

Attachment JRW-3

Public Service of New Hampshire d/b/a Eversource Energy  
Recommended Cost of Capital

<b>Capital Source</b>	<b>Capitalization Ratios</b>	<b>Cost Rate</b>	<b>Weighted Cost Rate</b>
<b>Short-Term Debt</b>	<b>3.51%</b>	<b>2.45%</b>	<b>0.09%</b>
<b>Long-Term Debt</b>	<b>46.49%</b>	<b>4.37%</b>	<b>2.03%</b>
<b>Common Equity</b>	<b><u>50.00%</u></b>	<b><u>8.70%</u></b>	<b><u>4.35%</u></b>
<b>Total Capitalization</b>	<b>100.00%</b>		<b>6.47%</b>

\* Capital Structure Ratios are developed in Attachment JRW-5.

Attachment JRW-4  
 Public Service of New Hampshire d/b/a Eversource Energy  
 Summary Financial Statistics for Proxy Group

Panel A  
 Electric Proxy Group

Company	Operating Revenue (\$mil)	Percent Reg Elec Revenue	Percent Reg Gas Revenue	Net Plant (\$mil)	Market Cap (\$mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
ALLETE, Inc. (NYSE-ALE)	\$1,240.5	84%	0%	\$4,405.6	\$3,983.2	BBB+	Baa1	2.89x	MN, WI	56.1%	8.5%	1.78
Alliant Energy Corporation (NYSE-LNT)	\$3,647.7	84%	12%	\$13,527.1	\$14,177.5	A-	Baa1	2.63x	WI,IA,IL,MN	43.6%	11.4%	2.72
Ameren Corporation (NYSE-AEE)	\$5,646.0	80%	13%	\$24,412.0	\$21,439.4	BBB+	Baa1	3.56x	IL,MO	44.7%	10.6%	2.66
American Electric Power Co. (NYSE-AEP)	\$15,561.4	96%	0%	\$61,095.5	\$49,306.3	A-	Baa1	2.67x	10 States	38.6%	9.9%	2.51
Avangrid (NYSE-AGR)	\$6,338.0	56%	23%	\$25,421.0	\$16,661.6	BBB+	Baa1	3.14x	NY,CT,ME	64.2%	4.6%	1.09
Avista Corporation (NYSE-AVA)	\$1,345.6	64%	22%	\$4,944.9	\$3,488.8	BBB	Baa2	2.21x	WA,OR,AK,ID	45.7%	10.6%	1.80
CMS Energy Corporation (NYSE-CMS)	\$6,845.0	65%	28%	\$18,973.0	\$19,402.5	BBB+	Baa1	2.54x	MI	27.3%	13.9%	3.87
Consolidated Edison, Inc. (NYSE-ED)	\$12,574.0	64%	17%	\$44,747.0	\$29,375.6	BBB+	A3	2.58x	NY,PA	44.2%	7.7%	1.62
Dominion Energy Inc. (NYSE-D)	\$16,572.0	67%	34%	\$69,581.0	\$74,607.2	BBB+	NA	2.49x	VA,NC,SC,OH,WV,UT	40.5%	5.4%	2.52
Duke Energy Corporation (NYSE-DUK)	\$24,658.0	91%	7%	\$102,339.0	\$74,542.2	A-	Baa1	2.59x	NC,OH,FL,SC,KY	40.5%	8.3%	1.66
Edison International (NYSE-EIX)	\$12,347.0	100%	0%	\$44,849.0	\$25,437.9	BBB	Baa3	2.54x	CA	37.9%	10.8%	1.91
Entergy Corporation (NYSE-ETR)	\$10,878.7	88%	0%	\$35,515.6	\$25,636.9	BBB+	Baa2	2.15x	LA,AR,MS,TX	33.4%	13.0%	2.50
Energy, Inc. (NYSE-EVRG)	\$5,147.8	100%	0%	\$19,216.9	\$16,564.2	A-	Baa1	3.07x	KS,MO	46.0%	7.2%	1.93
Eversource Energy (NYSE-ES)	\$8,526.5	82%	12%	\$27,635.4	\$32,513.5	A-	Baa1	3.49x	CT,NH,MA	44.4%	7.5%	2.57
Exelon Corporation (NYSE-EXC)	\$34,438.0	59%	4%	\$78,749.0	\$45,617.6	BBB+	Baa2	2.80x	PA,NJ,IL,MD,DC,DE	43.8%	9.3%	1.41
FirstEnergy Corporation (NYSE-FE)	\$10,844.0	100%	0%	\$31,881.0	\$26,224.6	BBB	Baa3	1.82x	OH,PA,NY,NJ,WV,MD	24.7%	13.1%	3.76
Hawaiian Electric Industries (NYSE-HE)	\$2,874.6	89%	0%	\$5,308.8	\$5,109.8	BBB-	NA	3.73x	HI	47.7%	9.8%	2.24
IDACORP, Inc. (NYSE-IDA)	\$1,346.4	100%	0%	\$4,531.5	\$5,372.7	BBB	Baa1	2.96x	ID	57.2%	9.6%	2.18
MGE Energy, Inc. (NYSE-MGEE)	\$555.0	70%	30%	\$1,643.4	\$2,631.0	A/A-	Aa2	4.95x	WI	60.3%	10.4%	3.07
NextEra Energy, Inc. (NYSE-NEE)	\$19,204.0	71%	0%	\$82,010.0	\$137,996.0	A-	Baa1	2.43x	FL	43.8%	10.6%	3.73
NorthWestern Corporation (NYSE-NWE)	\$1,257.9	78%	22%	\$4,704.6	\$3,932.3	BBB	NA	2.83x	MT,SD,NE	47.5%	10.2%	1.93
OGE Energy Corp. (NYSE-OGE)	\$2,231.6	100%	100%	\$8,964.8	\$8,015.1	BBB+	Baa1	3.36x	OK,AR	55.2%	10.6%	1.94
Otter Tail Corporation (NDQ-OTTR)	\$919.5	50%	0%	\$1,775.7	\$2,065.4	BBB	Baa2	4.16	MN,ND,SD	52.1%	11.5%	2.64
Pinnacle West Capital Corp. (NYSE-PNW)	\$3,471.2	95%	0%	\$14,254.3	\$11,273.2	A-	A3	2.95x	AZ	47.8%	10.1%	2.08
PNM Resources, Inc. (NYSE-PNM)	\$1,457.6	100%	0%	\$5,509.9	\$4,149.2	BBB+	Baa3	1.14x	NM,TX	33.0%	4.6%	2.47
Portland General Electric Company (NYSE-POR)	\$2,123.0	100%	0%	\$6,820.0	\$5,325.9	BBB+	A3	2.62x	OR	48.1%	8.4%	2.06
PPL Corporation (NYSE-PPL)	\$7,769.0	91%	8%	\$36,578.0	\$24,708.2	A-	Baa2	3.18x	PA,KY	35.9%	14.2%	1.90
Sempra Energy (NYSE-SRE)	\$10,829.0	56%	44%	\$37,043.0	\$43,210.1	BBB+	Baa1	2.31x	CA,TX	36.5%	10.4%	2.44
Southern Company (NYSE-SO)	\$21,419.0	73%	14%	\$84,420.0	\$71,408.9	A-	Baa2	3.20x	GA,FL,NJ,IL,VA,TN,MS	34.1%	18.1%	2.60
WEC Energy Group (NYSE-WEC)	\$7,523.1	58%	42%	\$23,661.5	\$32,871.4	A-	Baa1	3.12x	WI,IL,MN,MI	43.9%	11.4%	3.25
Xcel Energy Inc. (NYSE-XEL)	\$11,529.0	83%	16%	\$40,781.0	\$36,307.1	A-	Baa1	2.69x	MN,WI,ND,SD,MI	39.2%	10.8%	2.74
Mean	\$8,745.8	80%	14%	\$31,138.7	\$28,172.8	BBB+	Baa1	2.86		43.8%	10.1%	2.37
Median	\$6,845.0	83%	8%	\$24,412.0	\$21,439.4	BBB+	Baa1	2.80		43.9%	10.4%	2.44

