

**BEFORE THE WASHINGTON  
UTILITIES & TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP D/B/A PACIFIC POWER & LIGHT COMPANY,

Respondent.

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DOCKETS UE-230172

**J. RANDALL WOOLRDIGE, PH.D.  
ON BEHALF OF THE  
WASHINGTON STATE OFFICE OF THE ATTORNEY GENERAL  
PUBLIC COUNSEL UNIT**

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**EXHIBIT JRW-8**

Capital Asset Pricing Model (CAPM) Study

September 14, 2023

**Exhibit JRW-8**

**PacifiCorp  
Capital Asset Pricing Model**

**Panel A  
Electric Proxy Group**

<b>Risk-Free Interest Rate</b>	<b>4.30%</b>
<b>Beta*</b>	<b>0.88</b>
<b><u>Ex Ante Market Risk Premium**</u></b>	<b><u>5.50%</u></b>
<b>CAPM Cost of Equity</b>	<b>9.15%</b>

\* See page 3 of Exhibit JRW-8

\*\* See pages 5 and 6 of Exhibit JRW-8

**Panel B  
Bulkley Proxy Group**

<b>Risk-Free Interest Rate</b>	<b>4.30%</b>
<b>Beta*</b>	<b>0.90</b>
<b><u>Ex Ante Market Risk Premium**</u></b>	<b><u>5.50%</u></b>
<b>CAPM Cost of Equity</b>	<b>9.25%</b>

\* See page 3 of Exhibit JRW-8

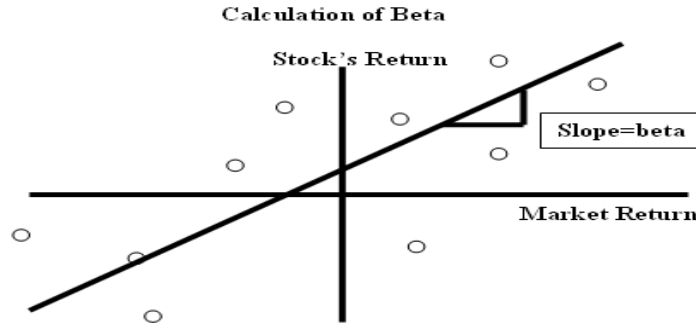
\*\* See pages 5 and 6 of Exhibit JRW-8

Exhibit JRW-8

Thirty-Year U.S. Treasury Yields  
2010-2023



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



Company	Beta
ALLETE, Inc. (NYSE-ALE)	0.90
Alliant Energy Corporation (NYSE-LNT)	0.85
Ameren Corporation (NYSE-AEE)	0.85
American Electric Power Co. (NYSE-AEP)	0.75
Avista Corporation (NYSE-AVA)	0.90
CMS Energy Corporation (NYSE-CMS)	0.80
Consolidated Edison, Inc. (NYSE-ED)	0.80
Dominion Energy Inc. (NYSE-D)	0.85
Duke Energy Corporation (NYSE-DUK)	0.85
Edison International (NYSE-EIX)	1.00
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)	0.95
NorthWestern Corporation (NYSE-NWE)	0.95
OGE Energy Corp. (NYSE-OGE)	1.00
Pinnacle West Capital Corp. (NYSE-PNW)	0.90
Portland General Electric Company (NYSE-POR)	0.90
Southern Company (NYSE-SO)	0.90
WEC Energy Group (NYSE-WEC)	0.80
Xcel Energy Inc. (NYSE-XEL)	0.85
Mean	0.87
Median	0.88

Data Source: *Value Line Investment Survey*, 2023.

