Capital Structure Ratios and Debt Cost Rate

Panel A - SWEPCO's Proposed Capital Structure and Debt Cost Rates

	Percent of Total	Cost
Long-Term Debt	50.63%	4.18%
Common Equity	49.37%	
Total Capital	100.00%	

Panel B - SWEPCO AND AEP Average Quarterly Capital Structure Ratios Including Short-Term Debt

SWEPCO	Average
Short-Term Debt	5.38%
Long-Term Debt	48.82%
Common Equity	45.80%
Total Capital	100.00%
AEP	Average
Short-Term Debt	9.60%
Long-Term Debt	50.22%
Common Equity	40.18%
Total Capital	100.00%

Panel C - SWEPCO AND AEP Average Quarterly Capital Structure Ratios without Short-Term Debt

SWEPCO	Average
Long-Term Debt	51.54%
Common Equity	48.46%
Total Capital	100.00%
AEP	Average
Long-Term Debt	55.53%
Common Equity	44.47%
Total Capital	100.00%

Panel D - CARD's Proposed Capital Structure Ratios and Debt Cost Rates

Capital Source	Capitalization Ratios	Cost
Long-Term Debt	50.63%	4.18%
Common Equity	49.37%	
Total Capitalization	100.00%	

SWEPCO and AEP Average Quarterly Capital Structure Ratios
Quarterly - 2018-2020

SWEPCO	*2018 FQ1*	*2018 FQ2*	*2018 FQ3*	*2018 FQ4*	*2019 FQ1*	*2019 FQ2*	*2019 FQ3*	*2019 FQ4*	*2020 FQ1*	*2020 FQ2*	*2020 FQ3*	*2020 FQ4*	*Average*
Short-Term Debt	12.87%	12.37%	8.91%	1.37%	1.88%	3.77%	2.67%	4.10%	5.75%	3.38%	2.37%	5.14%	5.38%
Long-Term Debt	42.33%	42.39%	48.79%	53.13%	53.04%	51.10%	50.56%	49.61%	48.19%	49.81%	49.47%	47.36%	48.82%
Common Equity	44.79%	45.24%	42.30%	45.49%	45.08%	45.13%	46.77%	46.28%	46.05%	46.82%	48.16%	47.49%	45.80%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

AEP	*2018 FQ1*	*2018 FQ2*	*2018 FQ3*	*2018 FQ4*	*2019 FQ1*	*2019 FQ2*	*2019 FQ3*	*2019 FQ4*	*2020 FQ1*	*2020 FQ2*	*2020 FQ3*	*2020 FQ4*	*Average*
Short-Term Debt	12.38%	11.24%	9.42%	8.22%	7.84%	7.92%	8.35%	9.37%	12.83%	10.33%	8.45%	8.80%	9.60%
Long-Term Debt	44.23%	45.57%	47.40%	49.09%	51.20%	52.21%	51.78%	51.73%	49.98%	51.77%	53.66%	54.02%	50.22%
Common Equity	43.38%	43.20%	43.19%	42.69%	40.96%	39.87%	39.87%	38.90%	37.18%	37.90%	37.89%	37.18%	40.18%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source S&P Global Market Intelligence

SWEPCO	*2018 FQ1*	*2018 FQ2*	*2018 FQ3*	*2018 FQ4*	*2019 FQ1*	*2019 FQ2*	*2019 FQ3*	*2019 FQ4*	*2020 FQ1*	*2020 FQ2*	*2020 FQ3*	*2020 FQ4*	*Average*
Long-Term Debt	48.59%	48.37%	53.56%	53.87%	54.05%	53.10%	51.95%	51.74%	51.14%	51.55%	50.67%	49.93%	51.54%
Common Equity	51.41%	51.63%	46.44%	46.13%	45.95%	46.90%	48.05%	48.26%	48.86%	48.45%	49.33%	50.07%	48.46%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

AEP	*2018 FQ1*	*2018 FQ2*	*2018 FQ3*	*2018 FQ4*	*2019 FQ1*	*2019 FQ2*	*2019 FQ3*	*2019 FQ4*	*2020 FQ1*	*2020 FQ2*	*2020 FQ3*	*2020 FQ4*	*Average*
Long-Term Debt	50.48%	51.34%	52.32%	53.49%	55.56%	56.70%	56.50%	57.08%	57.34%	57.73%	58.62%	59.23%	55.53%
Common Equity	49.52%	48.66%	47.68%	46.51%	44.44%	43.30%	43.50%	42.92%	42.66%	42.27%	41.38%	40.77%	44.47%
0	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source S&P Global Market Intelligence

SOAH DOCKET NO. 473-21-0538
PUC DOCKET NO. 51415

APPLICATION OF SOUTHWESTERN ELECTRIC POWER COMPANY FOR AUTHORITY TO CHANGE RATES	§ § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS

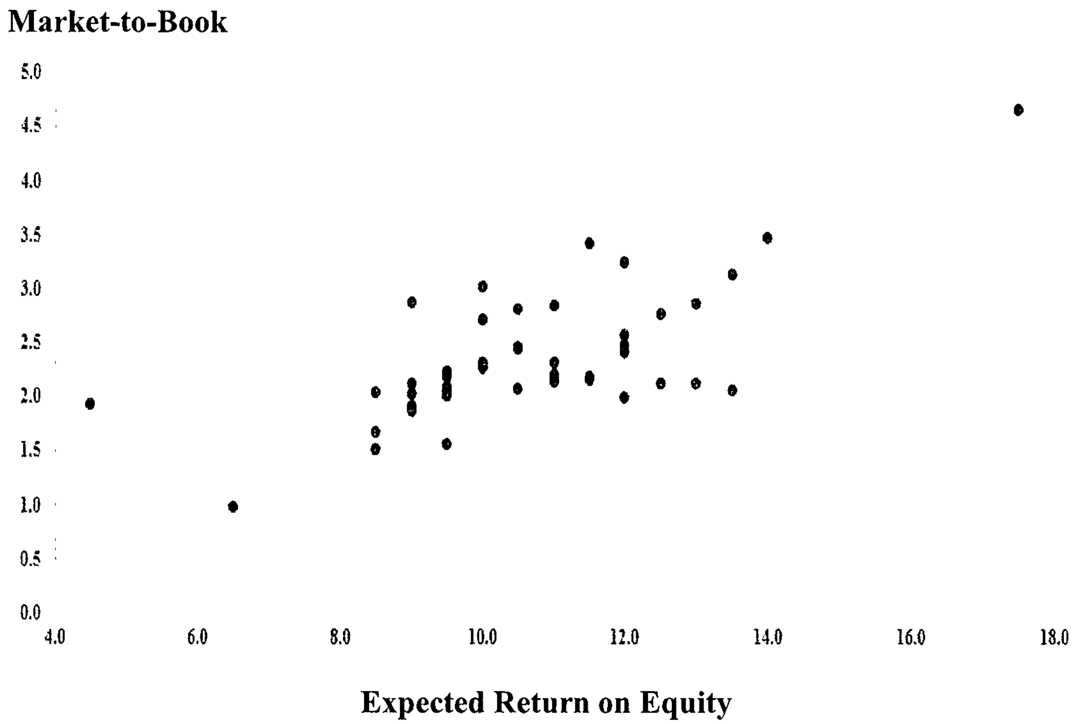
OF

J. RANDALL WOOLRIDGE, Ph. D.

Exhibit JRW-5

The Relationship Between Expected ROE and Market-to-Book Ratios

Electric Utilities and Gas Distribution Companies



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Source: *Value Line Investment Survey*, 2019.