Data Source: Company 2019 SEC 10-K filings, S&P Capital IQ; Value Line Investment Survey, 2020.

Panel B  
 Bulkley Proxy Group

Company	Operating Revenue (\$mil)	Percent Reg Elec Revenue	Percent Reg Gas Revenue	Net Plant (\$mil)	Market Cap (\$mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
ALLETE, Inc. (NYSE-ALE)	\$1,240.5	84%	0%	\$4,405.6	\$3,983.2	BBB+	Baa1	2.89x	MN, WI	56.1%	8.5%	1.78
Alliant Energy Corporation (NYSE-LNT)	\$3,647.7	84%	12%	\$13,527.1	\$14,177.5	A-	Baa1	2.63x	WI,IA,IL,MN	43.6%	11.4%	2.72
Avangrid (NYSE-AGR)	\$6,338.0	56%	23%	\$25,421.0	\$16,661.6	BBB+	Baa1	3.14x	NY,CT,ME	64.2%	4.6%	1.09

**Attachment JRW-4**  
**Public Service of New Hampshire d/b/a Eversource Energy**  
Value Line Risk Metrics

**Panel A**  
**Electric Proxy Group**

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
ALLETE, Inc. (NYSE-ALE)	0.85	A	2	80	95
Alliant Energy Corporation (NYSE-LNT)	0.80	A	2	90	95
Ameren Corporation (NYSE-AEE)	0.80	A	2	85	95
American Electric Power Co. (NYSE-AEP)	0.75	A+	1	85	100
Avangrid (NYSE-AGR)	0.80	B++	2	55	95
Avista Corporation (NYSE-AVA)	0.90	A	2	65	95
CMS Energy Corporation (NYSE-CMS)	0.80	B++	2	85	90
Consolidated Edison, Inc. (NYSE-ED)	0.75	A+	1	95	85
Dominion Energy Inc. (NYSE-D)	0.80	B++	2	50	90
Duke Energy Corporation (NYSE-DUK)	0.85	A	2	90	90
Edison International (NYSE-EIX)	0.90	B+	3	10	80
Entergy Corporation (NYSE-ETR)	0.95	B++	2	60	90
Evergy, Inc. (NYSE-EVRG)	1.05	B++	2	NMF	60
Eversource Energy (NYSE-ES)	0.90	A	1	95	85
Exelon Corporation (NYSE-EXC)	0.90	B++	2	55	95
FirstEnergy Corporation (NYSE-FE)	0.85	B++	2	40	95
Hawaiian Electric Industries (NYSE-HE)	0.80	A	2	60	100
IDACORP, Inc. (NYSE-IDA)	0.80	A	2	95	100
MGE Energy, Inc. (NYSE-MGEE)	0.70	A	1	95	95
NextEra Energy, Inc. (NYSE-NEE)	0.85	A+	1	70	95
NorthWestern Corporation (NYSE-NWE)	0.90	B++	2	85	100
OGE Energy Corp. (NYSE-OGE)	1.05	A	2	80	80
Otter Tail Corporation (NDQ-OTTR)	0.85	A	2	85	95
Pinnacle West Capital Corp. (NYSE-PNW)	0.85	A+	1	95	100
PNM Resources, Inc. (NYSE-PNM)	0.90	B+	3	75	90
Portland General Electric Company (NYSE-POR)	0.85	B++	2	85	95
PPL Corporation (NYSE-PPL)	1.05	B++	2	70	75
Sempra Energy (NYSE-SRE)	0.95	A	2	70	95
Southern Company (NYSE-SO)	0.90	A	2	85	90
WEC Energy Group (NYSE-WEC)	0.80	A+	1	90	85
Xcel Energy Inc. (NYSE-XEL)	0.75	A+	1	100	100
Mean	0.86	A	1.8	76	91

Data Source: Value Line Investment Survey, 2020.