**Panel B  
 Bulkley Proxy Group**

Company	Beta
ALLETE, Inc. (NYSE-ALE)	0.90
Alliant Energy Corporation (NYSE-LNT)	0.85
Ameren Corporation (NYSE-AEE)	0.85
American Electric Power Co. (NYSE-AEP)	0.75
Avista Corporation (NYSE-AVA)	0.90
CMS Energy Corporation (NYSE-CMS)	0.80
Duke Energy Corporation (NYSE-DUK)	0.85
Entergy Corporation (NYSE-ETR)	0.90
Evergy, Inc. (NYSE-EVRG)	0.90
IDACORP, Inc. (NYSE-IDA)	0.80
NextEra Energy, Inc. (NYSE-NEE)	0.95
NorthWestern Corporation (NYSE-NWE)	0.95
OGE Energy Corp. (NYSE-OGE)	1.00
Otter Tail Corp. (NYSE-OTTR)	0.85
Portland General Electric Company (NYSE-POR)	0.90
Southern Company (NYSE-SO)	0.90
Xcel Energy Inc. (NYSE-XEL)	0.85
Mean	0.88
Median	0.90

Data Source: *Value Line Investment Survey*, 2023.

**Exhibit JRW-8**  
**Risk Premium Approaches**

	<b>Historical Ex Post Returns</b>	<b>Surveys</b>	<b>Expected Return Models and Market Data</b>
<b>Means of Assessing The Market Risk Premium</b>	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
<b>Problems/Debated Issues</b>	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 - 2010-2023

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range		Midpoint of Range	Mean	Average
						Low	High			
<b>Historical Risk Premium</b>										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2023	1928-2022	Historical Stock Returns - Bond Returns	Arithmetic				6.64%	
					Geometric				5.06%	
	Dimson, Marsh, Staunton _ Credit Suisse Report	2023	1900-2022	Historical Stock Returns - Bond Returns	Arithmetic				6.40%	
					Geometric				4.60%	
	Median									5.52%
<b>Ex Ante Models (Puzzle Research)</b>										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Kroll (Duff & Phelps)	2023	Projection	Normalized with 3.5% 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%	
	JP Morgan Asset Management	2023	Projection	Equity Return of 7.90% and Long-Term Bond of 3.50%					4.40%	
	Market Risk Premia - 6-1-23	2023	Projection	Fundamental Economic and Market Factors					3.32%	
	KPMG	2023	Projection	Fundamental Economic and Market Factors					5.25%	
	Damodaran -8-1-23	2023	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					4.41%	
	Median									5.38%
<b>Surveys</b>										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2023	10-Year Projection	Equity Return of 7.50% and Long-Term Bond of 3.35%					3.15%	
	Duke - CFO Magazine Survey	2023	10-Year Projection	Approximately 200 CFOs Expected S&P 500 Return of 8.4% and Risk-Free Rate of 3.5%					4.90%	
	Fernandez - Academics, Analysts, and Companies	2023	Long-Term	Survey of Academics, Analysts, and Companies					5.70%	
	Median									5.30%
<b>Building Block</b>										
	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%
<b>Mean</b>										5.06%
<b>Median</b>										5.34%

CAPM Study

Kroll (Duff & Phelps) Equity Risk Premium Estimates



**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](http://kroll.com/cost-of-capital-resource-center)

Date	Risk-free Rate ( $R_f$ )	$R_f$ (%)	Kroll Recommended U.S. ERP (%)	What Changed
<b>Current Guidance:</b>				
June 8, 2023 – UNTIL FURTHER NOTICE*	Normalized 20-year U.S. Treasury yield*	3.50*	5.50	ERP
October 18, 2022 – June 7, 2023	Normalized 20-year U.S. Treasury yield	3.50	6.00	ERP
June 16, 2022 – October 17, 2022	Normalized 20-year U.S. Treasury yield	3.50	5.50	Rf
April 7, 2022 – June 15, 2022	Normalized 20-year U.S. Treasury yield	3.00	5.50	Rf
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	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

\* We recommend using the spot 20-year U.S. Treasury yield as the proxy for the risk-free rate, if the prevailing yield as of the valuation date is higher than our recommended U.S. normalized risk-free rate of 3.5%. This guidance is effective when developing USD-denominated discount rates as of June 16, 2022 and thereafter.

\*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.