

**BEFORE THE WASHINGTON
UTILITIES & TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Complainant,

v.

CASCADE NATURAL GAS CORPORATION,

Respondent.

DOCKET UG-200568

DR. J. RANDALL WOOLRIDGE ON BEHALF OF PUBLIC COUNSEL

EXHIBIT JRW-9

Capital Asset Pricing Model (CAPM) Study

November 19, 2020

Exhibit JRW-9

**Cascade Natural Gas Corporation
Capital Asset Pricing Model**

Gas Proxy Group

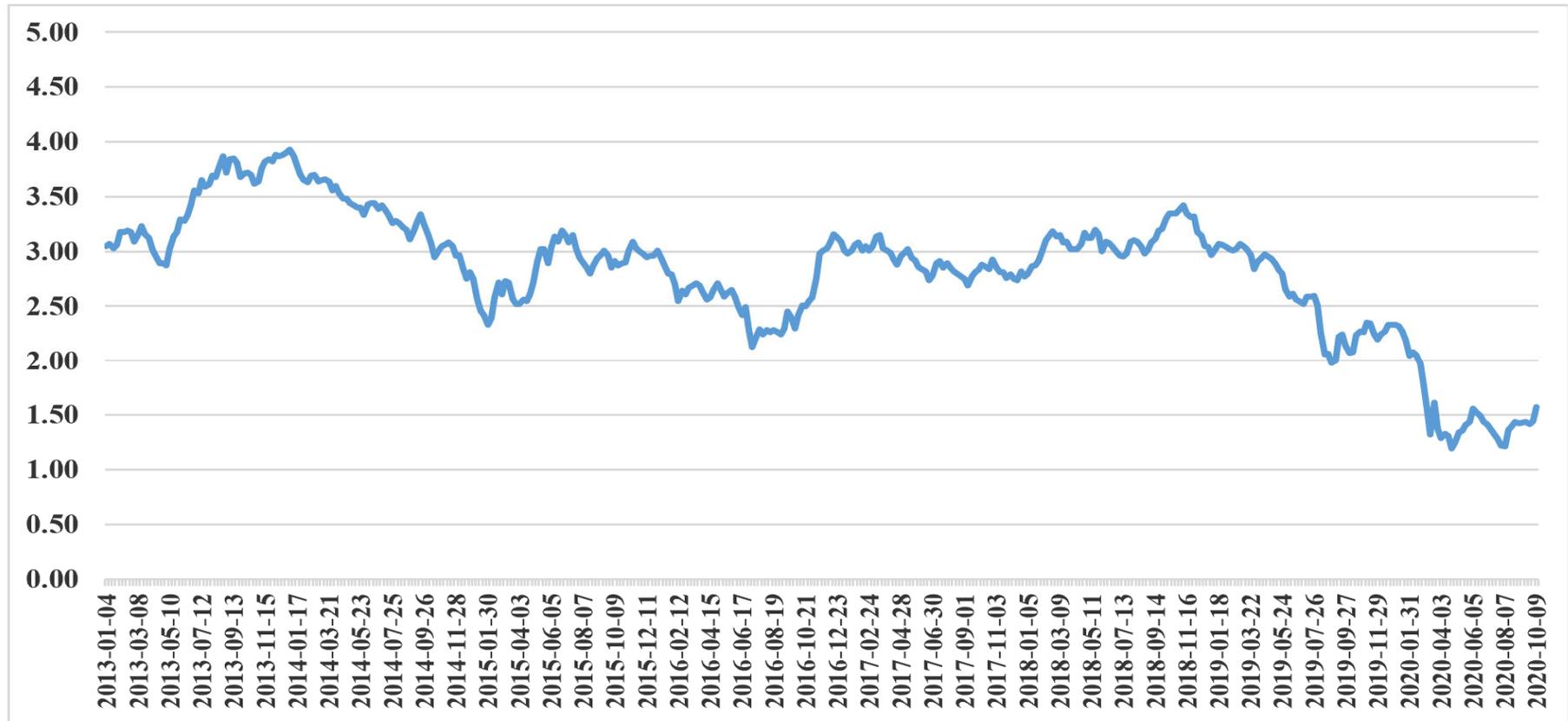
Risk-Free Interest Rate	2.50%
Beta*	0.80
<u>Ex Ante Equity Risk Premium**</u>	<u>6.00%</u>
CAPM Cost of Equity	7.3%

