

# COST OF CAPITAL STUDY

**YIELD CAPITALIZATION**

**2018 Assessment Year**

APPENDIX C

## NATURAL GAS DISTRIBUTION

<b>EQUITY RATE</b>						<b>8.00%</b>	
<b>CAPITAL ASSET PRICING MODEL</b>							PAGE
	CAPM Ex Ante		6.31%				4
<b>DIVIDEND GROWTH MODELS</b>							
	Value Line, based on Dividends Growth		7.00%				5
	Value Line, based on Earnings Growth		10.50%				6
	Value Line, based on Return on Equity		7.00%				7
	<b>FCFE GROWTH MODEL Multi Stage</b>		8.00%				8
				<b>RANGE</b>	6.31 -10.50%		
<b>DEBT RATE</b>						<b>4.25%</b>	9
<b>MARKET CAPITAL STRUCTURE</b>							
	Equity	70%	x	8.00%	=	5.60%	3
	Debt	30%	x	4.25%	=	1.28%	3
	Marginal Tax Rate	24%	=	(1-.24)	x	1.28%	
						<u>0.97%</u>	
<b>WEIGHTED AVERAGE COST OF CAPITAL</b>						<b>6.57%</b>	

## SUPPORT FOR GUIDELINE COMPANIES

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

Capital Structure at Book Value

Company	Ticker	Beta	Fin'l Strength	P/E Ratio	Div'd Yield	Common Stock	%	Preferred Stock	%	Long Term Debt	%	Total Debt & Equity
Atmos Energy Corp	ato	0.70	A+	20.90	2.1%	4,076,950,947	57.1%		0.0%	3,067,500,000	42.9%	7,144,450,947
New Jersey Resources	njr	0.75	A+	13.50	2.6%	1,255,234,387	55.6%		0.0%	1,001,200,000	44.4%	2,256,434,387
Nisource Inc	ni	0.60	B+	59.00	2.7%	4,325,606,802	36.5%		0.0%	7,512,200,000	63.5%	11,837,806,802
NW Natural Gas	nwn	0.65	A	25.20	3.2%	858,520,255	53.1%		0.0%	757,400,000	46.9%	1,615,920,255
South Jersey Industries	sjj	0.80	A	21.60	3.5%	1,244,943,102	51.3%		0.0%	1,180,300,000	48.7%	2,425,243,102
Southwest Gas	swx	0.75	B++	20.10	2.5%	1,780,397,632	50.7%		0.0%	1,732,000,000	49.3%	3,512,397,632
Spire Inc	sr	0.65	B++	13.40	2.8%	1,994,678,432	49.6%		0.0%	2,030,000,000	50.4%	4,024,678,432
UGI Corp	ugi	0.90	B++	18.10	2.0%	3,145,400,174	43.7%		0.0%	4,056,400,000	56.3%	7,201,800,174
WGL Holdings	wgl	0.80	A	22.00	2.4%	1,507,391,992	46.9%	28,200,000	0.9%	1,679,900,000	52.2%	3,215,491,992
	<b>Mean</b>	<b>0.73</b>		<b>23.76</b>	<b>2.6%</b>	<b>2,243,235,969</b>	<b>49.4%</b>		<b>0.1%</b>	<b>2,557,433,333</b>	<b>50.5%</b>	<b>4,803,802,636</b>
	<b>Harmonic Mean</b>	<b>0.72</b>		<b>20.00</b>	<b>2.56%</b>		<b>48.6%</b>				<b>49.9%</b>	
	<b>Median</b>	<b>0.75</b>		<b>20.90</b>	<b>2.59%</b>		<b>50.7%</b>		<b>0.0%</b>		<b>49.3%</b>	
	<b>Weighted Mean</b>					<b>20,189,123,723</b>	<b>46.7%</b>	<b>28,200,000</b>	<b>0.1%</b>	<b>23,016,900,000</b>	<b>53.2%</b>	<b>43,234,223,723</b>
	<b>Say</b>	<b>0.75</b>										

## SUPPORT FOR CAPITAL STRUCTURE MARKET VALUE

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

Capital Structure at Market Value

Company	Ticker	Stock Price	Common Shares	Common Stock	%	Preferred Stock	%	Long Term Debt	%	Total Debt & Equity
Atmos Energy Corp	ato	85.890	110,967,636	9,531,010,256	73.8%	-	0.0%	3,382,272,000	26.2%	12,913,282,256
New Jersey Resources	njr	40.200	87,594,863	3,521,313,493	76.1%	-	0.0%	1,107,676,000	23.9%	4,628,989,493
Nisource Inc	ni	25.670	337,410,827	8,661,335,929	50.2%	-	0.0%	8,603,400,000	49.8%	17,264,735,929
NW Natural Gas	nwn	59.650	28,713,052	1,712,733,552	66.7%	-	0.0%	853,339,000	33.3%	2,566,072,552
South Jersey Industries	sji	31.230	79,549,080	2,484,317,768	67.1%	-	0.0%	1,216,100,000	32.9%	3,700,417,768
Southwest Gas	swx	80.480	47,731,840	3,841,458,483	66.0%	-	0.0%	1,982,796,000	34.0%	5,824,254,483
Spire Inc	sr	75.150	48,344,121	3,633,060,693	62.2%	-	0.0%	2,210,300,000	37.8%	5,843,360,693
UGI Corp	ugi	46.950	173,014,311	8,123,021,901	65.1%	-	0.0%	4,346,800,000	34.9%	12,469,821,901
WGL Holdings	wgl	85.840	51,359,182	4,408,672,183	73.3%	28,200,000	0.5%	1,577,300,000	26.2%	6,014,172,183
<b>Mean</b>					<b>66.7%</b>		<b>0.1%</b>		<b>33.2%</b>	
<b>Harmonic Mean</b>					<b>65.8%</b>				<b>31.8%</b>	
<b>Median</b>					<b>66.7%</b>		<b>0.0%</b>		<b>33.3%</b>	
			<b>Weighted Mean</b>	<b>45,916,924,259</b>	<b>64.5%</b>	<b>28,200,000</b>	<b>0.0%</b>	<b>25,279,983,000</b>	<b>35.5%</b>	<b>71,225,107,259</b>
<b>Std Dev</b>					<b>7.7%</b>				<b>7.8%</b>	
<b>Coefficient of Variation</b>					<b>11.6%</b>				<b>23.4%</b>	
<b>Say</b>					<b>70%</b>				<b>30%</b>	<b>100%</b>

# SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT CAPITAL ASSET PRICING MODEL

Washington State Department of Revenue  
2018 Assessment Year - Natural Gas Distribution

$$\text{Ex Ante} \\ \text{Ke} = \text{Rf} + \text{B} (\text{Rp})$$

<b>Ke = Cost of Equity</b>				<b>6.31%</b>
				to page 1
	Rm =	rate of return	7.50%	
	Rf =	risk free rate	2.75%	
	Rp =	risk premium	4.75%	
	B =	Beta	0.75	page 7
<b>Rp = Risk Premium</b>				<b>4.75%</b>
				to above
	<b>Shannon Pratt and Roger Grabowski</b>		3.50%-6.00%	
	Cost of Capital, App and Exam, 5th Ed, 2014			
	<b>Dr. Aswath Damodaran</b>		5.08%	chart page 14
	<a href="http://pages.stern.nyu.edu/~adamodar/">http://pages.stern.nyu.edu/~adamodar/</a>		4.73%	adjusted for Rf
	2017 Implied Premium			
	<b>John Graham and Campbell Harvey</b>		7.16%	10 year expected real return
	<b>Duke CFO magazine Global Business Outlook survey - U.S.</b>		2.37%	Rf rate used in survey
	4th Qtr 2017		6.78%	adjusted for Rf
<b>Rf = Risk Free Rate</b>				<b>2.75%</b>
				to above
	<b>Value Line Investment Survey, Selected Yields January 8, 2018, page 2573</b>			
	as of 12-27-17	US Treasury Securities year end data		
		5 year	2.19%	
		10 year	2.41%	
		30 year	2.75%	
		30 year Zero	2.87%	
	<b>Federal Reserve Statistical Release (<a href="http://www.federalreserve.gov/Releases/H15/Current/">http://www.federalreserve.gov/Releases/H15/Current/</a>)</b>			
	as of 12-29-17	Treasury Constant Maturities		
		5 year	2.20%	
		10 year	2.40%	
		20 year	2.58%	
		30 year	2.74%	
		20 year TIPS	0.61%	1.97%
		30 year TIPS	0.73%	2.01%
				TIPS inflation indication
<b>Inflation</b>				<b>2.00%</b>
	<b>Value Line Investment Survey, Economic Series January 5, 2018, page 1500</b>			
	Consumer Price Index Annual Rate of Change 2020-2022			2.50%
	<b>Federal Reserve Bank of Philadelphia</b>			
	The Livingston Survey December 15, 2017			Table 3
	Inflation median (measured by the CPI) over next 10 years			2.34%
	<a href="https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey">https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey</a>			
<b>Nominal Gross Domestic Product (GDP)</b>				<b>3.80%</b>
	<b>Federal Reserve Projected Long Run Real GDP Growth</b>			
	Median Projection Value From December 13, 2017 Report			1.80%
	<a href="http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm">http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm</a>			
	<b>Congressional Budget Office Real GDP Economic Projections</b>			
	The Budget and Economic Outlook 2018-2028			Table D-1 pg 140
	Average Percentage Change From Year to Year	2018-2022		2.18%
	<a href="http://www.cbo.gov/publication/53651">http://www.cbo.gov/publication/53651</a>	2023-2028		1.73%
	<b>Federal Reserve Bank of Philadelphia</b>			
	The Livingston Survey, December 15, 2017			pg 4
	Average Annual Real GDP Growth Rate for Next Ten Years			2.18%
	<a href="https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey">https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey</a>			

**SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT  
DIVIDEND GROWTH MODEL**

Washington State Department of Revenue  
2018 Assessment Year  
Natural Gas Distribution

**Based on Dividend Growth**

$$K_e = (D1 / P_0) + G$$

Ke = Cost of Equity  
D1 = Expected Dividends  
Po = Current Price  
G = Sustainable Growth

Company	Ticker	Stock Price (Po)	Expected Dividend (D1)	Dividend Yield (D1/Po)	Dividend Short Term Growth (G)	Ke Short Term Growth
Atmos Energy Corp	ato	85.89	1.94	2.26%	7.00%	9.26%
New Jersey Resources	njr	40.20	1.10	2.74%	4.00%	6.74%
Nisource Inc	ni	25.67	0.78	3.04%	9.00%	12.04%
NW Natural Gas	nwn	59.65	1.89	3.17%	2.50%	5.67%
South Jersey Industries	sjj	31.23	1.15	3.68%	4.00%	7.68%
Southwest Gas	swx	80.48	2.08	2.58%	7.00%	9.58%
Spire Inc	sr	75.15	2.25	2.99%	4.00%	6.99%
UGI Corp	ugi	46.95	1.02	2.17%	3.00%	5.17%
WGL Holdings	wgl	85.84	2.08	2.42%	2.50%	4.92%
<b>Mean</b>						<b>7.56%</b>
<b>Harmonic Mean</b>						<b>6.98%</b>
<b>Median</b>						<b>6.99%</b>
<b>Max</b>						<b>12.04%</b>
<b>Min</b>						<b>4.92%</b>
<b>Std Dev</b>						<b>2.35%</b>
<b>Coefficient of Variation</b>						<b>31.11%</b>
<b>Say</b>						<b>7.00%</b>

## SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT DIVIDEND GROWTH MODEL

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

### Based on Earnings Growth

$$K_e = (D1 / P_o) + G$$

Ke = Cost of Equity  
 D1 = Expected Dividends  
 Po = Current Price  
 G = Sustainable Growth

Company	Ticker	Stock Price (Po)	Expected Dividends (D1)	Yield (D1/Po)	Earnings Short Term Growth (G)	Ke Short Term Growth
Atmos Energy Corp	ato	85.89	1.94	2.26%	7.5%	9.76%
New Jersey Resources	njr	40.20	1.10	2.74%	9.5%	12.24%
Nisource Inc	ni	25.67	0.78	3.04%	18.0%	21.04%
NW Natural Gas	nwn	59.65	1.89	3.17%	7.0%	10.17%
South Jersey Industries	sjj	31.23	1.15	3.68%	6.5%	10.18%
Southwest Gas	swx	80.48	2.08	2.58%	7.5%	10.08%
Spire Inc	sr	75.15	2.25	2.99%	9.0%	11.99%
UGI Corp	ugi	46.95	1.02	2.17%	6.5%	8.67%
WGL Holdings	wgl	85.84	2.08	2.42%	6.5%	8.92%
<b>Mean</b>						<b>11.45%</b>
<b>Harmonic Mean</b>						<b>10.74%</b>
<b>Median</b>						<b>10.17%</b>
<b>Max</b>						<b>21.04%</b>
<b>Min</b>						<b>8.67%</b>
<b>Std Dev</b>						<b>3.79%</b>
<b>Coefficient of Variation</b>						<b>33.10%</b>
<b>Say</b>						<b>10.50%</b>

## SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT DIVIDEND GROWTH MODEL

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

### Based on Return on Equity

$$K_e = (D1 / P_o) + G$$

- Ke** = Cost of Equity
- D1** = Expected Dividends
- E1** = Expected Earnings
- Po** = Current Price
- G** = Sustainable Growth
- b** = Retained Earnings % = (1 - Payout Ratio)
- ROE** = Return on Equity = (E1 / Po)

Company	Ticker	Stock Price (Po)	Expected Dividend (D1)	Expected Earnings (E1)	Dividend Yield (D1/Po)	Retained Earnings (b)	ROE (E1/Po)	Growth (b*ROE)	Ke Dividends	Ke Earnings	
Atmos Energy Corp	ato	85.890	1.94	4.00	2.3%	50.0%	4.66%	2.33%	4.59%	6.99%	
New Jersey Resources	njr	40.200	1.10	2.65	2.7%	41.0%	6.59%	2.70%	5.44%	9.29%	
Nisource Inc	ni	25.670	0.78	1.30	3.0%	NMF	5.06%	NMF	NMF	NMF	
NW Natural Gas	nwn	59.650	1.89	2.45	3.2%	NMF	4.11%	NMF	NMF	NMF	
South Jersey Industries	sjj	31.230	1.15	1.55	3.7%	10.0%	4.96%	0.50%	4.18%	5.46%	
Southwest Gas	swx	80.480	2.08	3.70	2.6%	10.0%	4.60%	0.46%	3.04%	5.06%	
Spire Inc	sr	75.150	2.25	4.80	3.0%	46.0%	6.39%	2.94%	5.93%	9.33%	
UGI Corp	ugi	46.950	1.02	2.50	2.2%	58.0%	5.32%	3.09%	5.26%	8.41%	
WGL Holdings	wgl	85.840	2.08	4.00	2.4%	35.0%	4.66%	1.63%	4.05%	6.29%	
									<b>Mean</b>	<b>4.64%</b>	<b>7.26%</b>
									<b>Harmonic Mean</b>	<b>4.44%</b>	<b>6.89%</b>
									<b>Median</b>	<b>4.59%</b>	<b>6.99%</b>
									<b>Max</b>	<b>5.93%</b>	<b>9.33%</b>
									<b>Min</b>	<b>3.04%</b>	<b>5.06%</b>
									<b>Std Dev</b>	<b>0.98%</b>	<b>1.77%</b>
									<b>Coefficient of Variation</b>	<b>21.18%</b>	<b>24.41%</b>
									<b>say</b>	<b>7.00%</b>	

**SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT  
FREE CASH FLOW TO EQUITY MODEL MULTI STAGE**

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

Company	Ticker	Stock Price	Expected Earnings	P/E	Payout Ratio	ROE	Ke
Atmos Energy Corp	ato	85.89	4.00	21.47	49.00%	11.00%	7.10%
New Jersey Resources	njr	40.20	2.65	15.17	42.00%	13.00%	10.23%
Nisource Inc	ni	25.67	1.30	19.75	67.00%	12.00%	8.69%
NW Natural Gas	nwn	59.65	2.45	24.35	63.00%	11.00%	6.58%
South Jersey Industries	sjj	31.23	1.55	20.15	60.00%	11.00%	8.85%
Southwest Gas	swx	80.48	3.70	21.75	51.00%	8.50%	7.54%
Spire Inc	sr	75.15	4.80	15.66	54.00%	9.50%	10.03%
UGI Corp	ugi	46.95	2.50	18.78	36.00%	11.50%	8.24%
WGL Holdings	wgl	85.84	4.00	21.46	70.00%	11.00%	6.11%
<b>Mean</b>				<b>19.84</b>	<b>54.67%</b>	<b>10.94%</b>	<b>8.15%</b>
<b>Harmonic Mean</b>				<b>19.42</b>	<b>52.36%</b>	<b>10.79%</b>	<b>7.92%</b>
<b>Median</b>				<b>20.15</b>	<b>54.00%</b>	<b>11.00%</b>	<b>8.24%</b>
<b>Industry Summary</b>				<b>20.00</b>	<b>54.00%</b>	<b>11.0%</b>	
						<b>Say</b>	<b>8.0%</b>