Industry Average Betas

Value Line Investment Survey Betas**

28-Jan-21

Rank	Industry	Beta	Rank	Industry	Beta	Rank	Industry	Beta
1	Oilfield Svcs/Equip.	1.49	34	Bank (Midwest)	1.20	67	Investment Co.	1.01
2	Homebuilding	1.47	35	Restaurant	1.19	68	Med Supp Non-Invasive	1.00
3	Insurance (Life)	1.47	36	Machinery	1.19	69	Environmental	1.00
4	Petroleum (Integrated)	1.42	37	Electrical Equipment	1.18	70	Telecom. Equipment	1.00
5	Hotel/Gaming	1.42	38	Bank	1.18	71	Investment Co.(Foreign)	1.00
6	Petroleum (Producing)	1.41	39	Medical Services	1.17	72	E-Commerce	0.99
7	Apparel	1.39	40	Electronics	1.17	73	Retail Store	0.98
8	Air Transport	1.37	41	Maritime	1.17	74	Cable TV	0.96
9	Shoe	1.37	42	Heavy Truck & Equip	1.15	75	Drug	0.96
10	Retail (Hardlines)	1.36	43	Toiletries/Cosmetics	1.15	76	Telecom. Services	0.95
11	Building Materials	1.33	44	R.E.I.T.	1.15	77	Healthcare Information	0.94
12	Office Equip/Supplies	1.33	45	Automotive	1.15	78	Computer Software	0.94
13	Aerospace/Defense	1.31	46	Reinsurance	1.14	79	Tobacco	0.94
14	Metals & Mining (Div.)	1.30	47	Publishing	1.11	80	Trucking	0.94
15	Metal Fabricating	1.30	48	Computers/Peripherals	1.10	81	Telecom. Utility	0.93
16	Pipeline MLPs	1.30	49	Semiconductor Equip	1.10	82	Electric Utility (West)	0.90
17	Auto Parts	1.29	50	Industrial Services	1.09	83	Foreign Electronics	0.90
18	Steel	1.28	51	Precision Instrument	1.09	84	Biotechnology	0.90
19	Retail Automotive	1.27	52	Packaging & Container	1.09	85	Beverage	0.89
20	Oil/Gas Distribution	1.26	53	Railroad	1.08	86	Electric Utility (East)	0.89
21	Paper/Forest Products	1.25	54	Power	1.07	87	Natural Gas Utility	0.89
22	Furn/Home Furnishings	1.25	55	Wireless Networking	1.07	88	Electric Util. (Central)	0.89
23	Public/Private Equity	1.24	56	Med Supp Invasive	1.06	89	Household Products	0.81
24	Natural Gas (Div.)	1.24	57	Retail Building Supply	1.06	90	Retail/Wholesale Food	0.81
25	Advertising	1.23	58	Educational Services	1.06	91	Water Utility	0.79
26	Financial Svcs. (Div.)	1.22	59	Semiconductor	1.06	92	Entertainment Tech	0.79
27	Recreation	1.21	60	Internet	1.05	93	Food Processing	0.77
28	Engineering & Const	1.21	61	Insurance (Prop/Cas.)	1.05	94	Precious Metals	0.68
29	Retail (Softlines)	1.21	62	Human Resources	1.04			
30	Chemical (Specialty)	1.21	63	Information Services	1.03			
31	Chemical (Diversified)	1.21	64	Entertainment	1.03			
32	Diversified Co.	1.20	65	Thrift	1.02			
33	Chemical (Basic)	1.20	66	IT Services	1.01		Mean	1.12

* Industry averages for 94 industries using *Value Line*'s database of 1,700 companies - Updated 1-28-21.

** *Value Line* computes betas using monthly returns regressed against the New York Stock Exchange Index for five years. These betas are then adjusted as follows: *VL* Beta = [{(2/3) * Regressed Beta} + {(1/3) * (1.0)}] to account to tendency for Betas to regress toward average of 1.0. See M. Blume, "On the Assessment of Risk," *Journal of Finance*, March 1971.

SOAH DOCKET NO. 473-21-0538
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APPLICATION OF SOUTHWESTERN ELECTRIC POWER COMPANY FOR AUTHORITY TO CHANGE RATES	§ § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

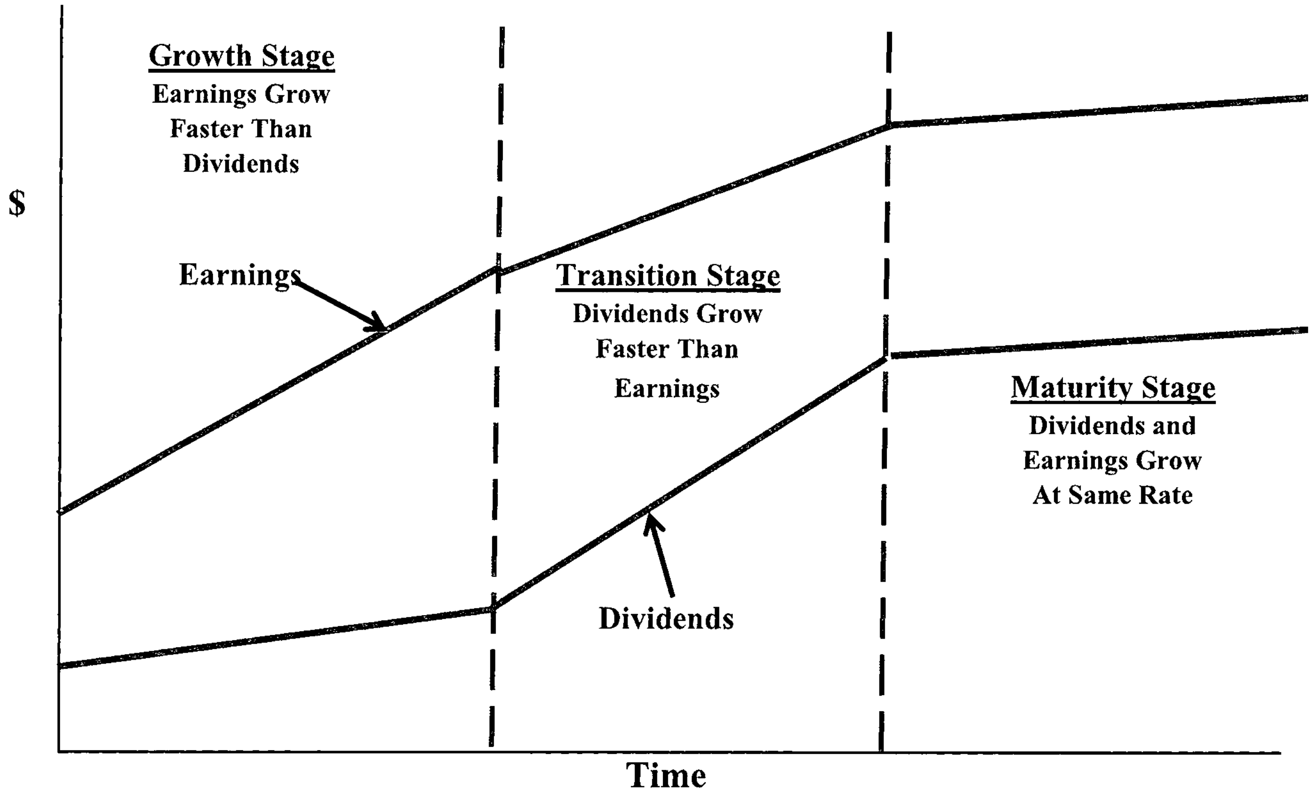
DIRECT TESTIMONY AND EXHIBITS

OF

J. RANDALL WOOLRIDGE, Ph. D.

Exhibit JRW-6

DCF Model


Growth Stage
Earnings Grow
Faster Than
Dividends
$
Earnings
Transition Stage
Dividends Grow
Faster Than
Earnings
Maturity Stage
Dividends and
Earnings Grow
At Same Rate
Dividends
Time

SOAH DOCKET NO. 473-21-0538
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APPLICATION OF SOUTHWESTERN ELECTRIC POWER COMPANY FOR AUTHORITY TO CHANGE RATES	§ § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS

OF

J. RANDALL WOOLRIDGE, Ph. D.

Exhibit JRW-7

DCF Study

Panel A
Electric Proxy Group

Dividend Yield*	3.80%
Adjustment Factor	1.02625
Adjusted Dividend Yield	3.90%
Growth Rate**	5.25%
Equity Cost Rate	9.15%

* Page 2 of Exhibit JRW-7
** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-7

Panel B
D'Ascendis Proxy Group

Dividend Yield*	3.90%
Adjustment Factor	1.025
Adjusted Dividend Yield	4.00%
Growth Rate**	5.00%
Equity Cost Rate	9.00%

* Page 2 of Exhibit JRW-7
** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-7

