BEFORE THE WASHINGTON

UTILITIES & TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,

Complainant,

v.

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

Respondent.

DOCKETS UE-230172

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

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

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

* See page 3 of Exhibit JRW-8

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

Panel B
Bulkley Proxy Group

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

* See page 3 of Exhibit JRW-8

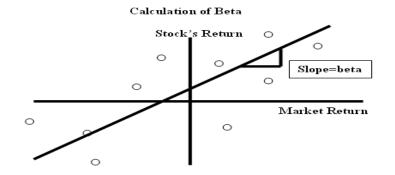
** See pages 5 and 6 of Exhibit JRW-8

Exhibit JRW-8



Thirty-Year U.S. Treasury Yields

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

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.

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

Exhibit JRW-8 Risk Premium Approaches

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

CAPM Study

ategory	Category	Study Authors	Publication Date		Premium - 2000-2023 Methodology	Return Measure	R Low	ange High	Midpoint of Range	Mean	Media
	Historical Risk		Date	Of Study	wiethodology	wieasure	LUW	mgn	of Kange	wican	
storicar Kis	i i i i stori i car i ci se	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
		1000000	2010	1920 2015	Thistorical Stock Texanis Bona Texanic	Geometric				4.40%	
		Damodaran	2023	1928-2022	Historical Stock Returns - Bond Returns	Arithmetic				6.64%	
		Danodaran	2025	1920=2022	Thistorical Stock Returns - Bond Returns	Geometric				5.06%	
		Dimson, Marsh, Staunton Credit Suisse Report	2023	1900-2022	Historical Stock Returns - Bond Returns	Arithmetic				6.40%	
		Dinison, Marsii, Staunion _Credit Suisse Report	2023	1900-2022	Historical Stock Returns - Bond Returns	Geometric				4.60%	
		Bate	2008	1900-2007	Historical Stock Returns - Bond Returns					4.60%	
		Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4.50%	
		01.11	2007	1026 2005	Weillouthe heat					7.000/	
		Shiller	2006	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				7.00%	
						Geometric				5.50%	
		Siegel	2005	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				6.10%	
						Geometric				4.60%	
		Dimson, Marsh, and Staunton	2006	1900-2005	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
		Goyal & Welch	2006	1872-2004	Historical Stock Returns - Bond Returns					4.77%	
		Median									-
Ante Mode	Ex Ante Mode	ls (Puzzle Research)									
		Claus Thomas	2001	1985-1998	Abnormal Earnings Model					3.00%	
		Arnott and Bernstein	2002	1810-2001	Fundamentals - Div Yld + Growth					2.40%	
		Constantinides	2002	1872-2000	Historical Returns & Fundamentals - P/D & P/E					6.90%	
		Cornell	1999	1926-1997	Historical Returns & Fundamental GDP/Earnings		3.50%	5.50%	4.50%	4.50%	
		Easton, Taylor, et al	2002	1920-1997	Residual Income Mode		5.5070	5.5070	4.5070	5.30%	
		Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2.55%	4.32%		3.44%	
							2.33%	4.52%			
		Harris & Marston	2001	1982-1998	Fundamental DCF with Analysts' EPS Growth					7.14%	
		McKinsey	2002	1962-2002	Fundamental (P/E, D/P, & Earnings Growth)		3.50%	4.00%		3.75%	
		Siegel	2005	1802-2001	Historical Earnings Yield					2.50%	
		Grabowski	2006	1926-2005	Historical and Projected		3.50%	6.00%	4.75%	4.75%	
		Maheu & McCurdy	2006	1885-2003	Historical Excess Returns, Structural Breaks,		4.02%	5.10%	4.56%	4.56%	
		Bostock	2004	1960-2002	Bond Yields, Credit Risk, and Income Volatility		3.90%	1.30%	2.60%	2.60%	
		Bakshi & Chen	2005	1982-1998	Fundamentals - Interest Rates					7.31%	
		Donaldson, Kamstra, & Kramer	2006	1952-2004	Fundamental, Dividend yld., Returns,, & Volatility		3.00%	4.00%	3.50%	3.50%	
		Campbell	2008	1982-2007	Historical & Projections (D/P & Earnings Growth)		4.10%	5.40%		4.75%	
		Best & Byrne	2001	Projection	Fundamentals - Div Yld + Growth					2.00%	
		Fernandez	2007	Projection	Required Equity Risk Premium					4.00%	
		DeLong & Magin	2008	Projection	Earnings Yield - TIPS					3.22%	
		Siegel - Rethink ERP	2008	Projection	Real Stock Returns and Components					5.50%	
			2011							5.50%	
		Kroll (Duff & Phelps)		Projection	Normalized with 3.5% Long-Term Treasury Yiek	D .					
		Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Tre	asury Rat				5.50%	
		American Appraisal Quarterly ERF	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 3.5	0%				4.40%	
		Market Risk Premia - 6-1-23	2023	Projection	Fundamental Economic and Market Factor:					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 m	onth, with	adjusted pa	ayou	4.41%	
		John Campbell	2001	1860-2000	Historical & Projections (D/P & Earnings Growth)	Arithmetic		4.00%	3.50%	3.50%	
		•		Projected for 75 Year		Geometric	1.50%	2.50%	2.00%	2.00%	
		Peter Diamond	2001		rs Fundamentals (D/P, GDP Growth)		3.00%	4.80%	3.90%	3.90%	
		John Shoven	2001		rs Fundamentals (D/P, P/E, GDP Growth)		3.00%	3.50%	3.25%	3.25%	
		Median	2001	rejected for /5 Tea	ar undumentalis (D/1,1/L, OD1 Olowill)		5.0070	5.5070	0.220	5.2570	4
rvevs	Surveys										
reys	Surveys	New York Fed	2015	Five-Year	Courses of Well Street Firms					5.70%	
			2015		Survey of Wall Street Firms	50/					
		Survey of Financial Forecasters			Equity Return of 7.50% and Long-Term Bond of 3.3		0.1.1.12.	D.462.5	07	3.15%	
		Duke - CFO Magazine Survey	2023		Approximately 200 CFOs Expected S&P 500 Return	of 8.4% and	KISK-Free	Rate of 3.5	74	4.90%	
		Fernandez - Academics, Analysts, and Companie	2023	Long-Term	Survey of Academics, Analysts, and Companie					5.70%	
		Median									:
ilding Bloc	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					4.00%	
		Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
		Grinold, Kroner, Siegel - Rethink ERF	2011	Projection	Current Supply Model (D/P & Earnings Growth	Arithmetic			4.63%	4.12%	
		,one, oreger recursite Ltd	2011	rojection		Geometric			3.60%		
		Median				Geometric			5.0070		
an	Mean										4
an dian											4
	Median										