**Panel B**  
**Bulkley Proxy Group**

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
ALLETE, Inc. (NYSE-ALE)	0.85	A	2	80	95
Alliant Energy Corporation (NYSE-LNT)	0.80	A	2	90	95
Avangrid (NYSE-AGR)	0.80	B++	2	55	95
FirstEnergy Corporation (NYSE-FE)	0.85	B++	2	40	95
Hawaiian Electric Industries (NYSE-HE)	0.80	A	2	60	100
NorthWestern Corporation (NYSE-NWE)	0.90	B++	2	85	100
Portland General Electric Company (NYSE-POR)	0.85	B++	2	85	95
PPL Corporation (NYSE-PPL)	1.05	B++	2	70	75
Mean	0.86	A	2.0	71	94

Data Source: Value Line Investment Survey, 2019.

### *Value Line Risk Metrics*

#### **Beta**

A relative measure of the historical sensitivity of a stock's price to overall fluctuations in the New York Stock Exchange Composite Index. A beta of 1.50 indicates a stock tends to rise (or fall) 50% more than the New York Stock Exchange Composite Index. The "coefficient" is derived from a regression analysis of the relationship between weekly percentage changes in the price of a stock and weekly percentage changes in the NYSE Index over a period of five years. In the case of shorter price histories, a smaller time period is used, but two years is the minimum. Betas are adjusted for their long-term tendency to converge toward 1.00.

#### **Financial Strength**

A relative measure of the companies reviewed by *Value Line*. The relative ratings range from A++ (strongest) down to C (weakest).

#### **Safety Rank**

A measurement of potential risk associated with individual common stocks. The Safety Rank is computed by averaging two other *Value Line* indexes the Price Stability Index and the Financial strength Rating. Safety Ranks range from 1 (Highest) to 5 (Lowest). Conservative investors should try to limit their purchases to equities ranked 1 (Highest) and 2 (Above Average) for Safety.

#### **Earnings Predictability**

A measure of the reliability of an earnings forecast. Earnings Predictability is based upon the stability of year-to-year comparisons, with recent years being weighted more heavily than earlier ones. The most reliable forecasts tend to be those with the highest rating (100); the least reliable, the lowest (5). The earnings stability is derived from the standard deviation of percentage changes in quarterly earnings over an eight-year period. Special adjustments are made for comparisons around zero and from plus to minus.

#### **Stock Price Stability**

A measure of the stability of a stock's price. It includes sensitivity to the market (see Beta as well as the stock's inherent volatility). *Value Line's* Stability ratings range from 1 (highest) to 5 (lowest).

Source: *Value Line Investment Analyzer*.

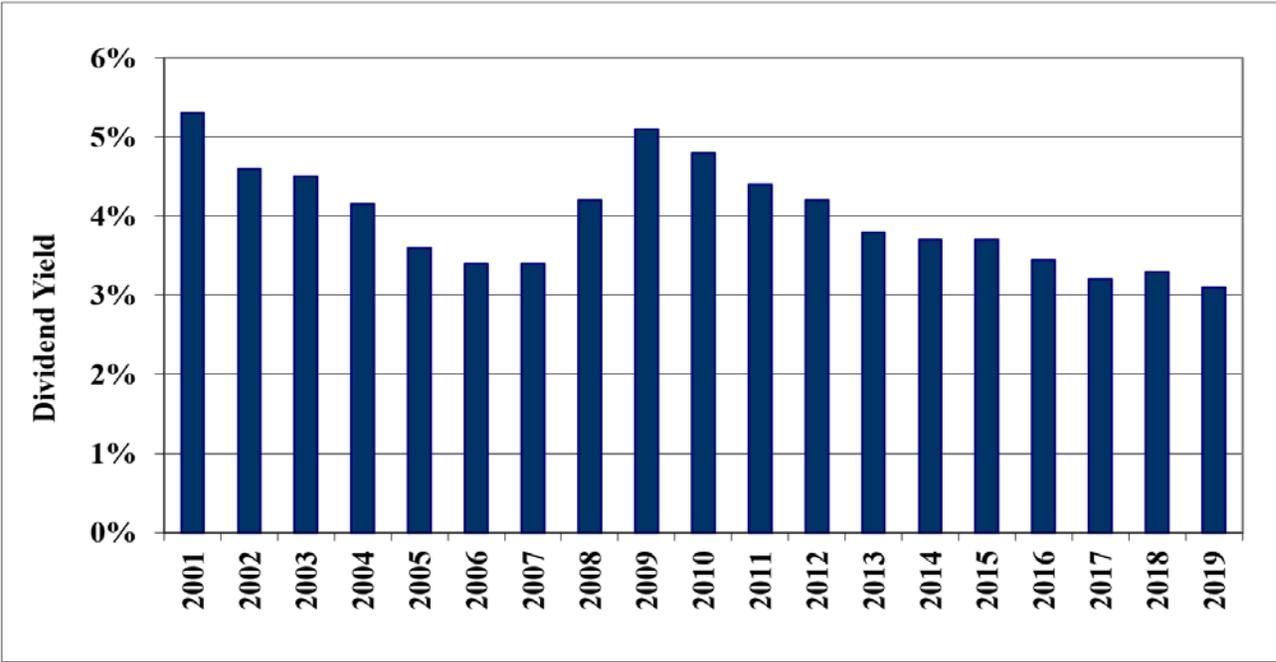
Attachment JRW-7  
Long-Term 'A' Rated Public Utility Bonds