DCF Study
Dividend Yields

Panel A
Electric Proxy Group*

Company		Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
ALLETE, Inc. (NYSE-ALE)	ALE	$2.52	3.9%	4.1%	4.3%
Alliant Energy Corporation (NYSE-LNT)	LNT	$1.52	3.1%	3.0%	2.9%
Ameren Corporation (NYSE-AEE)	AEE	$2.06	2.8%	2.7%	2.7%
American Electric Power Co. (NYSE-AEP)	AEP	$2.96	3.7%	3.6%	3.6%
Avista Corporation (NYSE-AVA)	AVA	$1.69	4.3%	4.4%	4.6%
CMS Energy Corporation (NYSE-CMS)	CMS	$1.74	3.1%	2.9%	2.9%
Consolidated Edison, Inc. (NYSE-ED)	ED	$3.10	4.5%	4.2%	4.2%
Dominion Energy Inc. (NYSE-D)	D	$2.52	3.5%	3.3%	3.3%
Duke Energy Corporation (NYSE-DUK)	DUK	$3.86	4.3%	4.2%	4.4%
Edison International (NYSE-EIX)	EIX	$2.65	4.6%	4.4%	4.6%
Entergy Corporation (NYSE-ETR)	ETR	$3.80	4.1%	3.8%	3.8%
Evergy, Inc. (NYSE-EVRG)	EVRG	$2.14	3.9%	3.9%	3.9%
Eversource Energy (NYSE-ES)	ES	$2.41	2.9%	2.8%	2.8%
Hawaiian Electric Industries (NYSE-HE)	HE	$1.36	3.9%	3.9%	3.9%
IDACORP, Inc. (NYSE-IDA)	IDA	$2.84	3.2%	3.1%	3.2%
MGE Energy, Inc. (NYSE-MGEE)	MGEE	$1.48	2.3%	2.2%	2.2%
NextEra Energy, Inc. (NYSE-NEE)	NEE	$1.54	1.9%	2.0%	2.1%
NorthWestern Corporation (NYSE-NWE)	NWE	$2.48	4.3%	4.3%	4.5%
OGE Energy Corp. (NYSE-OGE)	OGE	$1.61	5.2%	5.1%	5.1%
Otter Tail Corporation (NDQ-OTTR)	OTTR	$1.56	3.8%	3.8%	3.9%
Pinnacle West Capital Corp. (NYSE-PNW)	PNW	$3.32	4.4%	4.2%	4.2%
Portland General Electric Company (NYSE-POR)	POR	$1.63	3.8%	3.9%	4.0%
PPL Corporation (NYSE-PPL)	PPL	$1.66	6.0%	5.9%	6.0%
SEMPRA Energy (NYSE-SRE)	SRE	$4.40	3.6%	3.5%	3.5%
Southern Company (NYSE-SO)	SO	$2.56	4.3%	4.3%	4.5%
WEC Energy Group (NYSE-WEC)	WEC	$2.71	3.2%	3.0%	2.9%
Xcel Energy Inc. (NYSE-XEL)	XEL	$1.72	2.8%	2.6%	2.6%
Mean			3.8%	3.7%	3.7%
Median			3.8%	3.8%	3.9%

Data Sources http //quote yahoo com, March, 2021

Panel B
D'Ascendis Proxy Group

Company		Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
ALLETE, Inc. (NYSE-ALE)	ALE	2.52	3.9%	4.1%	4.3%
Alliant Energy Corporation (NYSE-LNT)	LNT	$1.52	3.1%	3.0%	2.9%
Ameren Corporation (NYSE-AEE)	AEE	$2.06	2.8%	2.7%	2.7%
Duke Energy Corporation (NYSE-DUK)	DUK	$3.86	4.3%	4.2%	4.4%
Edison International (NYSE-EIX)	EIX	$2.65	4.6%	4.4%	4.6%
Entergy Corporation (NYSE-ETR)	ETR	$3.80	4.1%	3.8%	3.8%
IDACORP, Inc. (NYSE-IDA)	IDA	$2.84	3.2%	3.1%	3.2%
NorthWestern Corporation (NYSE-NWE)	NWE	$2.48	4.3%	4.3%	4.5%
OGE Energy Corp. (NYSE-OGE)	OGE	$1.61	5.2%	5.1%	5.1%
Otter Tail Corporation (NDQ-OTTR)	OTTR	$1.56	3.8%	3.8%	3.9%
Pinnacle West Capital Corp. (NYSE-PNW)	PNW	$3.32	4.4%	4.2%	4.2%
Portland General Electric Company (NYSE-POR)	POR	$1.63	3.8%	3.9%	4.0%
Xcel Energy Inc. (NYSE-XEL)	XEL	$1.72	2.8%	2.6%	2.6%
Mean			3.9%	3.8%	3.9%
Median			3.9%	3.9%	4.0%

Data Sources. http //quote yahoo com, March, 2021

DCF Study

DCF Equity Cost Growth Rate Measures
Value Line Historic Growth Rates

Panel A
Electric Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
ALLETE, Inc. (NYSE-ALE)	4.0	3.0	5.0	2.5	3.5	4.5
Alliant Energy Corporation (NYSE-LNT)	6.0	7.0	4.5	6.0	7.0	5.5
Ameren Corporation (NYSE-AEE)	2.0	0.5		8.0	3.5	3.5
American Electric Power Co. (NYSE-AEP)	3.0	4.5	4.0	4.0	5.5	3.0
Avista Corporation (NYSE-AVA)	6.5	8.0	4.0	7.0	4.0	4.5
CMS Energy Corporation (NYSE-CMS)	7.5	11.5	5.0	7.0	7.0	5.5
Consolidated Edison, Inc. (NYSE-ED)	2.5	2.0	4.0	2.0	3.0	4.5
Dominion Energy Inc. (NYSE-D)	1.5	7.5	6.0		8.0	9.5
Duke Energy Corporation (NYSE-DUK)	3.0	3.0	2.0	2.5	3.0	1.0
Edison International (NYSE-EIX)	-3.5	7.0	2.0	-10.5	11.5	2.5
Entergy Corporation (NYSE-ETR)		1.5	1.0	3.0	2.0	-1.0
Evergy, Inc. (NYSE-EVRG)						
Eversource Energy (NYSE-ES)	6.0	9.0	6.5	7.0	7.0	3.5
Hawaiian Electric Industries (NYSE-HE)	6.0		2.5	2.0		3.5
IDACORP, Inc. (NYSE-IDA)	7.0	7.0	5.5	4.0	9.0	5.0
MGE Energy, Inc. (NYSE-MGEE)	5.0	3.5	5.5	3.0	4.5	6.0
Nextera Energy, Inc. (NYSE-NEE)	6.5	9.5	9.0	7.0	11.0	10.5
NorthWestern Corporation (NYSE-NWE)	7.0	5.5	6.0	6.0	7.5	7.0
OGE Energy Corp. (NYSE-OGE)	4.5	7.5	6.0	3.0	9.5	4.0
Otter Tail Corporation (NDQ-OTTR)	11.5	1.5	0.5	8.0	3.0	5.0
Pinnacle West Capital Corp. (NYSE-PNW)	6.5	3.0	3.0	5.0	3.5	4.0
Portland General Electric Company (NYSE-POR)	3.5	4.0	3.0	4.0	5.5	3.5
PPL Corporation (NYSE-PPL)	1.0	2.0	1.0	-1.0	2.0	-3.5
Sempra Energy (NYSE-SRE)	2.0	10.0	5.0	4.0	7.5	4.5
Southern Company (NYSE-SO)	3.0	3.5	3.5	3.0	3.5	3.0
WEC Energy Group (NYSE-WEC)	8.0	13.5	7.5	7.5	8.5	8.0
Xcel Energy Inc. (NYSE-XEL)	5.5	5.0	4.5	5.0	6.5	4.5
Mean	4.6	5.6	4.3	4.0	5.9	4.3
Median	5.0	5.0	4.5	4.0	5.5	4.5
Data Source: *Value Line Investment Survey*	Average of Median Figures =			4.8		

Panel B
D'Ascendis Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
ALLETE, Inc. (NYSE-ALE)	4.0	3.0	5.0	2.5	3.5	4.5
Alliant Energy Corporation (NYSE-LNT)	6.0	7.0	4.5	6.0	7.0	5.5
Ameren Corporation (NYSE-AEE)	2.0	0.5		8.0	3.5	3.5
Duke Energy Corporation (NYSE-DUK)	3.0	3.0	2.0	2.5	3.0	1.0
Edison International (NYSE-EIX)	-3.5	7.0	2.0	-10.5	11.5	2.5
Entergy Corporation (NYSE-ETR)		1.5	1.0	3.0	2.0	-1.0
IDACORP, Inc. (NYSE-IDA)	7.0	7.0	5.5	4.0	9.0	5.0
NorthWestern Corporation (NYSE-NWE)	7.0	5.5	6.0	6.0	7.5	7.0
OGE Energy Corp. (NYSE-OGE)	4.5	7.5	6.0	3.0	9.5	4.0
Otter Tail Corporation (NDQ-OTTR)	11.5	1.5	0.5	8.0	3.0	5.0
Pinnacle West Capital Corp. (NYSE-PNW)	6.5	3.0	3.0	5.0	3.5	4.0
Portland General Electric Company (NYSE-POR)	3.5	4.0	3.0	4.0	5.5	3.5
Xcel Energy Inc. (NYSE-XEL)	5.5	5.0	4.5	5.0	6.5	4.5
Mean	4.8	4.3	3.6	3.6	5.8	3.8
Median	5.0	4.0	3.8	4.0	5.5	4.0
Data Source: *Value Line Investment Survey*	Average of Median Figures =			4.4		