CAPM Study

		Publication	Time Period		Return	Range	Midpoint		Avera
Category	Study Authors	Date	Of Study	Methodology		Low High	of Range		
listorical Risk P	remium		r.	Cr.		U	0		
	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
x Ante Models (Puzzle Research)	2011	Destantion	Real Stock Returns and Components				5.50%	
	Siegel - Rethink ERP Kroll (Duff & Phelps)	2011	Projection	Normalized with 3.5% Long-Term Treasury Yield				5.50% 5.50%	
	Mschchowski - VL - 2014		Projection		D .				
		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 (Trail	ing 12 month, with adju	sted payout)		4.41%	
	Median								5
urveys									
	New York Fed	2015	Five-Year	Survey of Wall Street Firms				5.70%	
	Survey of Financial Forecasters	2023		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 Companie	2023	Long-Term	Survey of Academics, Analysts, and Companies				5.70%	
	Median								4
uilding Block									
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic		6.22%	5.21%	
			2	,	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%	
			11,00000		Geometric		3.60%		
	Median						2.5070		4
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CAPM Study

Kroll (Duff & Phelps) Equity Risk Premium Estimates

KROLL

For additional information, please visit

kroll.com/cost-of-capital-resource-center

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

Date	Risk-free Rate (Rr)	R _f (%)	Kroll Recommended U.S. ERP (%)	What Changed
Current Guidance:				
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,
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	Rt
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	Rt
June 1, 2011 - June 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R,
May 1, 2011 - May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R,
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,
June 1, 2010 - November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00	5.50	R ₁
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,
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.

Source: https://www.kroll.com/-/media/cost-of-capital/kroll-us-erp-rf-table-2023.pdf