Data Source: Mergent Bond Record

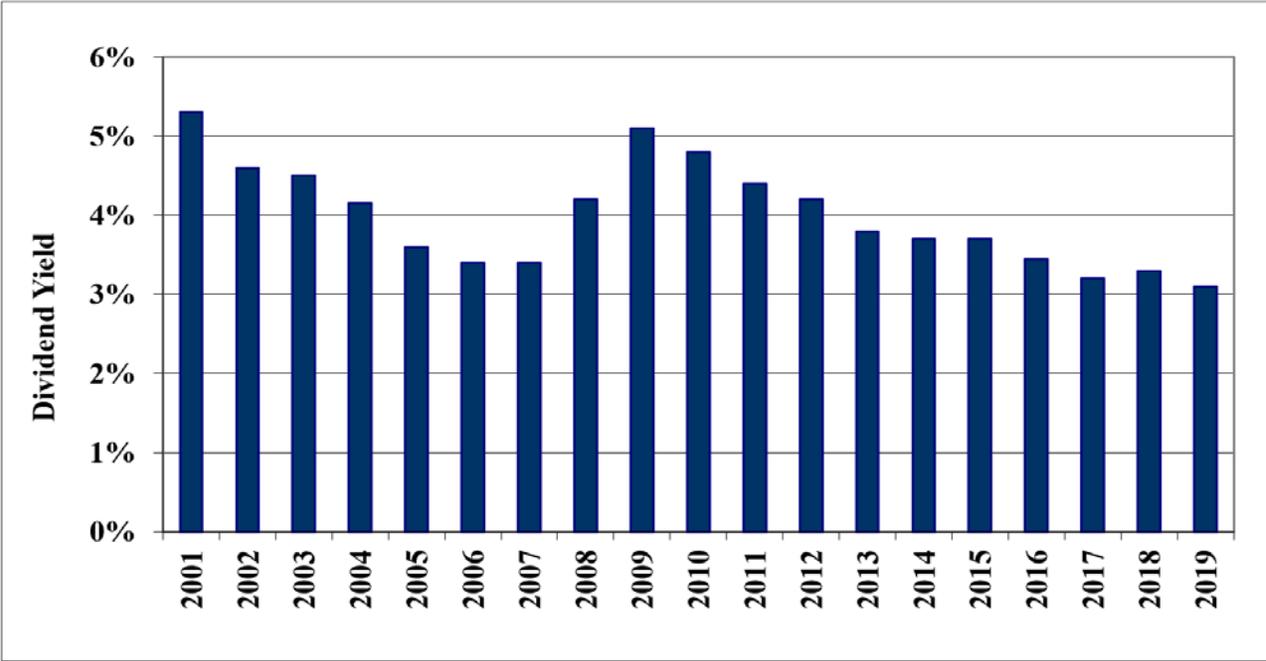
Attachment JRW-7

Electric Utility Average Dividend Yield



Data Source: Value Line Investment Survey.

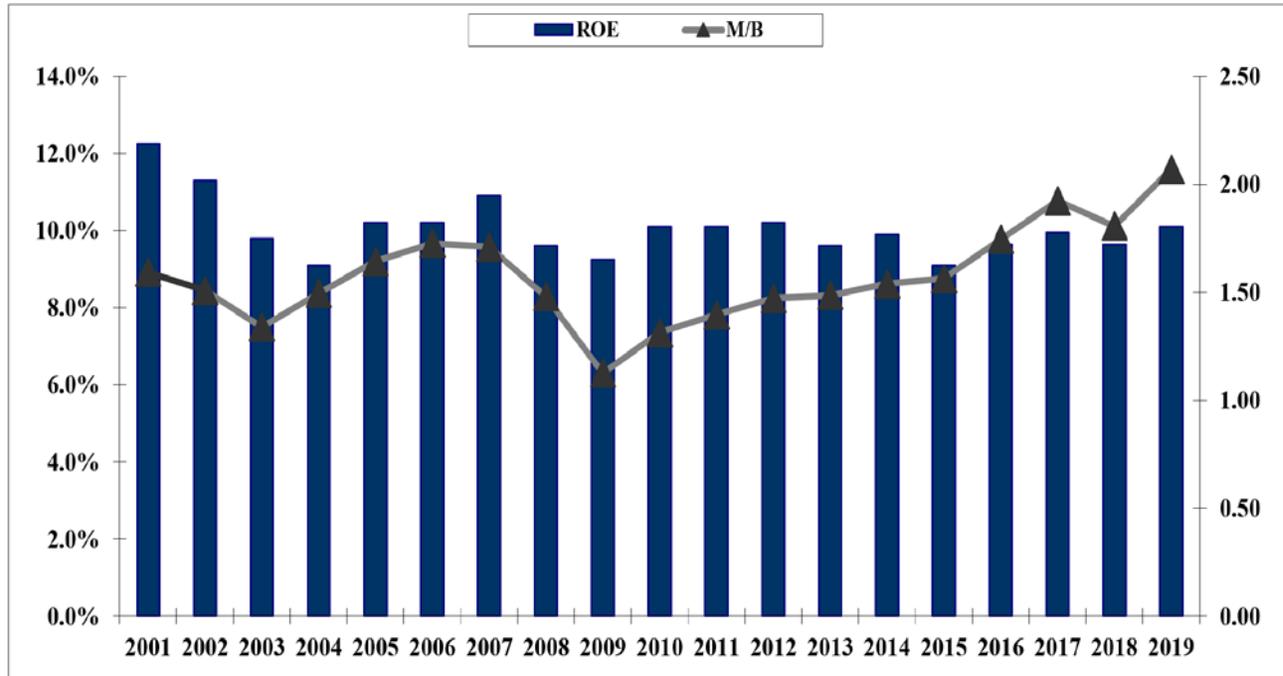
Panel B  
 Gas Distribution Company Average Dividend Yield



Data Source: Value Line Investment Survey.

Attachment JRW-7

Electric Utility Average Return on Equity and Market-to-Book Ratios



Data Source: Value Line Investment Survey.