DCF Study

DCF Equity Cost Growth Rate Measures
Value Line Projected Growth Rates

Panel A
Electric Proxy Group

Company	*Value Line* Projected Growth Est'd. '17-'19 to '23-'25 Earnings	Dividends	Book Value	*Value Line* Sustainable Growth Return on Equity	Retention Rate	Internal Growth
ALLETE, Inc. (NYSE-ALE)	6.0	3.5	3.0	9.0%	38.0%	3.4%
Alliant Energy Corporation (NYSE-LNT)	5.5	6.0	6.0	10.5%	37.0%	3.9%
Ameren Corporation (NYSE-AEE)	6.0	7.0	6.0	10.0%	40.0%	4.0%
American Electric Power Co. (NYSE-AEP)	6.0	5.5	5.5	10.5%	35.0%	3.7%
Avista Corporation (NYSE-AVA)	1.0	4.0	2.5	8.0%	25.0%	2.0%
CMS Energy Corporation (NYSE-CMS)	7.5	7.0	8.0	14.0%	40.0%	5.6%
Consolidated Edison, Inc. (NYSE-ED)	2.5	3.0	3.0	8.0%	33.0%	2.6%
Dominion Energy Inc. (NYSE-D)	7.0	-0.5	3.5	12.0%	31.0%	3.7%
Duke Energy Corporation (NYSE-DUK)	5.0	2.5	2.0	8.5%	30.0%	2.6%
Edison International (NYSE-EIX)	12.0	4.0	4.0	11.0%	40.0%	4.4%
Entergy Corporation (NYSE-ETR)	3.0	4.5	5.0	11.0%	36.0%	4.0%
Evergy, Inc. (NYSE-EVRG)	8.0	5.5	2.5	9.0%	38.0%	3.4%
Eversource Energy (NYSE-ES)	6.5	6.0	5.5	9.5%	39.0%	3.7%
Hawaiian Electric Industries (NYSE-HE)	1.5	2.0	3.5	8.5%	34.0%	2.9%
IDACORP, Inc. (NYSE-IDA)	4.5	6.5	4.0	9.5%	39.0%	3.7%
MGE Energy, Inc. (NYSE-MGEE)	4.5	5.5	5.0	9.5%	40.0%	3.8%
Nextera Energy, Inc. (NYSE-NEE)	10.5	10.5	6.0	12.5%	30.0%	3.8%
NorthWestern Corporation (NYSE-NWE)	2.5	4.0	3.0	9.0%	34.0%	3.1%
OGE Energy Corp. (NYSE-OGE)	4.0	4.5	1.5	13.0%	30.0%	3.9%
Otter Tail Corporation (NDQ-OTTR)	7.0	5.5	5.0	12.5%	39.0%	4.9%
Pinnacle West Capital Corp. (NYSE-PNW)	4.5	6.0	3.5	10.5%	33.0%	3.5%
Portland General Electric Company (NYSE-POR)	4.0	6.0	2.5	9.5%	35.0%	3.3%
PPL Corporation (NYSE-PPL)	2.5	1.5	4.5	12.5%	35.0%	4.4%
Sempra Energy (NYSE-SRE)	11.0	7.5	8.5	11.0%	43.0%	4.7%
Southern Company (NYSE-SO)	3.5	3.0	3.5	13.0%	28.0%	3.6%
WEC Energy Group (NYSE-WEC)	6.5	6.5	4.0	13.0%	35.0%	4.6%
Xcel Energy Inc. (NYSE-XEL)	6.0	6.0	5.5	10.5%	39.0%	4.1%
Mean	5.5	4.9	4.3	10.6%	35.4%	3.7%
Median	5.5	5.5	4.0	10.5%	35.0%	3.7%
Average of Median Figures =		5.0			Median =	3.7%

* 'Est'd. '17-'19 to '23-'25' is the estimated growth rate from the base period 2017 to 2019 until the future period 2023 to 2025.
Data Source *Value Line Investment Survey*

Panel B
D'Ascendis Proxy Group

Company	*Value Line* Projected Growth Est'd. '18-'20 to '23-'25 Earnings	Dividends	Book Value	*Value Line* Sustainable Growth Return on Equity	Retention Rate	Internal Growth
ALLETE, Inc. (NYSE-ALE)	6.0	3.5	3.0	9.0%	38.0%	3.4%
Alliant Energy Corporation (NYSE-LNT)	5.5	6.0	6.0	10.5%	37.0%	3.9%
Ameren Corporation (NYSE-AEE)	6.0	7.0	6.0	10.0%	40.0%	4.0%
Duke Energy Corporation (NYSE-DUK)	5.0	2.5	2.0	8.5%	30.0%	2.6%
Edison International (NYSE-EIX)	12.0	4.0	4.0	11.0%	40.0%	4.4%
Entergy Corporation (NYSE-ETR)	3.0	4.5	5.0	11.0%	36.0%	4.0%
IDACORP, Inc. (NYSE-IDA)	4.5	6.5	4.0	9.5%	39.0%	3.7%
NorthWestern Corporation (NYSE-NWE)	2.5	4.0	3.0	9.0%	34.0%	3.1%
OGE Energy Corp. (NYSE-OGE)	4.0	4.5	1.5	13.0%	30.0%	3.9%
Otter Tail Corporation (NDQ-OTTR)	7.0	5.5	5.0	12.5%	39.0%	4.9%
Pinnacle West Capital Corp. (NYSE-PNW)	4.5	6.0	3.5	10.5%	33.0%	3.5%
Portland General Electric Company (NYSE-POR)	4.0	6.0	2.5	9.5%	35.0%	3.3%
Xcel Energy Inc. (NYSE-XEL)	6.0	6.0	5.5	10.5%	39.0%	4.1%
Mean	5.4	5.1	3.9	10.3%	36.2%	3.7%
Median	5.0	5.5	4.0	10.5%	37.0%	3.9%
Average of Median Figures =		4.8			Median =	3.9%

* 'Est'd. '17-'19 to '23-'25' is the estimated growth rate from the base period 2017 to 2019 until the future period 2023 to 2025.

DCF Study

DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Panel A
Electric Proxy Group

Company	Yahoo	Zacks	S&P	Mean
ALLETE, Inc. (NYSE-ALE)	7.0%	N/A	6.0%	6.5%
Alliant Energy Corporation (NYSE-LNT)	5.7%	5.8%	5.8%	5.8%
Ameren Corporation (NYSE-AEE)	6.6%	6.6%	6.8%	6.7%
American Electric Power Co. (NYSE-AEP)	6.0%	5.8%	6.2%	6.0%
Avista Corp (NYSE-AVA)	6.0%	6.9%	5.3%	6.1%
CMS Energy Corporation (NYSE-CMS)	7.3%	7.0%	6.9%	7.0%
Consolidated Edison, Inc. (NYSE-ED)	3.0%	2.0%	3.0%	2.7%
Dominion Energy Inc. (NYSE-D)	2.8%	6.7%	6.6%	5.4%
Duke Energy Corporation (NYSE-DUK)	5.0%	5.2%	5.2%	5.2%
Edison International (NYSE-EIX)	NA	3.1%	4.0%	3.6%
Entergy Corporation (NYSE-ETR)	5.2%	5.2%	5.6%	5.3%
Evergy (NYSE-EVRG)	5.7%	5.9%	6.4%	6.0%
Eversource Energy (NYSE-ES)	7.1%	6.8%	6.9%	6.9%
Hawaiian Electric Industries (NYSE-HE)	1.3%	2.5%	3.6%	2.5%
IDACORP, Inc. (NYSE-IDA)	2.6%	2.6%	3.0%	2.8%
MGE Energy, Inc. (NYSE-MGEE)	4.7%	4.7%	4.7%	4.7%
Nextera Energy, Inc. (NYSE-NEE)	8.5%	7.8%	9.2%	8.5%
NorthWestern Corporation (NYSE-NWE)	4.7%	5.3%	4.8%	4.9%
OGE Energy Corp. (NYSE-OGE)	2.1%	3.6%	2.3%	2.6%
Otter Tail Corporation (NDQ-OTTR)	9.0%	N/A	5.4%	7.2%
Pinnacle West Capital Corp. (NYSE-PNW)	3.5%	3.8%	3.6%	3.6%
Portland General Electric Company (NYSE-POR)	13.4%	13.4%	4.7%	10.5%
PPL Corporation (NYSE-PPL)	N/A	N/A	3.2%	3.2%
Sempra Energy (NYSE-SRE)	8.5%	6.0%	5.4%	6.6%
Southern Company (NYSE-SO)	6.5%	5.0%	5.7%	5.7%
WEC Energy Group (NYSE-WEC)	6.1%	6.1%	5.8%	6.0%
Xcel Energy Inc. (NYSE-XEL)	6.3%	6.2%	5.5%	6.0%
Mean	5.8%	5.6%	5.2%	5.5%
Median	6.0%	5.8%	5.4%	5.8%

