3Q15	2Q15	1Q15	4Q14	3Q14
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
	Natural Gas																															
1	Atmos Energy Corporation	0.73	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.55	0.60	0.60	0.65	0.60	0.60	0.60	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.80	0.80	0.85	0.85	0.85	0.80	0.80
2	Chesapeake Utilities Corporation	0.68	0.80	0.80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.65	0.70	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.65	0.60	0.60	0.65	0.65	0.65	0.65	NA	0.65	0.65
3	New Jersey Resources Corporation	0.81	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.85	0.80	0.80	0.80	0.80
4	NiSource Inc.	0.71	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.55	0.55	0.55	0.55	0.55	0.50	0.55	0.60	0.60	0.60	NMF	0.65	NMF	NMF	NMF	NMF	NMF	NMF	NMF	0.85	0.85	0.85	0.80
5	Northwest Natural Gas Company	0.69	0.85	0.85	0.85	0.80	0.80	0.80	0.80	0.55	0.60	0.60	0.60	0.65	0.60	0.65	0.70	0.65	0.70	0.70	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70
6	ONE Gas, Inc.	0.72	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	South Jersey Industries, Inc.	0.86	1.05	1.05	1.05	1.05	1.05	1.00	0.95	0.80	0.80	0.80	0.80	0.85	0.80	0.75	0.85	0.80	0.85	0.85	0.80	0.80	0.80	0.80	0.80	0.85	0.80	0.85	0.85	0.80	0.80	0.80
8	Southwest Gas Corporation	0.81	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.65	0.70	0.70	0.70	0.70	0.70	0.75	0.80	0.75	0.80	0.75	0.75	0.75	0.75	0.75	0.75	0.80	0.80	0.85	0.85	0.85	0.85	0.85
9	Spire Inc.	0.72	0.85	0.85	0.85	0.85	1.00	0.80	0.80	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
10	UGI Corporation	0.91	1.05	1.05	N/A	N/A	1.00	1.00	0.95	0.75	N/A	N/A	0.80	0.80	0.80	0.85	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95	0.95	0.95	0.90	0.85	0.85
11	**Natural Gas Average**	0.76	0.90	0.90	0.89	0.88	0.91	0.87	0.86	0.63	0.66	0.66	0.68	0.69	0.67	0.69	0.75	0.72	0.75	0.76	0.74	0.75	0.74	0.74	0.75	0.78	0.77	0.80	0.80	0.81	0.78	0.77

Source: Value Line Software Analyzer

Northwest Natural Gas Company

Value Line Industry Historical Betas

Line	Company	Average	4Q21	3Q21	2Q21	1Q21	4Q20	3Q20	2Q20	1Q20	4Q19	3Q19	2Q19	1Q19	4Q18	3Q18	2Q18	1Q18	4Q17	3Q17	2Q17	1Q17	4Q16	3Q16	2Q16	1Q16	4Q15	3Q15	2Q15	1Q15	4Q14	3Q14
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
	Water																															
1	American States Water Company	0.70	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
2	American Water Works Company, Inc.	0.70	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70	0.70
3	California Water Service Group	0.72	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.70	0.70
4	Middlesex Water Company	0.73	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.70	0.70
5	SJW Group	0.73	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.75	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.85	0.85
6	York Water Company (The)	0.77	0.85	0.85	0.85	0.85	0.80	0.80	0.80	0.80	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.70	0.70
7	Artesian Resources Corp.	0.63	0.75	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.65	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.65	0.65	0.65	0.65	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.60	0.60
8	Consolidated Water Co. Ltd.	0.92	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.80	0.80	0.80	0.80	0.85	0.85
9	Essential Utilities, Inc.	0.76	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.90	0.65	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.70	0.70
10	Global Water Resources	0.54	0.75	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	**Water Average**	0.72	0.79	0.79	0.79	0.79	0.77	0.77	0.77	0.77	0.66	0.66	0.66	0.66	0.69	0.69	0.69	0.69	0.77	0.77	0.77	0.77	0.71	0.71	0.71	0.71	0.72	0.72	0.72	0.72	0.72	0.72