Attachment JRW-7  
Industry Average Betas\*  
Value Line Investment Survey Betas\*\*  
6-Jul-20

Rank	Industry	Beta	Rank	Industry	Beta	Rank	Industry	Beta
1	Homebuilding	1.49	34	Recreation	1.17	67	Publishing	1.03
2	Oilfield Svcs/Equip.	1.43	35	Diversified Co.	1.16	68	Insurance (Prop/Cas.)	1.02
3	Insurance (Life)	1.43	36	Electrical Equipment	1.15	69	Med Supp Non-Invasive	1.01
4	Hotel/Gaming	1.38	37	Electronics	1.14	70	Human Resources	1.01
5	Petroleum (Integrated)	1.38	38	Restaurant	1.14	71	Telecom. Equipment	1.01
6	Petroleum (Producing)	1.37	39	Computers/Peripherals	1.14	72	Investment Co.(Foreign)	1.00
7	Metal Fabricating	1.33	40	Bank (Midwest)	1.14	73	Investment Co.	1.00
8	Metals & Mining (Div.)	1.32	41	Bank	1.13	74	Computer Software	1.00
9	Natural Gas (Div.)	1.32	42	Automotive	1.13	75	Biotechnology	0.99
10	Building Materials	1.31	43	Retail (Softlines)	1.12	76	E-Commerce	0.99
11	Advertising	1.31	44	Reinsurance	1.11	77	Cable TV	0.96
12	Shoe	1.31	45	Railroad	1.11	78	Trucking	0.95
13	Maritime	1.28	46	Heavy Truck & Equip	1.11	79	Thrift	0.95
14	Steel	1.28	47	Semiconductor Equip	1.10	80	Tobacco	0.94
15	Apparel	1.28	48	R.E.I.T.	1.10	81	Foreign Electronics	0.94
16	Oil/Gas Distribution	1.28	49	Industrial Services	1.10	82	Telecom. Utility	0.93
17	Air Transport	1.27	50	Power	1.10	83	Environmental	0.93
18	Pipeline MLPs	1.27	51	Precision Instrument	1.09	84	Healthcare Information	0.92
19	Public/Private Equity	1.26	52	Wireless Networking	1.09	85	Beverage	0.89
20	Aerospace/Defense	1.26	53	Toiletries/Cosmetics	1.09	86	Telecom. Services	0.88
21	Retail Automotive	1.26	54	Internet	1.08	87	Electric Util. (Central)	0.88
22	Office Equip/Supplies	1.24	55	Semiconductor	1.07	88	Electric Utility (East)	0.87
23	Retail (Hardlines)	1.23	56	Retail Building Supply	1.07	89	Natural Gas Utility	0.85
24	Financial Svcs. (Div.)	1.22	57	Newspaper	1.07	90	Electric Utility (West)	0.85
25	Auto Parts	1.22	58	Packaging & Container	1.06	91	Entertainment Tech	0.84
26	Paper/Forest Products	1.22	59	Retail Store	1.05	92	Household Products	0.82
27	Chemical (Diversified)	1.21	60	Med Supp Invasive	1.05	93	Retail/Wholesale Food	0.79
28	Furn/Home Furnishings	1.21	61	Educational Services	1.05	94	Water Utility	0.78
29	Chemical (Specialty)	1.20	62	Information Services	1.04	95	Food Processing	0.77
30	Medical Services	1.20	63	Entertainment	1.04	96	Pharmacy Services	0.73
31	Chemical (Basic)	1.18	64	Funeral Services	1.04	97	Precious Metals	0.70
32	Engineering & Const	1.18	65	IT Services	1.03			
33	Machinery	1.17	66	Drug	1.03		Mean	1.10

\* Industry averages for 97 industries using Value Line's database of 1,704 companies - Updated 7-6-20.

\*\* 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.

**Attachment JRW-9**

**Public Service of New Hampshire d/b/a Eversource Energy  
Discounted Cash Flow Analysis**

**Panel A  
Electric Proxy Group**

<b>Dividend Yield*</b>	<b>3.60%</b>
<b>Adjustment Factor</b>	<b><u>1.025</u></b>
<b>Adjusted Dividend Yield</b>	<b>3.69%</b>
<b>Growth Rate**</b>	<b><u>5.00%</u></b>
<b>Equity Cost Rate</b>	<b>8.70%</b>

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\*\* Based on data provided on pages 3, 4, 5, and  
6 of Attachment JRW-9

**Panel B  
Bulkley Proxy Group**

<b>Dividend Yield*</b>	<b>3.80%</b>
<b>Adjustment Factor</b>	<b><u>1.0225</u></b>
<b>Adjusted Dividend Yield</b>	<b>3.89%</b>
<b>Growth Rate**</b>	<b><u>4.50%</u></b>
<b>Equity Cost Rate</b>	<b>8.40%</b>

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\*\* Based on data provided on pages 3, 4, 5, and  
6 of Attachment JRW-9

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy  
Monthly 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)	\$2.47	4.3%	4.2%	3.5%
Alliant Energy Corporation (NYSE-LNT)	\$1.42	2.9%	2.9%	2.8%
Ameren Corporation (NYSE-AEE)	\$1.98	2.7%	2.7%	2.6%
American Electric Power Co. (NYSE-AEP)	\$2.80	3.4%	3.4%	3.2%
Avangrid (NYSE-AVG)	\$1.76	4.1%	4.0%	3.8%
Avista Corporation (NYSE-AVA)	\$1.62	4.3%	4.0%	3.7%
CMS Energy Corporation (NYSE-CMS)	\$1.63	2.8%	2.8%	2.7%
Consolidated Edison, Inc. (NYSE-ED)	\$3.06	4.2%	3.9%	3.7%
Dominion Energy Inc. (NYSE-D)	\$3.67	4.4%	4.7%	4.6%
Duke Energy Corporation (NYSE-DUK)	\$3.78	4.5%	4.5%	4.3%
Edison International (NYSE-EIX)	\$2.55	4.5%	4.5%	4.0%
Entergy Corporation (NYSE-ETR)	\$3.72	3.8%	3.8%	3.4%
Evergy, Inc. (NYSE-EVRG)	\$2.02	3.3%	3.4%	3.3%
Eversource Energy (NYSE-ES)	\$2.27	2.7%	2.7%	2.7%
Exelon Corporation (NYSE-EXC)	\$1.53	4.0%	4.1%	3.7%
FirstEnergy Corporation (NYSE-FE)	\$1.56	3.8%	3.8%	3.5%
Hawaiian Electric Industries (NYSE-HE)	\$1.32	3.5%	3.3%	3.1%
IDACORP, Inc. (NYSE-IDA)	\$2.68	3.0%	3.0%	2.7%
MGE Energy, Inc. (NYSE-MGEE)	\$1.41	2.2%	2.2%	2.0%
NextEra Energy, Inc. (NYSE-NEE)	\$5.60	2.3%	2.4%	2.3%
NorthWestern Corporation (NYSE-NWE)	\$2.40	4.2%	4.1%	3.7%
OGE Energy Corp. (NYSE-OGE)	\$1.55	4.9%	4.9%	4.2%
Otter Tail Corporation (NDQ-OTTR)	\$1.48	3.6%	3.5%	3.2%
Pinnacle West Capital Corp. (NYSE-PNW)	\$3.13	4.1%	4.1%	3.7%
PNM Resources, Inc. (NYSE-PNM)	\$1.23	3.1%	3.1%	2.7%
Portland General Electric Company (NYSE-POR)	\$1.54	3.5%	3.3%	3.0%
PPL Corporation (NYSE-PPL)	\$1.66	6.2%	6.4%	5.6%
SEMPRA Energy (NYSE-SRE)	\$4.18	3.4%	3.5%	3.1%
Southern Company (NYSE-SO)	\$2.56	4.6%	4.6%	4.3%
WEC Energy Group (NYSE-WEC)	\$2.53	2.8%	2.8%	2.8%
Xcel Energy Inc. (NYSE-XEL)	\$1.72	2.7%	2.8%	2.7%
Mean		3.7%	3.6%	3.4%
Median		3.6%	3.5%	3.3%

