

**BEFORE THE WASHINGTON
UTILITIES & TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,

Complainant,

v.

PUGET SOUND ENERGY

Respondent.

DOCKETS UE-220066, UG-220067, and UG-210918 (*Consolidated*)

**J. RANDALL WOOLRIDGE
ON BEHALF OF THE
WASHINGTON STATE OFFICE OF THE ATTORNEY GENERAL
PUBLIC COUNSEL UNIT**

EXHIBIT JRW-10

Capital Asset Pricing Model Study

July 28, 2022

Exhibit JRW-10

**Puget Sound Energy
Capital Asset Pricing Model**

**Panel A
Electric Proxy Group**

Risk-Free Interest Rate	3.00%
Beta*	0.85
<u>Ex Ante Market Risk Premium**</u>	<u>5.50%</u>
CAPM Cost of Equity	7.7%

* See page 3 of Exhibit JRW-10

** See pages 5 and 6 of Exhibit JRW-10

**Panel B
Bulkley Proxy Group**

Risk-Free Interest Rate	3.00%
Beta*	0.85
<u>Ex Ante Market Risk Premium**</u>	<u>5.50%</u>
CAPM Cost of Equity	7.7%

* See page 3 of Exhibit JRW-10

** See pages 5 and 6 of Exhibit JRW-10

**Panel C
Gas Proxy Group**

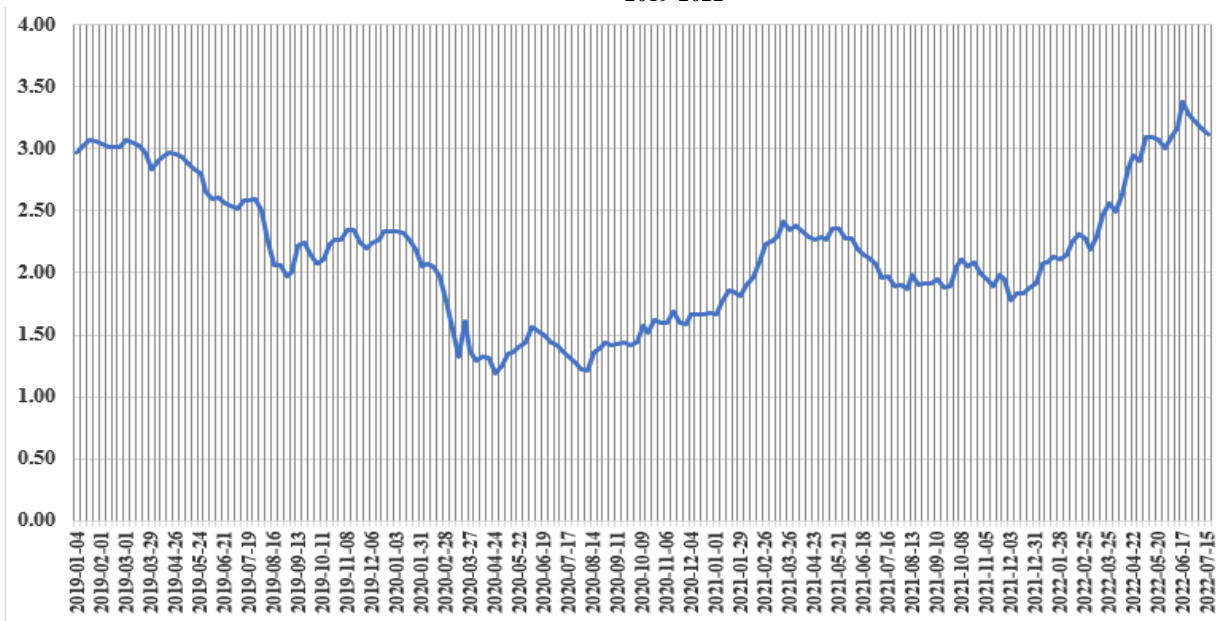
Risk-Free Interest Rate	3.00%
Beta*	0.80
<u>Ex Ante Market Risk Premium**</u>	<u>5.50%</u>
CAPM Cost of Equity	7.4%