* See page 3 of Exhibit JRW-9

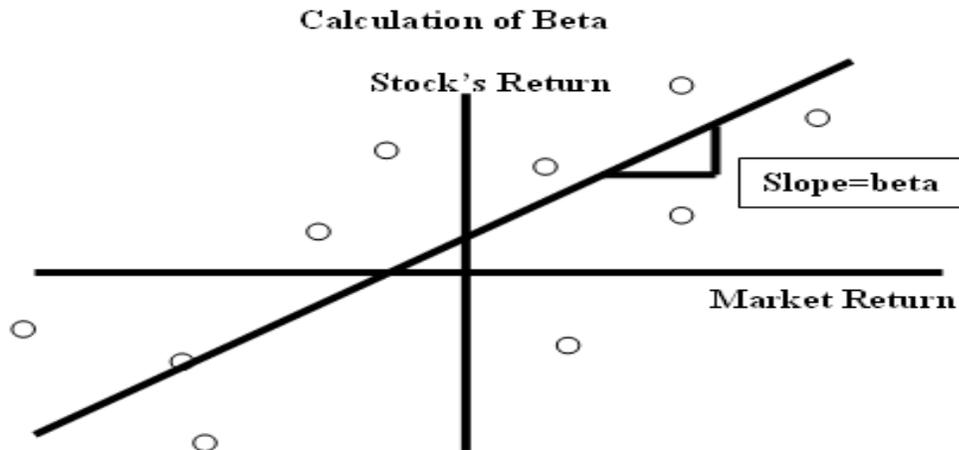
** See pages 5 and 6 of Exhibit JRW-9

Exhibit JRW-9

Thirty-Year U.S. Treasury Yields
2013-2020



Source: Federal Reserve Bank of St. Louis, FRED Database.



Gas Proxy Group

Atmos Energy Company (NYSE-ATO)	0.80
Chesapeake Utilities (NYSE-CPK)	0.75
New Jersey Resources Corp. (NYSE-NJR)	0.90
Nisource Inc (NYSE-NI)	0.85
Northwest Natural Gas Co. (NYSE-NWN)	0.80
ONE Gas, Inc. (NYSE-OGS)	0.80
South Jersey Industries, Inc. (NYSE-SJI)	1.00
Southwest Gas Company (NYSE-SWX)	0.90
Spire (NYSE-SR)	0.80
Mean	0.84
Median	0.80

Data Source: *Value Line Investment Survey*, 2020.

**Exhibit JRW-9
 Risk Premium Approaches**

	Historical Ex Post Returns	Surveys	Expected Return Models and Market Data
Means of Assessing The Market Risk Premium	Historical Average Stock Minus Bond Returns	Surveys of CFOs, Financial Forecasters, Companies, Analysts on Expected Returns and Market Risk Premiums	Use Market Prices and Market Fundamentals (such as Growth Rates) to Compute Expected Returns and Market Risk Premiums
Problems/Debated Issues	Time Variation in Required Returns, Measurement and Time Period Issues, and Biases such as Market and Company Survivorship Bias	Questions Regarding Survey Histories, Responses, and Representativeness Surveys may be Subject to Biases, such as Extrapolation	Assumptions Regarding Expectations, Especially Growth

Source: Adapted from Antti Ilmanen, "Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003).