Data Sources: <http://quote.yahoo.com>, July, 2020.

Panel B  
Bulkley Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
ALLETE, Inc. (NYSE-ALE)	\$2.47	4.3%	4.2%	3.5%
Alliant Energy Corporation (NYSE-LNT)	\$1.42	2.9%	2.9%	2.8%
Avangrid (NYSE-AVG)	\$1.76	3.6%	3.5%	3.5%
FirstEnergy Corporation (NYSE-FE)	\$1.56	3.8%	3.8%	3.5%
Hawaiian Electric Industries (NYSE-HE)	\$1.32	3.5%	3.3%	3.1%
NorthWestern Corporation (NYSE-NWE)	\$2.40	4.2%	4.1%	3.7%
Portland General Electric Company (NYSE-POR)	\$1.54	3.5%	3.3%	3.0%
PPL Corporation (NYSE-PPL)	\$1.66	6.2%	6.4%	5.6%
Mean		4.0%	3.9%	3.6%
Median		3.7%	3.7%	3.5%

Data Source: <http://quote.yahoo.com>, December, 2019.

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy  
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)	2.5	3.0	5.0	4.0	3.5	5.0
Alliant Energy Corporation (NYSE-LNT)	5.0	7.0	4.0	5.0	7.0	5.0
Ameren Corporation (NYSE-AEE)	1.0	-2.0	-0.5	6.5	3.0	2.5
American Electric Power Co. (NYSE-AEP)	3.0	4.5	4.0	4.0	5.5	3.0
Avangrid (NYSE-AGR)						
Avista Corporation (NYSE-AVA)	6.5	8.0	4.0	7.0	4.0	4.5
CMS Energy Corporation (NYSE-CMS)	9.5	15.0	4.5	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)	-0.5	2.5	1.0	0.5	1.5	-2.5
Eergy, Inc. (NYSE-EVRG)						
Eversource Energy (NYSE-ES)	6.0	9.0	6.5	7.0	7.0	3.5
Exelon Corporation (NYSE-EXC)	-4.5	-3.5	6.5	4.5	-3.0	4.0
FirstEnergy Corporation (NYSE-FE)	-7.0	-3.0	-8.5		-2.0	-17.5
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)	4.5	3.5	5.5	2.5	4.0	5.5
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)	5.0	7.0	7.0	2.0	10.0	5.5
Otter Tail Corporation (NDQ-OTTR)	5.5	1.5		9.0	2.5	4.5
Pinnacle West Capital Corp. (NYSE-PNW)	6.5	3.0	3.0	5.0	3.5	4.0
PNM Resources, Inc. (NYSE-PNM)	15.0	5.0	0.5	7.0	10.0	
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)	8.5	14.5	8.0	6.0	9.5	10.5
Xcel Energy Inc. (NYSE-XEL)	5.5	5.0	4.5	5.0	6.5	4.5
Mean	3.8	5.0	3.7	3.9	5.4	3.5
Median	4.5	4.8	4.0	4.0	5.5	4.5
Average of Median Figures =				4.5		

Data Source: Value Line Investment Survey.

Panel B  
Bulkley 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)	1.0	3.0	5.5	4.0	3.0	5.5
Alliant Energy Corporation (NYSE-LNT)	4.5	7.5	4.0	4.5	7.0	4.5
Avangrid (NYSE-AVG)						
FirstEnergy Corporation (NYSE-FE)	-7.0	-2.5	-8.0	-2.5	-5.0	-17.5
Hawaiian Electric Industries (NYSE-HE)	5.0		3.0	4.0		3.5
NorthWestern Corporation (NYSE-NWE)	8.5	5.0	5.5	7.0	7.0	8.0
PNM Resources, Inc. (NYSE-PNM)	7.0	2.5		6.0	11.0	1.0
PPL Corporation (NYSE-PPL)		2.5	1.0	-0.5	2.0	-4.0
Mean	3.2	3.0	1.8	3.2	4.2	0.1
Median	4.8	2.8	3.5	4.0	5.0	3.5
Average of Median Figures =				3.9		

Data Source: Value Line Investment Survey.