# SUPPORT FOR DEBT RATING AND DEBT YIELD RATE

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

Company	Ticker	Mergent's Ratings	S&P Ratings
Atmos Energy Corp	ato	A2	A
New Jersey Resources	njr	Aa2	A
Nisource Inc	ni	Baa2	BBB+
NW Natural Gas	nwn	A3	AA-
South Jersey Industries	sjj	A2	BBB+
Southwest Gas	swx	A3	BBB+
Spire Inc	sr	Baa2	A-
UGI Corp	ugi		
WGL Holdings	wgl	A3	A+
<b>Overall Average Debt Rating</b>		<b>A3</b>	<b>A-</b>

<b>Mergent's Bond Record January 2018, page 249</b>				
<b>Corporate</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
October	3.60%	3.75%	3.91%	4.32%
November	3.57%	3.67%	3.84%	4.27%
December	3.51%	3.61%	3.79%	4.22%
<b>4th Qtr Average</b>	<b>3.56%</b>	<b>3.68%</b>	<b>3.85%</b>	<b>4.27%</b>
<b>Public Utilities</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
October		3.74%	3.91%	4.26%
November		3.65%	3.83%	4.16%
December		3.62%	3.79%	4.14%
<b>4th Qtr Average</b>		<b>3.67%</b>	<b>3.84%</b>	<b>4.19%</b>
<b>Industrials</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
October	3.60%	3.74%	3.90%	4.37%
November	3.57%	3.68%	3.85%	4.37%
December	3.51%	3.60%	3.79%	4.31%
<b>4th Qtr Average</b>	<b>3.56%</b>	<b>3.67%</b>	<b>3.85%</b>	<b>4.35%</b>

		Avg YTM	Med YTM
S&P's Long Term Bond Yield	A-	<b>4.37%</b>	<b>4.36%</b>

Bloomberg December	20y	25y	30y
A-	<b>4.04%</b>	<b>4.06%</b>	<b>4.24%</b>

<b>Debt Yield Rate</b>	<b>4.25%</b>
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## SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

Company	Ticker	Stock Price	2017		2018		2017		2018	
			Actual Earnings Ratio (EPS/P)	Projected Earnings Ratio (PEPS/P)	Cash Flow Ratio (CF/P)	Projected Cash Flow Ratio				
Atmos Energy Corp	ato	85.89	3.60	4.2%	4.00	4.7%	6.62	7.7%	7.00	8.1%
New Jersey Resources	njr	40.20	1.73	4.3%	2.65	6.6%	2.68	6.7%	3.65	9.1%
Nisource Inc	ni	25.67	0.39	1.5%	1.30	5.1%	2.07	8.1%	3.10	12.1%
NW Natural Gas	nwn	59.65	(1.94)	nmf	2.45	4.1%	1.04	1.7%	5.15	8.6%
South Jersey Industries	sjj	31.23	1.23	3.9%	1.55	5.0%	2.50	8.0%	2.85	9.1%
South Jersey Industries	sjj	31.23	1.23	3.9%	3.70	11.8%	2.50	8.0%	9.80	31.4%
Southwest Gas	swx	80.48	3.55	4.4%	4.80	6.0%	8.95	11.1%	7.85	9.8%
Spire Inc	sr	75.15	3.43	4.6%	2.50	3.3%	6.54	8.7%	5.00	6.7%
UGI Corp	ugi	46.95	2.29	4.9%	2.50	5.3%	4.73	10.1%	5.00	10.6%
WGL Holdings	wgl	85.84	3.11	3.6%	4.00	4.7%	6.11	7.1%	6.90	8.0%
		<b>Mean</b>	<b>3.9%</b>		<b>5.7%</b>		<b>7.7%</b>		<b>11.4%</b>	
		<b>Harmonic Mean</b>	<b>3.5%</b>		<b>5.1%</b>		<b>6.0%</b>		<b>9.6%</b>	
		<b>Median</b>	<b>4.2%</b>		<b>5.0%</b>		<b>8.0%</b>		<b>9.1%</b>	
		<b>Max</b>	<b>4.9%</b>		<b>11.8%</b>		<b>11.1%</b>		<b>31.4%</b>	
		<b>Min</b>	<b>1.5%</b>		<b>3.3%</b>		<b>1.7%</b>		<b>6.7%</b>	
		<b>Std Dev</b>	<b>1.0%</b>		<b>2.4%</b>		<b>2.5%</b>		<b>7.2%</b>	
		<b>Coefficient of Variation</b>	<b>24.9%</b>		<b>41.7%</b>		<b>32.2%</b>		<b>63.3%</b>	

Source:

**Say**

**4.0%**

**5.0%**

**7.5%**

**10.0%**

Actual earnings: Value Line / Q4 average stock price

Estimated Earnings: Value Line / Q4 average stock price

Actual Cash Flow: Value Line / Q4 average stock price

Estimated Cash Flow: Value Line / Q4 average stock price

## SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

Company	Ticker	Stock Price	Enterprise Value	EBITDA Historical	Annual Change VL	EBITDA Forecast	EV / EBITDA Forecast
Atmos Energy Corp	ato	85.89	12,913,282,256	1,047,179,000	5.74%	1,107,288,973	11.66
New Jersey Resources	njr	40.20	4,628,989,493	248,885,000	36.19%	338,966,511	13.66
Nisource Inc	ni	25.67	17,264,735,929	1,486,400,000	49.76%	2,226,009,662	7.76
NW Natural Gas	nwn	59.65	2,566,072,552	224,829,000	395.19%	1,113,335,913	2.30
South Jersey Industries	sjj	31.23	3,700,417,768	219,195,000	14.00%	249,882,300	14.81
Southwest Gas	swx	80.48	5,843,360,693	475,800,000	9.50%	520,987,709	11.22
Spire Inc	sr	75.15	12,469,821,901	1,410,000,000	20.03%	1,692,431,193	7.37
UGI Corp	ugi	46.95	12,462,421,901	1,410,000,000	5.71%	1,490,486,258	8.36
WGL Holdings	wgl	85.84	6,014,172,183	495,151,000	12.93%	559,172,160	10.76
<b>Mean</b>							<b>9.77</b>
<b>Harmonic Mean</b>							<b>7.34</b>
<b>Median</b>							<b>10.76</b>
<b>Std Dev</b>							<b>3.79</b>
<b>Coefficient of Variation</b>							<b>0.39</b>
<b>Say</b>							<b>7.75</b>

## SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

2018 Assessment Year

Natural Gas Distribution

Company	Ticker	Stock Price	Revenues	Multiple	Cash Flow	Multiple	Earnings	Multiple	Book Value	Multiple
Atmos Energy Corp	ato	85.890	26.01	3.30	6.62	12.97	3.60	23.86	36.74	2.34
New Jersey Resources	njr	40.200	26.28	1.53	2.68	15.00	1.73	23.24	14.33	2.81
Nisource Inc	ni	25.670	14.46	1.78	2.07	12.40	0.39	65.82	12.82	2.00
NW Natural Gas	nwn	59.650	26.53	2.25	1.04	57.36	(1.94)	nmf	29.90	1.99
South Jersey Industries	sjj	31.230	15.55	2.01	2.50	12.49	1.23	25.39	15.65	2.00
Southwest Gas	swx	80.480	52.60	1.53	8.95	8.99	3.55	22.67	37.30	2.16
Spire Inc	sr	75.150	36.07	2.08	6.54	11.49	3.43	21.91	41.26	1.82
UGI Corp	ugi	46.950	35.18	1.33	4.73	9.93	2.29	20.50	18.18	2.58
WGL Holdings	wgl	85.840	45.99	1.87	6.11	14.05	3.11	27.60	29.35	2.92
		<b>Mean</b>		<b>1.96</b>		<b>17.19</b>		<b>28.87</b>		<b>2.29</b>
		<b>Harmonic Mean</b>		<b>1.84</b>		<b>13.01</b>		<b>25.45</b>		<b>2.23</b>
		<b>Median</b>		<b>1.87</b>		<b>12.49</b>		<b>23.55</b>		<b>2.16</b>
		<b>Max</b>		<b>3.30</b>		<b>57.36</b>		<b>65.82</b>		<b>2.92</b>
		<b>Min</b>		<b>1.33</b>		<b>8.99</b>		<b>20.50</b>		<b>1.82</b>
		<b>Say</b>		<b>1.85</b>		<b>13.00</b>		<b>25.00</b>		<b>2.25</b>

## DATA INPUT

Washington State Department of Revenue

2018 Assessment Year

Natural Gas Distribution

Instructions: Data entered on this page will flow to the applicable worksheets.

Guideline Companies		Stock Price	Beta Levered	Financial Strength	Revenues	Cash Flow	Current Earnings	Forecast Earnings	Forward P/E	Dividends	Bk Value	Common	LTD (BV)	Trailing P/E Ratio	Aver Annual Div Yield
Name	Ticker	Yahoo	V L	V L	Per Share	Per Share	Per Share	Per Share		Per Share	Stock	Shares	V L	V L	V L
Atmos Energy Corp	ato	85.890	0.70	A+	26.01	6.62	3.60	5.15	16.68	1.80	36.74	110,967,636	3,067,500,000	20.90	2.4%
New Jersey Resources	njr	40.200	0.75	A+	26.28	2.68	1.73	2.95	13.63	1.04	14.33	87,594,863	1,001,200,000	13.50	2.8%
Nisource Inc	ni	25.670	0.60	B+	14.46	2.07	0.39	1.80	14.26	0.70	12.82	337,410,827	7,512,200,000	59.00	3.4%
NW Natural Gas	nwn	59.650	0.65	A	26.53	1.04	(1.94)	3.50	17.04	1.88	29.90	28,713,052	757,400,000	25.20	3.4%
South Jersey Industries	sjj	31.230	0.80	A	15.55	2.50	1.23	2.25	13.88	1.10	15.65	79,549,080	1,180,300,000	21.60	4.3%
Southwest Gas	swx	80.480	0.75	B++	52.60	8.95	3.55	5.10	15.78	1.98	37.30	47,731,840	1,732,000,000	20.10	3.1%
Spire Inc	sr	75.150	0.65	B++	36.07	6.54	3.43	5.50	13.66	2.10	41.26	48,344,121	2,030,000,000	13.40	3.4%
UGI Corp	ugi	46.950	0.90	B++	35.18	4.73	2.29	3.05	15.39	0.96	18.18	173,014,311	4,056,400,000	18.10	2.3%
WGL Holdings	wgl	85.840	0.80	A	45.99	6.11	3.11	4.60	18.66	2.02	29.35	51,359,182	1,679,900,000	22.00	2.4%
<b>Average</b>									15.44					23.76	
<b>Harmonic Mean</b>									15.27					20.00	
<b>Median</b>									15.39					20.90	