Source: Value Line Software Analyzer

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/118

CAPM RETURN

Northwest Natural Gas Company

CAPM Return

Line	Description	Current Market Risk Premium (1)	Normalized Market Risk Premium (2)
1	Risk-Free Rate[1,2]	2.26%	3.30%
2	Risk Premium[3]	9.78%	8.74%
3	Beta[4]	0.73	0.73
4	**CAPM**	**9.40%**	**9.68%**

Sources:

[1] Exhibit AWEC-CUB/116, Gorman/Page 1.

[2] *Blue Chip Financial Forecast March 1, 2022* , at 2.

[3] *Kroll 2022 Yearbook,* at 146.

[4] Exhibit AWEC-CUB/117, Gorman/Page 2.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

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	)

EXHIBIT AWEC-CUB/119

STANDARD & POOR'S CREDIT METRICS

Northwest Natural Gas Company

Standard & Poor's Credit Metrics

Line	Description	Retail Cost of Service Amount ($000) (1)	S&P Benchmark (Low Volatility) Intermediate (2)	Significant (3)	Aggressive (4)	Reference (5)
1	OR Rate Base	$ 1,729,298				NW Natural/1302, Walker/Page 1
2	Weighted Common Return	4.60%				Page 2, Line 2, Col. 4.
3	Pre-Tax Rate of Return	8.62%				Page 2, Line 3, Col. 5.
4	Income to Common	$ 79,548				Line 1 x Line 2.
5	EBIT	$ 149,028				Line 1 x Line 3.
6	Depreciation & Amortization	$ 111,660				NW Natural/1302, Walker/Page 1
7	Imputed Amortization	$ -				UG 435 AWEC-CUB DR 13.
8	Capitalized Interest*	$ (2,203)				UG 435 AWEC-CUB DR 8 Attachment 1.
9	Deferred Income Taxes & ITC	$ -				N/A
10	Funds from Operations (FFO)	$ 189,005				Sum of Line 4 and Lines 6 through 9.
11	Imputed Interest Expense	$ -				UG 435 AWEC-CUB DR 13.
12	EBITDA	$ 260,688				Sum of Lines 5 through 7 and Line 11.
13	Adjusted Debt*	$ 1,090,785				Page 3, Line 3, Col. 1 x RB OR Allocator.
14	Total Adjusted Debt Ratio	52.0%				Page 3, Line 4, Col 2.
15	Debt to EBITDA	4.2x	3.0x - 4.0x	4.0x - 5.0x	5.0x - 6.0x	Line 13 / Line 12.
16	FFO to Total Debt	17%	13% - 23%	9% - 13%	6% - 9%	Line 10 / Line 13.
17	Indicative Credit Rating		**A+/A**	**A-**	**BBB**	S&P Methodology, November 19, 2013.

Sources:
Standard & Poor's: "Criteria: Corporate Methodology," November 19, 2013.
*The allocation factor was derived from NW Natural/1312, Walker/Page 1.

Note:
Based on the March 2021 S&P report, NW Natural has an "A+" credit rating, an "Excellent" business profile, an "Intermediate" financial profile, and falls under the 'Low Volatility' matrix.

S&P Business/Financial Risk Profile Matrix			
Business Risk Profile	**Financial Risk Profile**		
	3 (intermediate)	4 (significant)	5 (aggressive)
1 (excellent)	a+/a	a-	bbb
2 (strong)	a-/bbb+	bbb	bb+
3 (satisfactory)	bbb/bbb-	bbb-/bb+	bb

Northwest Natural Gas Company

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

Line	Description	Amount (1)	Weight (2)	Cost (3)	Weighted Cost (4)	Pre-Tax Weighted Cost (5)
1	Long-Term Debt	$1,164,700	50.00%	4.271%	2.136%	2.136%
2	Common Equity	$1,164,700	50.00%	**9.200%**	4.600%	6.482%
3	**Total**	**$2,329,400**	**100.00%**		**6.736%**	**8.618%**
4	Composite Tax Rate*					1.4092

Sources:
NW Natural/200, Wilson/Page 3.
*NW Natural/1309, Walker/Page 1.