* See page 3 of Exhibit JRW-10

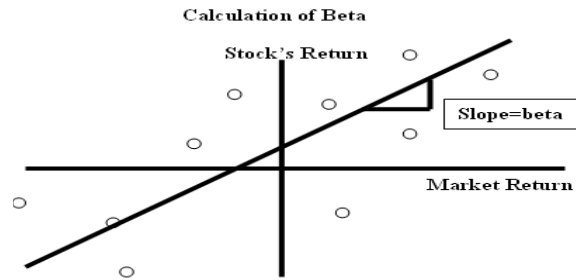
** See pages 5 and 6 of Exhibit JRW-10

Exhibit JRW-10

Thirty-Year U.S. Treasury Yields
2019-2022



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



Company	Beta
ALLETE, Inc. (NYSE-ALE)	0.90
Alliant Energy Corporation (NYSE-LNT)	0.80
Ameren Corporation (NYSE-AEE)	0.80
American Electric Power Co. (NYSE-AEP)	0.75
Avista Corporation (NYSE-AVA)	0.95
CMS Energy Corporation (NYSE-CMS)	0.75
Consolidated Edison, Inc. (NYSE-ED)	0.75
Dominion Energy Inc. (NYSE-D)	0.80
Duke Energy Corporation (NYSE-DUK)	0.85
Edison International (NYSE-EIX)	0.95
Entergy Corporation (NYSE-ETR)	0.90
Evergy, Inc. (NYSE-EVRG)	0.90
Eversource Energy (NYSE-ES)	0.90
Hawaiian Electric Industries (NYSE-HE)	0.85
IDACORP, Inc. (NYSE-IDA)	0.80
MGE Energy, Inc. (NYSE-MGEE)	0.70
NextEra Energy, Inc. (NYSE-NEE)	0.90
NorthWestern Corporation (NYSE-NWE)	0.95
OGE Energy Corp. (NYSE-OGGE)	1.00
Pinnacle West Capital Corp. (NYSE-PNW)	0.90
Portland General Electric Company (NYSE-POR)	0.85
Southern Company (NYSE-SO)	0.90
WEC Energy Group (NYSE-WEC)	0.80
Xcel Energy Inc. (NYSE-XEL)	0.80
Mean	0.85
Median	0.85

Data Source: Value Line Investment Survey, 2022.

**Panel B
 Bulkley Proxy Group**

Company	Beta
Alliant Energy Corporation (NYSE-LNT)	0.80
Ameren Corporation (NYSE-AEE)	0.80
Avista Corporation (NYSE-AVA)	0.95
Black Hills Corporation (NYSE-BKH)	1.00
CMS Energy Corporation (NYSE-CMS)	0.75
Duke Energy Corporation (NYSE-DUK)	0.85
MGE Energy, Inc. (NYSE-MGEE)	0.70
NextEra Energy, Inc. (NYSE-NEE)	0.90
NiSource Inc (NYSE-NI)	0.85
NorthWestern Corporation (NYSE-NWE)	0.95
Southern Company (NYSE-SO)	0.90
WEC Energy Group (NYSE-WEC)	0.80
Xcel Energy Inc. (NYSE-XEL)	0.80
Mean	0.85
Median	0.85

Data Source: Value Line Investment Survey, 2022.

**Panel C
 Gas Proxy Group**

Company	Beta
Atmos Energy Company (NYSE-ATO)	0.80
Chesapeake Utilities (NYSE-CPK)	0.75
New Jersey Resources Corp. (NYSE-NJR)	0.95
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	0.85
Median	0.80

Data Source: Value Line Investment Survey, 2022.

Exhibit JRW-10
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).

CAPM Study

Market Risk Premium Results - 2010-2022

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range		Midpoint of Range	Mean	Average
						Low	High			
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
	Damodaran	2022	1928-2021	Historical Stock Returns - Bond Returns	Geometric				4.40%	
	Dimson, Marsh, Staunton _Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				6.71%	
					Geometric				5.17%	
	Median				Arithmetic				5.50%	
					Geometric					5.56%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2022	Projection	Normalized with 2.5% Long-Term Treasury Yield					5.50%	
	Mschewski - 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	2022	Projection	Fundamental Economic and Market Factors					3.47%	
	KPMG	2022	Projection	Fundamental Economic and Market Factors					5.00%	
	Damodaran -3-1-22	2022	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					5.37%	
	Median									5.50%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2022	10-Year Projection	About 20 Financial Forecasters					3.88%	
	Duke - CFO Magazine Survey	2020	10-Year Projection	Approximately 200 CFOs					4.05%	
	Fernandez - Academics, Analysts, and Companies	2021	Long-Term	Survey of Academics, Analysts, and Companies					5.50%	
	Median									4.78%
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										4.97%
Median										5.14%

CAPM Study

Duff & Phelps Equity Risk Premium Estimates



Table: U.S. Equity Risk Premium & Risk-free Rates

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

For additional information, please visit
kroll.com/cost-of-capital-resource-center

Date	Risk-free Rate (R_f)	R_f (%)	Kroll Recommended U.S. ERP (%)	What Changed
Current Guidance:				
April 7, 2022 – UNTIL FURTHER NOTICE	Normalized 20-year U.S. Treasury yield	3.00	5.50	R_f
December 7, 2020 – April 6, 2022	Normalized 20-year U.S. Treasury yield	2.50	5.50	ERP
June 30, 2020 – December 6, 2020	Normalized 20-year U.S. Treasury yield	2.50	6.00	R_f
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 Kroll Recommended U.S. ERP, visit kroll.com/cost-of-capital-resource-center.

Source: <https://www.kroll.com/-/media/cost-of-capital/kroll-us-erp-rf-table-2022.pdf>