Value Line Mar 2018

						Projected (Next Year)							Income Statement	
Calculated Debt	Payout Ratio	Current Payout Ratio	Forecast Payout Ratio	Current % Rtn on Shrhldrs Equity	Forecast % Rtn on Shrhldrs Equity	Revenues	Cash Flow	Earnings	P/E	Dividends	Bk Value	% Rtn on Shrhldrs Equity	CF Projection	Operating Income
mk to bk	calculated	V L	VL	V L	V L	V L	V L	V L	calculated	V L	V L	V L	V L	Morningstar
109.64%	50%	50%	49%	9.8%	11.0%	28.05	7.00	4.00	21.47	1.94	42.10	9.5%	8.60	727,546,000
100.97%	60%	59%	42%	12.1%	13.0%	29.50	3.65	2.65	15.17	1.10	15.95	16.5%	4.20	167,044,000
110.35%	179%	NMF	67%	3.0%	12.0%	16.20	3.10	1.30	19.75	0.78	13.65	9.5%	3.60	916,100,000
109.42%	-97%	NMF	63%	NMF	11.0%	27.10	5.15	2.45	24.35	1.89	30.45	9.0%	6.35	139,251,000
102.47%	89%	90%	60%	8.0%	11.0%	15.80	2.85	1.55	20.15	1.15	16.35	9.5%	3.75	95,709,000
108.71%	56%	54%	51%	10.0%	8.5%	54.10	9.80	3.70	21.75	2.08	39.80	9.5%	13.75	334,013,000
105.50%	61%	60%	54%	8.1%	9.5%	43.30	7.85	4.80	15.66	2.25	43.75	11.0%	9.40	321,700,000
103.20%	42%	42%	36%	12.9%	11.5%	39.15	5.00	2.50	18.78	1.02	19.65	13.0%	5.70	993,700,000
110.23%	65%	65%	70%	10.5%	11.0%	47.15	6.90	4.00	21.46	2.08	32.95	12.0%	7.70	341,013,000
		60.0%	54.7%	9.3%	10.9%				19.8			11.1%	7.01	
		57.2%	52.4%	7.7%	10.8%				19.4			10.7%	5.84	
		59.0%	54.0%	9.9%	11.0%				20.1			9.5%	6.35	

Balance Sheet					CF Statement			
Current Assets	Current Liabilities	Intangibles (Excl. GW)	PP&E Gross	LT Debt	Dep & Amort	Fair Value	Carrying Value	
Morningstar	Morningstar	Morningstar	Morningstar	Morningstar	Morningstar	10-K	10-K	
539,646,000	1,013,443,000	-	11,301,304,000	3,067,045,000	319,633,000	3,382,272,000	3,085,000,000	Fiscal year is September
579,444,000	802,918,000	41,084,000	3,211,070,000	997,080,000	81,841,000	1,107,676,000	1,097,045,000	Fiscal year is September
1,763,300,000	3,178,400,000	231,700,000	21,649,900,000	7,512,200,000	570,300,000	8,603,400,000	7,796,500,000	02/20/2018
269,936,000	381,850,000	-	3,215,451,000	683,184,000	85,578,000	853,339,000	779,887,000	02/23/2018
196,527,000	353,654,000	-	2,652,244,000	758,052,000	123,486,000	1,216,100,000	1,186,800,000	03/01/2018
657,032,000	815,881,000	-	7,361,276,000	1,798,576,000	250,951,000	1,982,796,000	1,823,922,000	02/28/2018
725,500,000	1,097,900,000	-	5,339,000,000	1,995,000,000	154,100,000	2,210,300,000	2,095,000,000	Fiscal year is September
1,697,500,000	1,690,100,000	611,700,000	8,849,900,000	3,994,600,000	416,300,000	4,346,800,000	4,211,900,000	Fiscal year is September
985,889,000	1,488,988,000	-	6,143,841,000	1,430,861,000	154,138,000	1,577,300,000	1,430,900,000	Fiscal year is September

## STOCK PRICE

Washington State Department of Revenue  
 2018 Assessment Year  
 Natural Gas Distribution

								60.96
								Year End
Atmos Energy Corp ato								
Date	Open	High	Low	Close	Adj Close*	Volume	85.890	
Dec 29, 2017	85.63	86.14	85.4	85.89	85.89	775,000		
Chesapeake Util cpk								
Date	Open	High	Low	Close	Adj Close*	Volume	78.550	
Dec 29, 2017	79.05	79.45	78.3	78.55	78.55	48,400		
New Jersey Resources njr								
Date	Open	High	Low	Close	Adj Close*	Volume	40.200	
Dec 29, 2017	39.65	40.35	39.65	40.2	40.2	755,200		
Nisource Inc ni								
Date	Open	High	Low	Close	Adj Close*	Volume	25.670	
Dec 29, 2017	25.61	25.71	25.44	25.67	25.67	2,798,300		
NW Natural Gas nwn								
Date	Open	High	Low	Close	Adj Close*	Volume	59.650	
Dec 29, 2017	59.95	60.25	59.6	59.65	59.65	122,300		
South Jersey Industries sji								
Date	Open	High	Low	Close	Adj Close*	Volume	31.230	
Dec 29, 2017	31.44	31.71	31.18	31.23	31.23	332,500		
Southwest Gas Corp swx								
Date	Open	High	Low	Close	Adj Close*	Volume	80.480	
Dec 29, 2017	80.9	81.31	80.43	80.48	80.48	138,000		
Spire Inc sr								
Date	Open	High	Low	Close	Adj Close*	Volume	75.150	
Dec 29, 2017	75.35	75.75	75.1	75.15	75.15	115,400		
UGI Corp ugi								
Date	Open	High	Low	Close	Adj Close*	Volume	46.950	
Dec 29, 2017	47.03	47.13	46.66	46.95	46.95	1,055,100		
WGL Holdings wgl								
Date	Open	High	Low	Close	Adj Close*	Volume	85.840	
Dec 29, 2017	85.99	86.16	85.81	85.84	85.84	166,000		