Northwest Natural Gas Company

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

Line	Description		Amount (1)	Weight (2)
1	Long-Term Debt	$	1,164,700	47.98%
2	Short-Term Debt*	$	98,105	4.04%
3	Off-Balance Sheet Debt**	$	-	0.00%
4	**Total Debt**	**$**	**1,262,805**	**52.02%**
5	Common Equity	$	1,164,700	47.98%
6	**Total**	**$**	**2,427,505**	**100.00%**

Sources:
NW Natural/200, Wilson/Page 3.
*UG 435 SDR 76 Attachment 1.
**UG 435 AWEC-CUB DR 13.

Northwest Natural Gas Company

S&P Adjusted Debt Ratio

(Operating Subsidiaries of Value Line Electric, Gas and Water Utilities)

(Industry Medians)

		% Distribution of 10 Year Average		
Rating	**Median**	**<50**	**50 to 55**	**>55**
AA-	45.2%	100%	0%	0%
A+	56.7%	33%	0%	67%
A	48.7%	58%	25%	17%
A-	52.1%	29%	56%	16%
BBB+	50.4%	46%	39%	14%
BBB	54.2%	13%	38%	50%

Source:
S&P Capital IQ, downloaded June 14, 2021.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/120

VILLADSEN/FIGUEROA REVISED SIMPLE DCF

Northwest Natural Gas Company

Villadsen/Figueroa Revised Simple DCF

Line	Company	Stock Price (1)	Most Recent Dividend (2)	Quarterly Expected Dividend Yield (3)	Combined Long-Term Growth Rate (4)	Quarterly Growth Rate (5)	DCF Cost Of Equity (6)
1	Amer. States Water	$90.10	$0.37	0.41%	6.1%	1.5%	7.8%
2	Amer. Water Works	$180.71	$0.60	0.34%	7.6%	1.9%	9.1%
3	Artesian Res Corp	$38.68	$0.26	0.68%	4.0%	1.0%	6.8%
4	Atmos Energy	$98.94	$0.63	0.64%	7.0%	1.7%	9.8%
5	California Water	$63.81	$0.23	0.37%	9.5%	2.3%	11.1%
6	Chesapeake Utilities	$129.44	$0.48	0.38%	6.1%	1.5%	7.7%
7	Essential Utilities	$49.04	$0.27	0.55%	5.7%	1.4%	8.0%
8	Global Water Resources Inc	$19.43	$0.02	0.13%	15.0%	3.6%	15.6%
9	Middlesex Water	$107.51	$0.27	0.26%	4.0%	1.0%	5.0%
10	New Jersey Resources	$37.66	$0.33	0.89%	4.9%	1.2%	8.6%
11	NiSource Inc.	$25.25	$0.22	0.89%	8.6%	2.1%	12.4%
12	Northwest Natural	$52.08	$0.48	0.93%	5.0%	1.2%	8.9%
13	ONE Gas Inc.	$72.42	$0.58	0.81%	5.9%	1.4%	9.3%
14	SJW Group	$68.69	$0.34	0.51%	11.3%	2.7%	13.5%
15	South Jersey Inds.	$24.86	$0.30	1.24%	9.0%	2.2%	14.4%
16	Southwest Gas	$70.80	$0.60	0.85%	6.7%	1.6%	10.4%
17	Spire Inc.	$69.41	$0.65	0.95%	5.7%	1.4%	9.7%
	Gas						
18	**Average**	**$64.54**	**$0.47**	**0.84%**	**6.5%**	**1.6%**	**10.1%**
19	**Median**	**$69.41**	**$0.48**	**0.89%**	**6.1%**	**1.5%**	**9.7%**
	Water						
20	**Average**	**$77.25**	**$0.30**	**0.41%**	**7.9%**	**1.9%**	**9.6%**
21	**Median**	**$66.25**	**$0.27**	**0.39%**	**6.9%**	**1.7%**	**8.5%**