Data Sources www zacks com, http·//quote yahoo com, S&P Cap IQ, March, 2021

Panel B
D'Ascendis Proxy Group

Company	Yahoo	Zacks	S&P	Mean
ALLETE, Inc. (NYSE-ALE)	7.0%	N/A	6.0%	6.5%
Alliant Energy Corporation (NYSE-LNT)	5.7%	5.8%	5.8%	5.8%
Ameren Corporation (NYSE-AEE)	6.6%	6.6%	6.8%	6.7%
Duke Energy Corporation (NYSE-DUK)	5.0%	5.2%	5.2%	5.2%
Edison International (NYSE-EIX)	NA	3.1%	4.0%	3.6%
Entergy Corporation (NYSE-ETR)	5.2%	5.2%	5.6%	5.3%
IDACORP, Inc. (NYSE-IDA)	2.6%	2.6%	3.0%	2.8%
NorthWestern Corporation (NYSE-NWE)	4.7%	5.3%	4.8%	4.9%
OGE Energy Corp. (NYSE-OGE)	2.1%	3.6%	2.3%	2.6%
Otter Tail Corporation (NDQ-OTTR)	9.0%	N/A	5.4%	7.2%
Pinnacle West Capital Corp. (NYSE-PNW)	3.5%	3.8%	3.6%	3.6%
Portland General Electric Company (NYSE-POR)	13.4%	13.4%	4.7%	10.5%
Xcel Energy Inc. (NYSE-XEL)	6.3%	6.2%	5.5%	6.0%
Mean	5.9%	5.5%	4.8%	5.4%
Median	5.4%	5.2%	5.2%	5.3%

Data Sources. www zacks com, http //quote yahoo com, S&P Cap IQ, March, 2021

DCF Study

DCF Growth Rate Indicators

Electric and D'Ascendis Proxy Groups

Growth Rate Indicator	Electric Proxy Group	D'Ascendis Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	4.8%	4.4%
Projected *Value Line* Growth in EPS, DPS, and BVPS	5.0%	4.8%
Sustainable Growth ROE * Retention Rate	3.7%	3.9%
Projected EPS Growth from Yahoo and Zacks - Mean/Median	5.5%/5.8%	5.4%/5.3%

SOAH DOCKET NO. 473-21-0538
PUC DOCKET NO. 51415

APPLICATION OF SOUTHWESTERN ELECTRIC POWER COMPANY FOR AUTHORITY TO CHANGE RATES	§ § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS

OF

J. RANDALL WOOLRIDGE, Ph. D.

Exhibit JRW-8

Capital Asset Pricing Model

Panel A
Electric Proxy Group

Risk-Free Interest Rate	2.50%
Beta*	0.85
Ex Ante Equity Risk Premium**	6.00%
CAPM Cost of Equity	7.6%

* See page 3 of Exhibit JRW-8

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

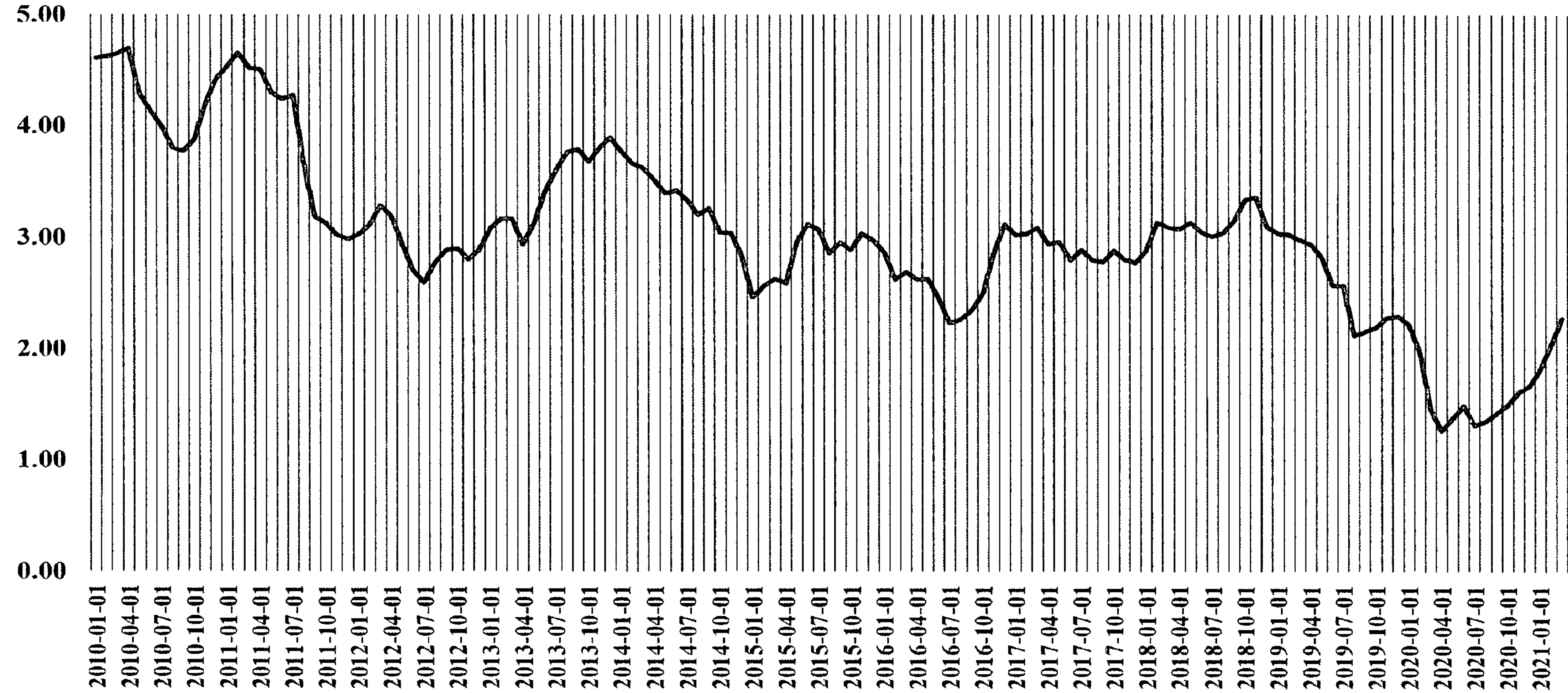
Panel B
D'Ascendis Proxy Group

Risk-Free Interest Rate	2.50%
Beta*	0.85
Ex Ante Equity Risk Premium**	6.00%
CAPM Cost of Equity	7.6%

* See page 3 of Exhibit JRW-8

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

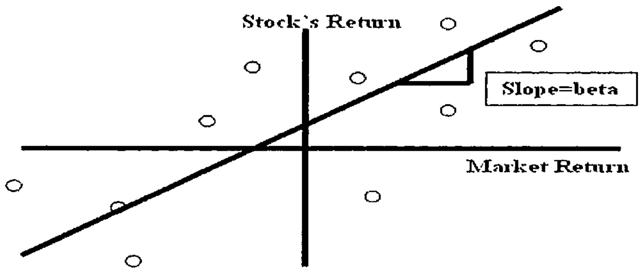
Thirty-Year U.S. Treasury Yields
2010-2021