Source:  
 finance.yahoo.com  
 Historical Stock Quotes



<b>IMPLIED PREMIUMS FOR US MARKET</b>																	
These implied premiums are calculated using the S&P 500. Updated January 5, 2018																	
Year	Earnings Yield	Dividend Yield	S&P 500	Earnings*	Dividends*	Dividends + Buybacks	Change in Earnings	Change in Dividends	T.Bill Rate	T.Bond Rate	Bond-Bill	Smoothed Growth	Implied Premium (DDM)	Analyst Growth Estimate	Implied Premium (FCFE)	Implied Premium (FCFE with sustainable Payout)	ERP/Riskfree Rate
1960	5.34%	3.41%	58.11	3.10	1.98				2.66%	2.76%	0.10%	2.45%					
1961	4.71%	2.85%	71.55	3.37	2.04		8.60%	2.91%	2.13%	2.35%	0.22%	2.41%	2.92%		2.92%		1.24
1962	5.81%	3.40%	63.1	3.67	2.15		8.79%	5.21%	2.73%	3.85%	1.12%	4.05%	3.56%		3.56%		0.92
1963	5.51%	3.13%	75.02	4.13	2.35		12.75%	9.45%	3.12%	4.14%	1.02%	4.96%	3.38%		3.38%		0.82
1964	5.62%	3.05%	84.75	4.76	2.58		15.23%	10.08%	3.54%	4.21%	0.67%	5.13%	3.31%		3.31%		0.79
1965	5.73%	3.06%	92.43	5.30	2.83		9.42%	3.93%	4.65%	0.72%	11.20%	5.46%	3.32%		3.32%		0.71
1966	6.74%	3.59%	80.33	5.41	2.88		2.23%	1.96%	4.76%	4.64%	-0.12%	4.19%	3.68%		3.68%		0.79
1967	5.66%	3.09%	96.47	5.46	2.98		0.85%	3.37%	4.21%	5.70%	1.49%	5.25%	3.20%		3.20%		0.56
1968	5.51%	2.93%	103.86	5.72	3.04		4.81%	2.09%	5.21%	6.16%	0.95%	5.32%	3.00%		3.00%		0.49
1969	6.63%	3.52%	92.06	6.10	3.24		6.66%	6.49%	6.58%	7.88%	1.30%	7.55%	3.74%		3.74%		0.47
1970	5.98%	3.46%	92.15	5.51	3.19		-9.72%	-1.61%	6.53%	6.50%	-0.03%	4.78%	3.41%		3.41%		0.52
1971	5.46%	3.10%	102.09	5.57	3.16		1.15%	-0.74%	4.39%	5.89%	1.50%	4.57%	3.09%		3.09%		0.52
1972	5.23%	2.70%	118.05	6.17	3.19		10.76%	0.71%	3.84%	6.41%	2.57%	5.21%	2.72%		2.72%		0.42
1973	8.16%	3.70%	97.55	7.96	3.61		28.93%	13.24%	6.93%	6.90%	-0.03%	8.30%	4.30%		4.30%		0.62
1974	13.64%	5.43%	68.56	9.35	3.72		17.48%	3.14%	8.00%	7.40%	-0.60%	6.42%	5.59%		5.59%		0.76
1975	8.55%	4.14%	90.19	7.71	3.73		-17.54%	0.30%	5.80%	7.76%	1.96%	5.99%	4.13%		4.13%		0.53
1976	9.07%	3.93%	107.46	9.75	4.22		26.39%	13.10%	5.08%	6.81%	1.73%	8.19%	4.55%		4.55%		0.67
1977	11.43%	5.11%	95.1	10.87	4.86		11.53%	5.12%	7.78%	7.78%	2.66%	9.52%	5.92%		5.92%		0.76
1978	12.11%	5.39%	96.11	11.64	5.18		7.07%	6.60%	7.18%	9.15%	1.97%	8.48%	5.72%		5.72%		0.63
1979	13.48%	5.53%	107.94	14.55	5.97		25.01%	15.23%	10.38%	10.33%	-0.05%	11.70%	6.45%		6.45%		0.62
1980	11.04%	4.74%	135.76	14.99	6.44		3.01%	7.81%	11.24%	12.43%	1.19%	11.01%	5.03%		5.03%		0.40
1981	12.39%	5.57%	122.55	15.18	6.83		1.31%	6.08%	14.71%	13.98%	-0.73%	11.42%	5.73%		5.73%		0.41
1982	9.83%	4.93%	140.64	13.82	6.93		-8.95%	1.58%	10.54%	10.47%	-0.07%	7.96%	4.90%		4.90%		0.47
1983	8.06%	4.32%	164.93	13.29	7.12		-3.84%	2.76%	8.80%	11.80%	3.00%	9.09%	4.31%		4.31%		0.37
1984	10.07%	4.68%	167.24	16.84	7.83		26.69%	9.85%	9.85%	11.51%	1.66%	11.02%	5.11%		5.11%		0.44
1985	7.42%	3.88%	211.28	15.68	8.20		-6.91%	4.74%	7.72%	8.99%	1.27%	7.89%	4.03%	6.75%	3.84%		0.43
1986	5.96%	3.38%	242.17	14.43	8.19		-7.93%	-0.15%	6.16%	7.22%	1.06%	5.54%	3.36%	6.96%	3.58%		0.50
1987	6.49%	3.71%	247.08	16.04	9.17		11.10%	11.99%	5.47%	8.86%	3.39%	9.66%	4.18%	8.58%	3.99%		0.45