Source:

NW Natural/303, Villadsen-Figueroa, Page 22-25, Schedule No. BVJF-6.6 and 6.7

Northwest Natural Gas Company

Villadsen/Figueroa Revised Multi-Stage DCF

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	Amer. States Water	$90.10	$0.37	6.1%	5.7%	5.4%	5.0%	4.6%	4.3%	3.9%	5.9%
2	Amer. Water Works	$180.71	$0.60	7.6%	7.0%	6.4%	5.8%	5.1%	4.5%	3.9%	5.7%
3	Artesian Res Corp	$38.68	$0.26	4.0%	4.0%	4.0%	4.0%	3.9%	3.9%	3.9%	6.8%
4	Atmos Energy	$98.94	$0.63	7.0%	6.5%	6.0%	5.5%	4.9%	4.4%	3.9%	7.1%
5	California Water	$63.81	$0.23	9.5%	8.5%	7.6%	6.7%	5.8%	4.8%	3.9%	6.1%
6	Chesapeake Utilities	$129.44	$0.48	6.1%	5.8%	5.4%	5.0%	4.6%	4.3%	3.9%	5.7%
7	Essential Utilities	$49.04	$0.27	5.7%	5.4%	5.1%	4.8%	4.5%	4.2%	3.9%	6.5%
8	Global Water Resources Inc	$19.43	$0.02	15.0%	13.2%	11.3%	9.5%	7.6%	5.8%	3.9%	5.0%
9	Middlesex Water	$107.51	$0.27	4.0%	4.0%	4.0%	3.9%	3.9%	3.9%	3.9%	5.0%
10	New Jersey Resources	$37.66	$0.33	4.9%	4.7%	4.6%	4.4%	4.2%	4.1%	3.9%	7.9%
11	NiSource Inc.	$25.25	$0.22	8.6%	7.8%	7.0%	6.2%	5.5%	4.7%	3.9%	8.8%
12	Northwest Natural	$52.08	$0.48	5.0%	4.8%	4.6%	4.4%	4.3%	4.1%	3.9%	8.1%
13	ONE Gas Inc.	$72.42	$0.58	5.9%	5.5%	5.2%	4.9%	4.6%	4.2%	3.9%	7.7%
14	SJW Group	$68.69	$0.34	11.3%	10.0%	8.8%	7.6%	6.4%	5.1%	3.9%	7.2%
15	South Jersey Inds.	$24.86	$0.30	9.0%	8.1%	7.3%	6.4%	5.6%	4.7%	3.9%	10.8%
16	Southwest Gas	$70.80	$0.60	6.7%	6.3%	5.8%	5.3%	4.8%	4.4%	3.9%	8.1%
17	Spire Inc.	$69.41	$0.65	5.7%	5.4%	5.1%	4.8%	4.5%	4.2%	3.9%	8.3%
	Multi-Stage Gas										
18	**Average**	**$64.54**	**$0.47**	**6.5%**	**6.1%**	**5.7%**	**5.2%**	**4.8%**	**4.3%**	**3.9%**	**8.1%**
19	**Median**	**$69.41**	**$0.48**	**6.1%**	**5.8%**	**5.4%**	**5.0%**	**4.6%**	**4.3%**	**3.9%**	**8.1%**
	Multi-Stage Water										
20	**Average**	**$77.25**	**$0.30**	**7.9%**	**7.2%**	**6.6%**	**5.9%**	**5.2%**	**4.6%**	**3.9%**	**6.0%**
21	**Median**	**$66.25**	**$0.27**	**6.9%**	**6.4%**	**5.9%**	**5.4%**	**4.9%**	**4.4%**	**3.9%**	**6.0%**