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy  
DCF Equity Cost Growth Rate Measures  
Value Line Projected Growth Rates

Panel A  
Electric Proxy Group

Company	Value Line			Value Line		
	Projected Growth			Sustainable Growth		
	Est'd. '17-'19 to '23-'25			Return on Equity	Retention Rate	Internal Growth
Earnings	Dividends	Book Value				
ALLETE, Inc. (NYSE-ALE)	5.5	4.5	3.5	8.0%	31.0%	2.5%
Alliant Energy Corporation (NYSE-LNT)	6.5	5.5	7.5	10.5%	33.0%	3.5%
Ameren Corporation (NYSE-AEE)	6.0	5.0	5.5	10.0%	45.0%	4.5%
American Electric Power Co. (NYSE-AEP)	5.0	5.5	4.5	10.5%	31.0%	3.3%
Avangrid (NYSE-AGR)	6.0	2.5	1.0	5.5%	28.0%	1.5%
Avista Corporation (NYSE-AVA)	1.0	4.0	3.0	8.0%	36.0%	2.9%
CMS Energy Corporation (NYSE-CMS)	7.5	7.0	7.5	13.5%	38.0%	5.1%
Consolidated Edison, Inc. (NYSE-ED)	3.0	3.5	3.0	8.0%	34.0%	2.7%
Dominion Energy Inc. (NYSE-D)	7.0	4.5	6.0	14.0%	24.0%	3.4%
Duke Energy Corporation (NYSE-DUK)	5.0	2.0	2.5	8.5%	30.0%	2.6%
Edison International (NYSE-EIX)	NMF	4.0	5.5	10.0%	36.0%	3.6%
Entergy Corporation (NYSE-ETR)	3.0	4.0	5.0	11.0%	34.0%	3.7%
Evergy, Inc. (NYSE-EVRG)	3.0	5.5	2.0	8.0%	25.0%	2.0%
Eversource Energy (NYSE-ES)	6.5	6.0	5.0	9.5%	40.0%	3.8%
Exelon Corporation (NYSE-EXC)	5.0	5.5	4.0	9.0%	48.0%	4.3%
FirstEnergy Corporation (NYSE-FE)	8.5	3.0	9.5	15.5%	40.0%	6.2%
Hawaiian Electric Industries (NYSE-HE)	3.5	4.0	4.0	9.0%	29.0%	2.6%
IDACORP, Inc. (NYSE-IDA)	3.0	6.5	3.5	9.0%	33.0%	3.0%
MGE Energy, Inc. (NYSE-MGEE)	4.0	5.5	5.0	9.5%	41.0%	3.9%
Nextera Energy, Inc. (NYSE-NEE)	10.0	10.5	6.0	12.5%	36.0%	4.5%
NorthWestern Corporation (NYSE-NWE)	2.5	4.0	3.0	8.5%	30.0%	2.6%
OGE Energy Corp. (NYSE-OGE)	3.0	6.0	1.0	12.5%	26.0%	3.3%
Otter Tail Corporation (NDQ-OTTR)	3.5	5.0	4.0	11.0%	31.0%	3.4%
Pinnacle West Capital Corp. (NYSE-PNW)	4.5	5.5	3.5	10.5%	33.0%	3.5%
PNM Resources, Inc. (NYSE-PNM)	6.0	5.5	5.5	9.5%	46.0%	4.4%
Portland General Electric Company (NYSE-POR)	4.0	6.0	3.0	9.0%	33.0%	3.0%
PPL Corporation (NYSE-PPL)	2.5	2.0	4.5	12.5%	33.0%	4.1%
Sempra Energy (NYSE-SRE)	10.0	7.5	4.5	11.0%	41.0%	4.5%
Southern Company (NYSE-SO)	3.0	3.0	3.5	12.5%	25.0%	3.1%
WEC Energy Group (NYSE-WEC)	6.0	6.5	3.5	12.5%	32.0%	4.0%
Xcel Energy Inc. (NYSE-XEL)	6.0	6.0	5.5	11.0%	40.0%	4.4%
Mean	5.0	5.0	4.4	10.3%	34.3%	3.5%
Median	5.0	5.5	4.0	10.0%	33.0%	3.5%
Average of Median Figures =		4.8			Median =	3.5%

\* '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  
Bulkley Proxy Group

Company	Value Line			Value Line		
	Projected Growth			Sustainable Growth		
	Est'd. '17-'19 to '23-'25			Return on Equity	Retention Rate	Internal Growth
Earnings	Dividends	Book Value				
ALLETE, Inc. (NYSE-ALE)	5.5	4.5	3.5	8.0%	31.0%	2.5%
Alliant Energy Corporation (NYSE-LNT)	6.5	5.5	7.5	10.5%	33.0%	3.5%
Avangrid (NYSE-AGR)	6.0	2.5	1.0	5.5%	28.0%	1.5%
FirstEnergy Corporation (NYSE-FE)	8.5	3.0	9.5	15.5%	40.0%	6.2%
Hawaiian Electric Industries (NYSE-HE)	3.5	4.0	4.0	9.0%	29.0%	2.6%
NorthWestern Corporation (NYSE-NWE)	2.5	4.0	3.0	8.5%	30.0%	2.6%
Portland General Electric Company (NYSE-POR)	4.0	6.0	3.0	9.0%	33.0%	3.0%
PPL Corporation (NYSE-PPL)	2.5	2.0	4.5	12.5%	33.0%	4.1%
Mean	4.9	3.9	4.5	9.8%	32.1%	3.2%
Median	4.8	4.0	3.8	9.0%	32.0%	2.8%
Average of Median Figures =		4.2			Median =	2.8%

\* '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.

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy  
DCF Equity Cost Growth Rate Measures  
Analysts Projected EPS Growth Rate Estimates