Exhibit JRW-9

Capital Asset Pricing Model
Market Risk Premium

Summary of 2010-20 Equity Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range		Midpoint of Range		Average
						Low	High	Mean	Mean	
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic					6.00%
					Geometric					4.40%
	Damodaran	2020	1928-2019	Historical Stock Returns - Bond Returns	Arithmetic					6.43%
					Geometric					4.83%
	Dimson, Marsh, Staunton_Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic					5.50%
					Geometric					
	Median									5.43%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components						5.50%
	Duff & Phelps	2020	Projection	Normalized with 3.5% Long-Term Treasury Yield						6.00%
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate						5.50%
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors						6.00%
	Market Risk Premia	2020	Projection	Fundamental Economic and Market Factors						5.24%
	KPMG	2020	Projection	Fundamental Economic and Market Factors						6.75%
	Damodaran -7-20	2020	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)						5.65%
	Median									5.65%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms						5.70%
	Survey of Financial Forecasters	2020	10-Year Projection	About 20 Financial Forecasters						3.36%
	Duke - CFO Magazine Survey	2020	10-Year Projection	Approximately 200 CFOs						4.05%
	Fernandez - Academics, Analysts, and Companies	2020	Long-Term	Survey of Academics, Analysts, and Companies						5.60%
	Median									4.83%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric					4.00%
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric					3.00%
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Median									4.06%
Mean										4.99%
Median										5.13%

Duff & Phelps Risk-Free Interest Rates and Equity Risk Premium Estimates



June 30, 2020

For additional information, please visit
<https://www.duffandphelps.com/insights/publications/cost-of-capital>

Table: Equity Risk Premium & Risk-free Rates

**Duff & Phelps Recommended
 U.S. Equity Risk Premium (ERP) and
 Corresponding Risk-free Rates (R_f);
 January 2008–Present**

Date	Risk-free Rate (R_f)	R_f (%)	Duff & Phelps Recommended ERP (%)	What Changed
Current Guidance:				
June 30, 2020 – UNTIL FURTHER NOTICE	Normalized 20-year U.S. Treasury yield	2.50	6.00	Rf
March 25, 2020 – June 29, 2020	Normalized 20-year U.S. Treasury yield	3.00	6.00	ERP
December 19, 2019 – March 24, 2020	Normalized 20-year U.S. Treasury yield	3.00	5.00	ERP
September 30, 2019 – December 18, 2019	Normalized 20-year U.S. Treasury yield	3.00	5.50	R_f
December 31, 2018 – September 29, 2019	Normalized 20-year U.S. Treasury yield	3.50	5.50	ERP
September 5, 2017 – December 30, 2018	Normalized 20-year U.S. Treasury yield	3.50	5.00	ERP
November 15, 2016 – September 4, 2017	Normalized 20-year U.S. Treasury yield	3.50	5.50	R_f
January 31, 2016 – November 14, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2015	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2014	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.00	
February 28, 2013 – January 30, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.00	ERP
December 31, 2012	Normalized 20-year U.S. Treasury yield	4.00	5.50	
January 15, 2012 – February 27, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	6.00	
September 30, 2011 – January 14, 2012	Normalized 20-year U.S. Treasury yield	4.00	6.00	ERP
July 1, 2011 – September 29, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
June 1, 2011 – June 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
May 1, 2011 – May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2010 – April 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
June 1, 2010 – November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2009	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2009 – May 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	ERP
June 1, 2009 – November 30, 2009	Spot 20-year U.S. Treasury yield	Spot	6.00	R_f
December 31, 2008	Normalized 20-year U.S. Treasury yield	4.50	6.00	
November 1, 2008 – May 31, 2009	Normalized 20-year U.S. Treasury yield	4.50	6.00	R_f
October 27, 2008 – October 31, 2008	Spot 20-year U.S. Treasury yield	Spot	6.00	ERP
January 1, 2008 – October 26, 2008	Spot 20-year U.S. Treasury yield	Spot	5.00	Initialized

Normalized in this context means that in months where the risk-free rate is deemed to be abnormally low, a proxy for a longer-term sustainable risk-free rate is used.

To learn more about cost of capital issues, and to ensure that you are using the most recent Duff & Phelps Recommended ERP, visit www.duffandphelps.com/insights/publications/cost-of-capital. This and other related resources can also be found in the online Cost of Capital Navigator platform. To learn more about the Cost of Capital Navigator and other Duff & Phelps valuation and industry data products, visit www.DPCostofCapital.com.