1988	8.20%	3.68%	277.72	24.12	10.22		50.42%	11.49%	6.35%	9.14%	2.79%	9.76%	4.12%	7.67%	3.77%		0.41
1989	6.80%	3.32%	353.4	24.32	11.73		0.83%	14.80%	8.37%	7.93%	-0.44%	9.58%	3.85%	7.46%	3.51%		0.44
1990	6.58%	3.74%	330.22	22.65	12.35		-6.87%	5.26%	7.81%	8.07%	0.26%	7.39%	3.92%	7.19%	3.89%		0.48
1991	4.58%	3.11%	417.09	19.30	12.97		-14.79%	5.03%	7.00%	6.70%	-0.30%	6.34%	3.27%	7.81%	3.48%		0.52
1992	4.16%	2.90%	435.71	20.87	12.64		8.13%	-2.59%	5.30%	6.68%	1.38%	4.67%	2.83%	9.83%	3.55%		0.53
1993	4.25%	2.72%	466.45	26.90	12.69		28.89%	0.41%	3.50%	5.79%	2.29%	4.73%	2.74%	8.00%	3.17%		0.55
1994	5.89%	2.91%	459.27	31.75	13.36		18.03%	5.34%	5.00%	7.82%	2.82%	7.23%	3.06%	7.17%	3.55%		0.45
1995	5.74%	2.30%	615.93	37.70	14.17		18.74%	6.00%	3.50%	5.57%	2.07%	5.65%	2.44%	6.50%	3.29%		0.59
1996	4.83%	2.01%	740.74	40.63	14.89		7.77%	5.10%	5.00%	6.41%	1.41%	6.13%	2.11%	7.92%	3.20%		0.50
1997	4.08%	1.60%	970.43	44.09	15.52		8.52%	4.25%	5.35%	5.74%	0.39%	5.45%	1.67%	8.00%	2.73%		0.48
1998	3.11%	1.32%	1229.23	44.27	16.20		0.41%	4.37%	4.33%	4.65%	0.32%	4.60%	1.38%	7.20%	2.26%		0.49
1999	3.07%	1.14%	1469.25	51.68	16.71		16.74%	3.16%	5.37%	6.44%	1.07%	5.75%	1.20%	12.50%	2.05%		0.32
2000	3.94%	1.23%	1320.28	56.13	16.27		8.61%	-2.65%	5.73%	5.11%	-0.62%	3.71%	1.65%	12.00%	2.87%		0.56
2001	3.85%	1.37%	1148.09	38.85	15.74	30.08	-30.79%	-3.24%	1.80%	5.05%	3.25%	3.56%	1.73%	10.30%	3.62%	2.91%	0.72
2002	5.23%	1.83%	879.82	46.04	16.08	29.83	18.51%	2.15%	1.20%	3.81%	2.61%	3.57%	2.29%	8.00%	4.10%	4.73%	1.08
2003	4.87%	1.61%	1111.91	54.69	17.88	31.58	18.79%	11.19%	1.00%	4.25%	3.25%	5.35%	2.12%	11.00%	3.69%	4.74%	0.87
2004	5.58%	1.60%	1211.92	67.68	19.407	40.60	23.75%	8.54%	2.18%	4.22%	2.04%	4.90%	2.02%	8.50%	3.65%	4.86%	0.86
2005	5.47%	1.79%	1248.29	76.45	22.38	61.17	12.96%	15.32%	4.31%	4.39%	0.08%	6.16%	2.20%	8.00%	4.08%	5.22%	0.93
2006	6.18%	1.77%	1418.3	87.72	25.05	73.16	14.74%	11.93%	4.88%	4.70%	-0.18%	5.93%	1.97%	12.50%	4.16%	6.12%	0.89
2007	5.62%	1.89%	1468.36	82.54	27.73	95.36	-5.91%	10.70%	3.31%	4.02%	0.71%	5.03%	2.06%	5.00%	4.37%	4.59%	1.09
2008	7.24%	3.11%	903.25	65.39	28.05	67.52	-20.78%	1.15%	1.59%	2.21%	0.62%	2.11%	4.05%	4.00%	6.43%	6.92%	2.91
2009	5.35%	2.00%	1115.10	59.65	22.31	37.43	-8.78%	-20.46%	0.14%	3.84%	3.70%	0.28%	2.60%	7.20%	4.36%	4.64%	1.14
2010	6.65%	1.84%	1257.64	83.66	23.12	55.53	40.25%	3.63%	0.13%	3.29%	3.16%	3.33%	2.24%	6.95%	5.20%	6.09%	1.58
2011	7.72%	2.07%	1257.60	97.05	26.02	71.28	16.01%	12.54%	0.03%	1.88%	1.85%	2.75%	2.71%	7.18%	6.01%	8.34%	3.20
2012	7.18%	2.13%	1426.19	102.47	30.44	75.90	5.58%	16.99%	0.05%	1.76%	1.71%	2.93%	2.47%	5.27%	5.78%	7.30%	3.28
2013	5.81%	1.96%	1488.36	107.45	36.28	88.13	4.86%	19.19%	0.07%	3.04%	2.97%	5.01%	2.03%	4.28%	4.96%	4.99%	1.63
2014	5.49%	1.92%	2058.90	113.01	39.44	101.98	5.17%	8.71%	0.05%	2.17%	2.12%	2.77%	2.24%	5.58%	5.78%	5.48%	2.66
2015	5.20%	2.11%	2043.94	106.32	43.16	106.10	-5.92%	9.43%	0.21%	2.27%	2.06%	2.96%	2.46%	5.51%	6.12%	5.16%	2.70
2016	4.86%	2.01%	2238.83	108.86	45.03	108.67	2.39%	4.33%	0.51%	2.45%	1.94%	2.64%	2.41%	5.54%	5.69%	4.50%	2.32
2017	4.67%	1.86%	2673.61	124.94	49.73	108.28	14.77%	10.44%	1.39%	2.41%	1.02%	3.22%	2.36%	7.05%	5.08%	4.99%	2.11