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

CAPM Study

Calculation of Beta



Panel A
Electric Proxy Group

Company Name	Beta
ALLETE, Inc. (NYSE-ALE)	0.90
Alliant Energy Corporation (NYSE-LNT)	0.85
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)	0.95
Evergy, Inc. (NYSE-EVRG)	0.95
Eversource Energy (NYSE-ES)	0.90
Hawaiian Electric Industries (NYSE-HE)	0.80
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-OGE)	1.05
Otter Tail Corporation (NDQ-OTTR)	0.85
Pinnacle West Capital Corp. (NYSE-PNW)	0.90
Portland General Electric Company (NYSE-POR)	0.85
PPL Corporation (NYSE-PPL)	1.10
Sempra Energy (NYSE-SRE)	1.00
Southern Company (NYSE-SO)	0.95
WEC Energy Group (NYSE-WEC)	0.80
Xcel Energy Inc. (NYSE-XEL)	0.80
Mean	0.87
Median	0.85

Data Source: *Value Line Investment Survey*, 2021

Panel B
D'Ascendis Proxy Group

	Company Name	Beta
ALLETE, Inc.	ALLETE, Inc. (NYSE-ALE)	0.90
Alliant Energy	Alliant Energy Corporation (NYSE-LNT)	0.85
Ameren Corpo	Ameren Corporation (NYSE-AEE)	0.80
Duke Energy C	Duke Energy Corporation (NYSE-DUK)	0.85
Edison Interna	Edison International (NYSE-EIX)	0.95
Entergy Corpo	Entergy Corporation (NYSE-ETR)	0.95
IDACORP, Inc	IDACORP, Inc. (NYSE-IDA)	0.80
NorthWestern	NorthWestern Corporation (NYSE-NWE)	0.95
OGE Energy C	OGE Energy Corp. (NYSE-OGE)	1.05
Otter Tail Cor	Otter Tail Corporation (NDQ-OTTR)	0.85
Pinnacle West	Pinnacle West Capital Corp. (NYSE-PNW)	0.90
Portland Gene	Portland General Electric Company (NYSE-POR)	0.85
Xcel Energy In	Xcel Energy Inc. (NYSE-XEL)	0.80
	Mean	0.88
	Median	0.85

Data Source: *Value Line Investment Survey*, 2021

CAPM Study

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

Category	Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Median
Historical Ris	**Historical Risk Premium**										
		Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6 00%	
						Geometric				4 40%	
		Damodaran	2021	1928-2020	Historical Stock Returns - Bond Returns	Arithmetic				6 44%	
						Geometric				4 83%	
		Dimson Marsh, Staunton Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5 50%	
						Geometric					
		Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4 50%	
		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									5 50%
Ex Ante Mode	**Ex Ante Models (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	1981-1998	Residual Income Model					5 30%	
		Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2 55%	4 32%		3 44%	
		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	2011	Projection	Real Stock Returns and Components					5 50%	
		Duff & Phelps	2021	Projection	Normalized with 3 5% Long-Term Treasury Yield					5 50%	
		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	2021	Projection	Fundamental Economic and Market Factors					3 42%	
		KPMG	2021	Projection	Fundamental Economic and Market Factors					6 25%	
		Damodaran -3-21	2021	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					4 63%	
		Social Security									
		Office of Chief Actuary		1900-1995							
		John Campbell	2001	1860-2000	Historical & Projections (D/P & Earnings Growth)	Arithmetic	3 00%	4 00%	3 50%	3 50%	
				Projected for 75 Years		Geometric	1.50%	2 50%	2 00%	2 00%	
		Peter Diamond	2001	Projected for 75 Years	Fundamentals (D/P, GDP Growth)		3 00%	4 80%	3 90%	3 90%	
		John Shoven	2001	Projected for 75 Years	Fundamentals (D/P, P/E, GDP Growth)		3 00%	3 50%	3 25%	3 25%	
		Median									4 00%
Surveys	**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 Forecastsers					3 36%	
		Duke - CFO Magazine Survey	2020	10-Year Projection	Approximately 200 CFOs					4 05%	
		Welch - Academics	2008	30-Year Projection	Random Academics		5 00%	5 74%	5 37%	5 37%	
		Fernandez - Academics, Analysts, and Compani	2020	Long-Term	Survey of Academics, Analysts, and Companies					5 60%	
		Median									5 37%
Building 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	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	**Mean**										**4.73%**
Median	**Median**										**4 83%**

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CAPM Study

Summary of 2010-21 Equity Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Average
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2021	1928-2020	Historical Stock Returns - Bond Returns	Arithmetic				6.44%	
					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	2021	Projection	Fundamental Economic and Market Factors					3.42%	
	KPMG	2021	Projection	Fundamental Economic and Market Factors					6.25%	
	Damodaran -3-21	2021	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					4.63%	
	Median									5.50%
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 Forecastsers					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										**4.95%**
Median										**5.13%**

CAPM Study

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

DUFF & PHELPS

Table: Equity Risk Premium & Risk-free Rates

December 9, 2020

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

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:				
December 9, 2020 – UNTIL FURTHER NOTICE	Normalized 20-year U.S. Treasury yield	2.50	5.50	ERP
June 30, 2020 - December 8, 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 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.

Source: https://www.duffandphelps.com/-/media/assets/pdfs/publications/articles/dp-erp-rf-table-2020.pdf?la=en&hash=CEC22C0DD9928B72337F9B7E7536C753B0513063.

SOAH DOCKET NO. 473-21-0538
PUC DOCKET NO. 51415

APPLICATION OF SOUTHWESTERN ELECTRIC POWER COMPANY FOR AUTHORITY TO CHANGE RATES	§ § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS

OF

J. RANDALL WOOLRIDGE, Ph. D.

Exhibit JRW-9

SWEPCO's Recommended Cost of Capital

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.63%	4.18%	2.11%
Common Equity	49.37%	10.35%	5.11%
Total Capital	100.00%		7.22%

SWEPCO Common Equity Cost Rate

Line No.	Principal Methods	
1.	Discounted Cash Flow Model (DCF) (1)	8.73%
2.	Risk Premium Model (RPM) (2)	10.54%
3.	Capital Asset Pricing Model (CAPM) (3)	12.46%
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	12.12%
5.	Indicated Range of Common Equity Cost Rates before Adjustment for Company-Specific Risk	9.85% - 10.96%
6.	Size Risk Adjustment (5)	0.20%
7.	Credit Risk Adjustment (6)	0.27%
8.	Indicated Range of Common Equity Cost Rates after Adjustment	10.32% - 11.43%
9.	Recommended Common Equity Cost Rate	10.35%

Notes: (1) From Schedule DWD-3.
(2) From page 1 of Schedule DWD-4.
(3) From page 1 of Schedule DWD-5.
(4) From page 1 of Schedule DWD-7.
(5) Adjustment to reflect the Company's greater business risk due to its smaller size realtive to the Utility Proxy Group as detailed in Mr. D'Ascendis' direct testimony.
(6) Company-specific risk adjustment to reflect SWEPCO's greater credit risk compared to the Utility Proxy Group. SWEPCO's Moody's bond rating of Baa2 is riskier than the Utility Proxy Group's Moody's bond rating of A3. An upward adjustment of 2/3 of the spread between A2 and Baa2 public utility bond yields (as shown on page 4 of Schedule DWD-4) is appropriate.

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J. RANDALL WOOLRIDGE, Ph. D.