Source:

NW Natural/303, Villadsen-Figueroa, Page 22-25, Schedule No. BVJF-6.6 and 6.7

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UG 435

In the Matter of	)
	)
NORTHWEST NATURAL GAS COMPANY, dba NW Natural,	)
	)
Request for a General Rate Revision.	)
	)

EXHIBIT AWEC-CUB/121

ACCURACY OF INTEREST RATE FORECASTS

Northwest Natural Gas Company

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	Jun-17	3.0%	3.7%	3Q 18	3.1%	0.6%
68	Sep-17	2.9%	3.6%	4Q 18	3.3%	0.3%
69	Dec-17	2.8%	3.6%	1Q 19	3.0%	0.6%
70	Mar-18	2.8%	3.7%	2Q 19	2.8%	0.9%
71	Jun-18	3.0%	3.8%	3Q 19	2.3%	1.5%
72	Sep-18	3.1%	3.7%	4Q 19	2.3%	1.4%
73	Dec-18	3.1%	3.7%	1Q 20	1.9%	1.8%
74	Jan-19	3.3%	3.6%	2Q 20	1.4%	2.2%
75	Feb-19	3.3%	3.5%	2Q 20	1.4%	2.1%
76	Mar-19	3.3%	3.4%	2Q 20	1.4%	2.0%
77	Apr-19	3.0%	3.2%	3Q 20	1.4%	1.8%
78	May-19	3.0%	3.2%	3Q 20	1.4%	1.8%
79	Jun-19	3.0%	3.1%	3Q 20	1.4%	1.7%
80	Jul-19	2.8%	2.8%	4Q 20	1.6%	1.2%
81	Aug-19	2.8%	2.7%	4Q 20	1.6%	1.1%
82	Sep-19	2.8%	2.6%	4Q 20	1.6%	1.0%
83	Oct-19	2.3%	2.5%	1Q 21	2.1%	0.4%
84	Nov-19	2.3%	2.5%	1Q 21	2.1%	0.4%
85	Dec-19	2.3%	2.5%	1Q 21	2.1%	0.4%
86	Jan-20	2.3%	2.6%	2Q 21	2.3%	0.3%
87	Feb-20	2.3%	2.6%	2Q 21	2.3%	0.3%
88	Mar-20	2.3%	2.5%	2Q 21	2.3%	0.2%
89	Apr-20	1.9%	2.0%	3Q 21	1.9%	0.1%
90	May-20	1.9%	1.8%	3Q 21	1.9%	-0.1%
91	Jun-20	1.9%	1.9%	3Q 21	1.9%	0.0%
92	Jul-20	1.4%	1.9%	4Q 21	2.0%	-0.1%
93	Aug-20	1.4%	1.9%	4Q 21	2.0%	-0.1%
94	Sep-20	1.4%	1.8%	4Q 21	2.0%	-0.2%
95	Oct-20	1.4%	1.9%	1Q 22		
96	Nov-20	1.4%	2.0%	1Q 22		
97	Dec-20	1.4%	2.0%	1Q 22		
98	Jan-21	1.6%	2.1%	2Q 22		
99	Feb-21	1.6%	2.2%	2Q 22		
100	Mar-21	1.6%	2.4%	2Q 22		
101	Apr-21	2.1%	2.7%	3Q 22		
102	May-21	2.1%	2.8%	3Q 22		
103	Jun-21	2.1%	2.8%	3Q 22		
104	Jul-21	2.3%	2.7%	4Q 22		
105	Aug-21	2.3%	2.6%	4Q 22		
106	Sep-21	2.3%	2.6%	4Q 22		