Exhibit JRW-10

GDP and S&P 500 Growth Rates

Growth Rates
GDP, S&P 500 Price, EPS, and DPS

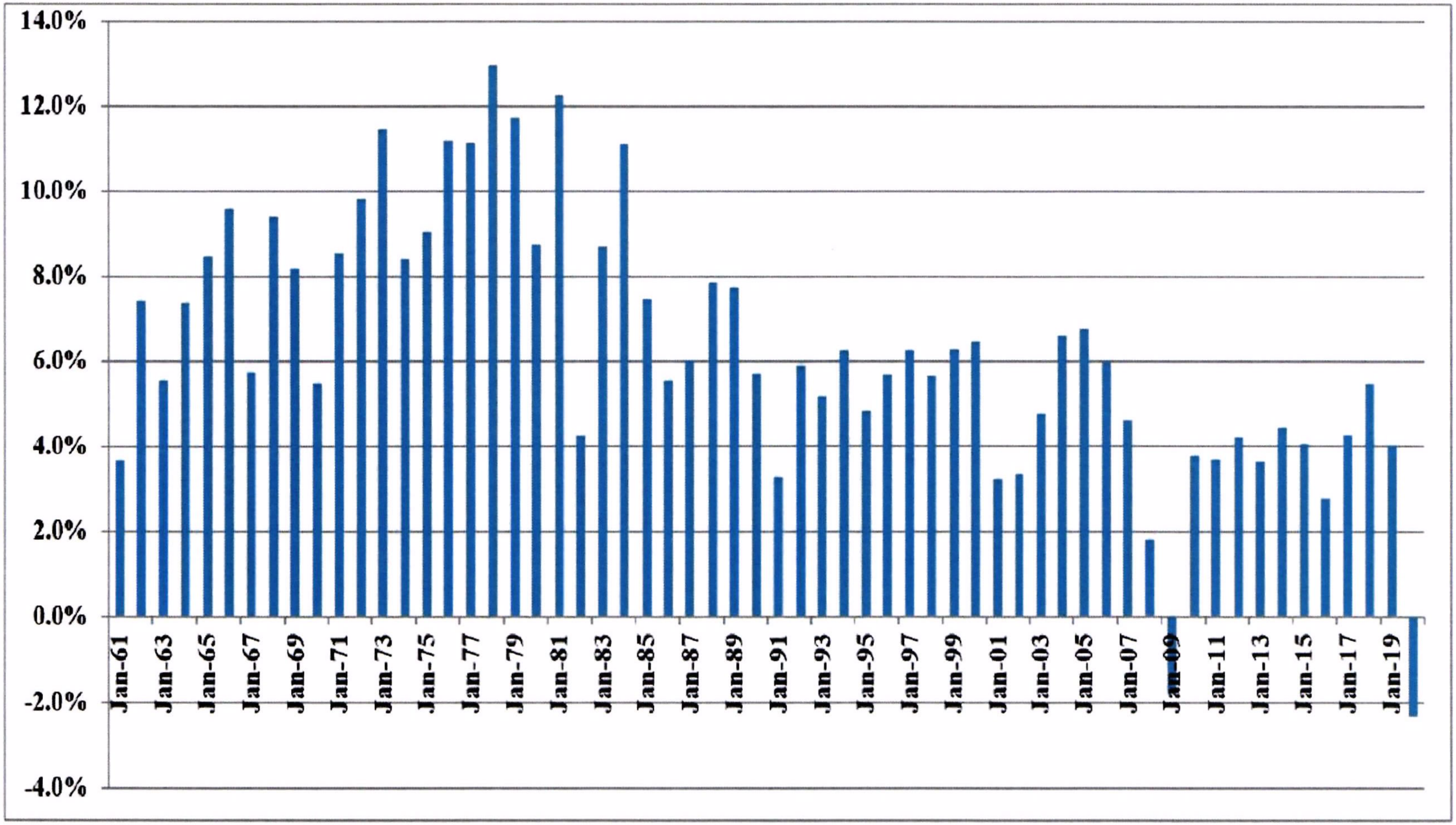
		GDP	S&P 500	S&P 500 EPS	S&P 500 DPS
	1960	542.382	58.11	3.10	1.98
1	1961	562.210	71.55	3.37	2.04
2	1962	603.921	63.1	3.67	2.15
3	1963	637.451	75.02	4.13	2.35
4	1964	684.460	84.75	4.76	2.58
5	1965	742.289	92.43	5.30	2.83
6	1966	813.414	80.33	5.41	2.88
7	1967	859.958	96.47	5.46	2.98
8	1968	940.651	103.86	5.72	3.04
9	1969	1017.615	92.06	6.10	3.24
10	1970	1073.303	92.15	5.51	3.19
11	1971	1164.850	102.09	5.57	3.16
12	1972	1279.110	118.05	6.17	3.19
13	1973	1425.376	97.55	7.96	3.61
14	1974	1545.243	68.56	9.35	3.72
15	1975	1684.904	90.19	7.71	3.73
16	1976	1873.412	107.46	9.75	4.22
17	1977	2081.826	95.1	10.87	4.86
18	1978	2351.599	96.11	11.64	5.18
19	1979	2627.334	107.94	14.55	5.97
20	1980	2857.307	135.76	14.99	6.44
21	1981	3207.042	122.55	15.18	6.83
22	1982	3343.789	140.64	13.82	6.93
23	1983	3634.038	164.93	13.29	7.12
24	1984	4037.613	167.24	16.84	7.83
25	1985	4338.979	211.28	15.68	8.20
26	1986	4579.631	242.17	14.43	8.19
27	1987	4855.215	247.08	16.04	9.17
28	1988	5236.438	277.72	24.12	10.22
29	1989	5641.580	353.4	24.32	11.73
30	1990	5963.144	330.22	22.65	12.35
31	1991	6158.129	417.09	19.30	12.97
32	1992	6520.327	435.71	20.87	12.64
33	1993	6858.559	466.45	26.90	12.69
34	1994	7287.236	459.27	31.75	13.36
35	1995	7639.749	615.93	37.70	14.17
36	1996	8073.122	740.74	40.63	14.89
37	1997	8577.552	970.43	44.09	15.52
38	1998	9062.817	1229.23	44.27	16.20
39	1999	9630.663	1469.25	51.68	16.71
40	2000	10252.347	1320.28	56.13	16.27
41	2001	10581.822	1148.09	38.85	15.74
42	2002	10936.418	879.82	46.04	16.08
43	2003	11458.246	1111.91	54.69	17.88
44	2004	12213.730	1211.92	67.68	19.407
45	2005	13036.637	1248.29	76.45	22.38
46	2006	13814.609	1418.3	87.72	25.05
47	2007	14451.860	1468.36	82.54	27.73
48	2008	14712.845	903.25	65.39	28.05
49	2009	14448.932	1115.10	59.65	22.31
50	2010	14992.052	1257.64	83.66	23.12
51	2011	15542.582	1257.60	97.05	26.02
52	2012	16197.007	1426.19	102.47	30.44
53	2013	16784.851	1848.36	107.45	36.28
54	2014	17527.258	2058.90	113.01	39.44
55	2015	18238.301	2043.94	106.32	43.16
56	2016	18745.075	2238.83	108.86	45.03
57	2017	19542.980	2673.61	124.94	49.73
58	2018	20611.861	2506.85	148.34	53.61
59	2019	21433.226	3230.78	*162.35*	*58.80*
60	2020	20934.850	3756.07	138.12	56.70
	Growth Rates	6.28	7.20	6.53	5.75

Data Sources GDPA -http //research stlouisfed org/fred2/series/GDPA/downloaddata
S&P 500, EPS and DPS - http //pages stern nyu edu/~adamodar/

10-Year Averag	3.40%	11.56%	5.14%	9.39%
20-Year Averag	3.63%	5.37%	4.61%	6.44%
30-Year Averag	4.27%	8.44%	6.21%	5.21%
40-Year Averag	5.10%	8.65%	5.71%	5.59%
50-Year Averag	6.12%	7.70%	6.65%	5.93%

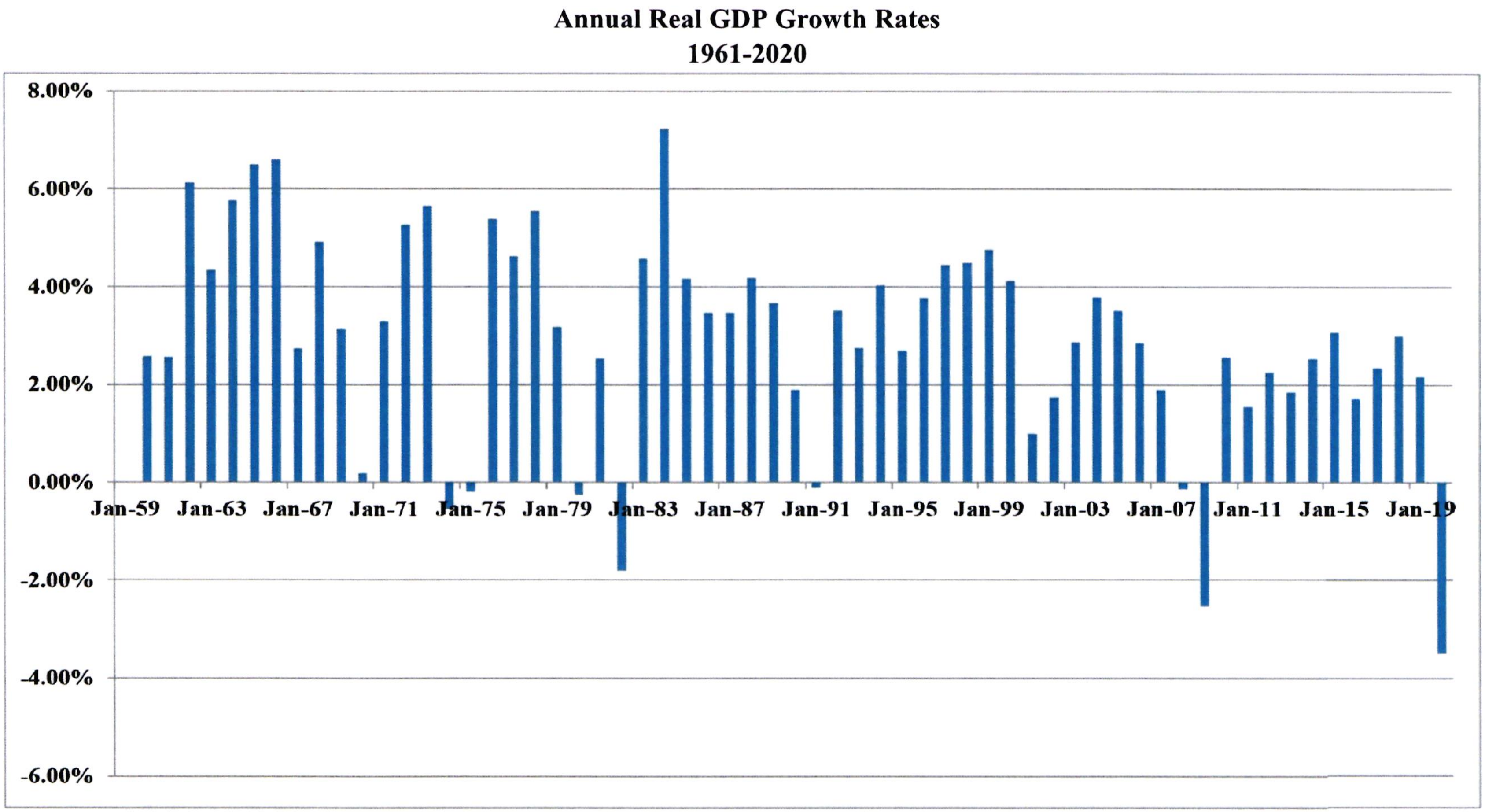
Annual Nominal GDP Growth Rates

Annual Growth Rates - 1961-2020



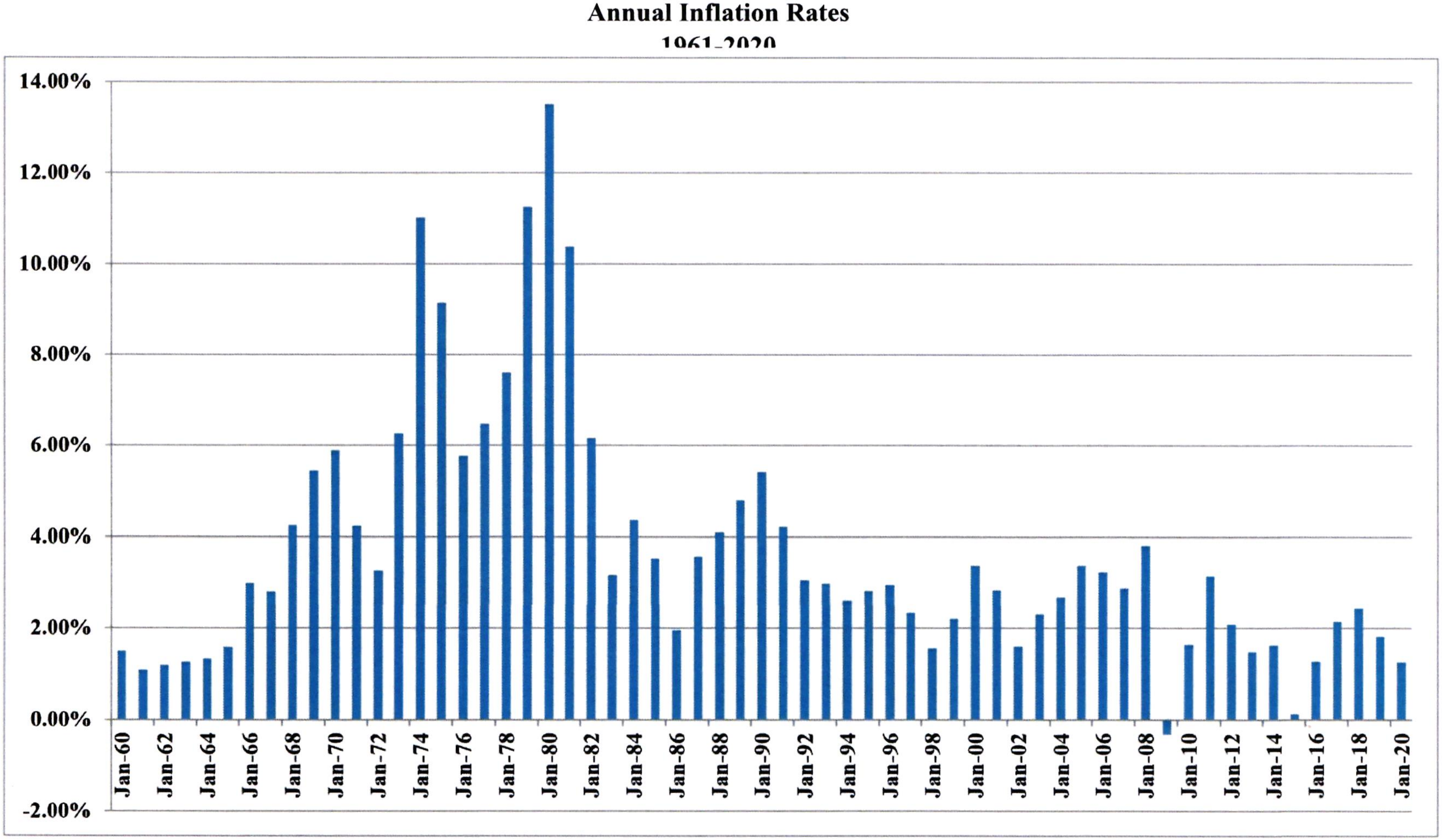
Data Sources: GDPA -https://fred.stlouisfed.org/series/GDPA

Real GDP Growth Rates



Data Sources: GDPC1 - https://fred.stlouisfed.org/series/GDPCA

Inflation Rates



Data Sources: CPIAUCSL - https://fred.stlouisfed.org/series/CPIAUCSL

Projected Nominal GDP Growth Rates

Panel A
Historic GDP Growth Rates

10-Year Average		3.40%
20-Year Average		3.63%
30-Year Average		4.27%
40-Year Average		5.10%
50-Year Average		6.12%

Calculated using GDP data on Page 1 of Exhibit JRW-10

Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	2019-29	3.8%
Survey of Financial Forecasters	Ten Year	4.3%
Social Security Administration	2020-2095	4.1%
Energy Information Administration	2019-2050	4.2%

Sources:

Congressional Budget Office,The *2020 Long-Term Budget Outlook*, June 25, 2020.
U.S. Energy Information Administration, *Annual Energy Outlook 2020*, Table: Macroeconomic Indicators,
Social Security Administration, 2020 Annual Report of the Board of Trustees of the Old-Age,
Survivors, and Disability Insurance (OASDI) Program, Table VI.G4, p. 211(July 15, 2020),
The 4.1% growth rate is the growth in projected GDP from $22,341 trillion in 2020 to $450,425 trillion in 2095.
https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/

CD ATTACHED

TO VIEW PLEASE CONTACT

CENTRAL RECORDS

512-936-7180

Woolridge Work Papers

Dr. Woolridge's work papers, data and work sheets, and source documents are provided in three zip files. The zip files, and their contents, are:

File	Contents
Articles 2021.zip	Copies of articles, studies, reports, regulatory decisions And orders used and cited in the Testimony and Exhibits, listed by Authors name and date of publication
Electric V-Lines – February 15, 2021.zip	Copies of the *Value Line* reports used in Testimony and Exhibits
Work Sheets – SWEPCO - TX - JRWoolridge.zip	Copies of data, work papers, and work sheets used in the development of Dr. Woolridge's Exhibits as well as the Figures, and Tables in his Testimony.