Panel A  
Electric Proxy Group

Company	Yahoo	Zacks	Mean
Company	Yahoo	Zacks	Mean
ALLETE, Inc. (NYSE-ALE)	7.0%	N/A	7.0%
Alliant Energy Corporation (NYSE-LNT)	5.3%	5.5%	5.4%
Ameren Corporation (NYSE-AEE)	5.9%	6.8%	6.4%
American Electric Power Co. (NYSE-AEP)	5.9%	5.8%	5.8%
Avangrid (NYSE-AGR)	5.2%	5.8%	5.5%
Avista Corp (NYSE-AVA)	6.0%	5.2%	5.6%
CMS Energy Corporation (NYSE-CMS)	7.2%	6.9%	7.0%
Consolidated Edison, Inc. (NYSE-ED)	2.7%	2.0%	2.3%
Dominion Energy Inc. (NYSE-D)	4.7%	4.7%	4.7%
Duke Energy Corporation (NYSE-DUK)	4.7%	4.6%	4.6%
Edison International (NYSE-EIX)	1.3%	3.3%	2.3%
Entergy Corporation (NYSE-ETR)	6.2%	5.7%	6.0%
Eversource Energy (NYSE-ES)	5.9%	6.1%	6.0%
Exelon Corporation (NYSE-EXC)	-3.6%	2.7%	
FirstEnergy Corporation (NYSE-FE)	-2.4%	NA	
Hawaiian Electric Industries (NYSE-HE)	3.3%	1.7%	2.5%
IDACORP, Inc. (NYSE-IDA)	2.6%	2.6%	2.6%
MGE Energy, Inc. (NYSE-MGEE)	4.0%	4.2%	4.1%
Nextera Energy, Inc. (NYSE-NEE)	8.1%	7.9%	8.0%
NorthWestern Corporation (NYSE-NWE)	3.7%	3.4%	3.5%
OGE Energy Corp. (NYSE-OGE)	2.4%	3.7%	3.0%
Otter Tail Corporation (NDQ-OTTR)	9.0%	N/A	9.0%
Pinnacle West Capital Corp. (NYSE-PNW)	4.5%	5.2%	4.8%
PNM Resources, Inc. (NYSE-PNM)	5.7%	6.2%	5.9%
Portland General Electric Company (NYSE-POR)	4.2%	5.3%	4.7%
PPL Corporation (NYSE-PPL)	2.9%	N/A	2.9%
Sempra Energy (NYSE-SRE)	5.4%	7.2%	6.3%
Southern Company (NYSE-SO)	4.5%	4.0%	4.3%
WEC Energy Group (NYSE-WEC)	5.9%	5.9%	5.9%
Xcel Energy Inc. (NYSE-XEL)	6.0%	5.9%	6.0%
	4.4%	4.9%	5.1%
<b>Median</b>	4.7%	5.2%	5.4%

Data Sources: www.zacks.com, http://quote.yahoo.com, July, 2020.

\* Exelon and FirstEnergy were excluded from the DCF analysis due to negative projected EPS growth rates.

Panel B  
Bulkley Proxy Group

Company	Yahoo	Zacks	Mean
ALLETE, Inc. (NYSE-ALE)	7.0%	N/A	7.0%
Alliant Energy Corporation (NYSE-LNT)	5.3%	5.5%	5.4%
Avangrid (NYSE-AGR)	5.2%	5.8%	5.5%
FirstEnergy Corporation (NYSE-FE)	-2.4%	NA	
Hawaiian Electric Industries (NYSE-HE)	3.3%	1.7%	2.5%
NorthWestern Corporation (NYSE-NWE)	3.7%	3.4%	3.5%
Portland General Electric Company (NYSE-POR)	4.2%	5.3%	4.7%
PPL Corporation (NYSE-PPL)	2.9%	N/A	2.9%
<b>Mean</b>	3.6%	4.3%	4.5%
<b>Median</b>	3.9%	5.3%	4.7%

Data Sources: www.zacks.com, http://quote.yahoo.com, November 6, 2019.

FirstEnergy is excluded due to negative projected EPS growth rate.

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy  
DCF Growth Rate Indicators

Growth Rate Indicator	Electric Proxy Group	Bulkley Proxy Group
Historic <i>Value Line</i> Growth in EPS, DPS, and BVPS	4.5%	3.9%
Projected <i>Value Line</i> Growth in EPS, DPS, and BVPS	4.8%	4.2%
Sustainable Growth ROE * Retention Rate	3.5%	2.8%
Projected EPS Growth from Yahoo and Zack - Mean/Median	5.1%/5.4%	4.5%/4.7%

**Attachment JRW-10**

**Public Service of New Hampshire d/b/a Eversource Energy  
Capital Asset Pricing Model**

**Panel A  
Electric Proxy Group**

<b>Risk-Free Interest Rate</b>	<b>2.50%</b>
<b>Beta*</b>	<b>0.85</b>
<b><u>Ex Ante Equity Risk Premium**</u></b>	<b><u>6.00%</u></b>
<b>CAPM Cost of Equity</b>	<b>7.6%</b>

\* See page 3 of Attachment JRW-10

\*\* See pages 5 and 6 of Attachment JRW-10

**Panel B  
Bulkley Proxy Group**

<b>Risk-Free Interest Rate</b>	<b>2.50%</b>
<b>Beta*</b>	<b>0.60</b>
<b><u>Ex Ante Equity Risk Premium**</u></b>	<b><u>6.00%</u></b>
<b>CAPM Cost of Equity</b>	<b>6.1%</b>

\* See page 3 of Attachment JRW-10

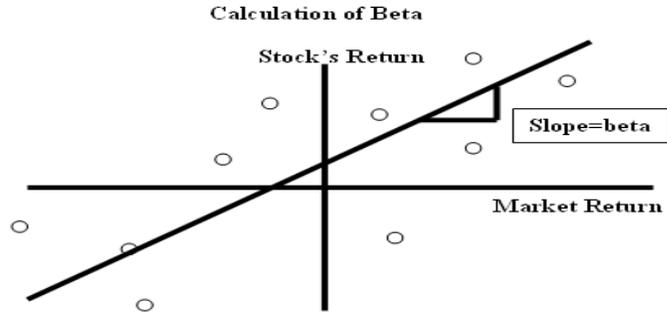
\*\* See pages 5 and 6 of Attachment JRW-10

Attachment JRW-10

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



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



**Panel A**  
**Electric Proxy Group**

Company	Beta
ALLETE, Inc. (NYSE-ALE)	0.85
Alliant Energy Corporation (NYSE-LNT)	0.80
Ameren Corporation (NYSE-AEE)	0.80
American Electric Power Co. (NYSE-AEP)	0.75
Avangrid (NYSE-AGR)	0.80
Avista Corporation (NYSE-AVA)	0.90
CMS Energy Corporation (NYSE-CMS)	0.80
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)	0.90
Entergy Corporation (NYSE-ETR)	0.95
Evergy, Inc. (NYSE-EVRG)	1.05
Eversource Energy (NYSE-ES)	0.90
Exelon Corporation (NYSE-EXC)	0.90
FirstEnergy Corporation (NYSE-FE)	0.85
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)	0.85
NorthWestern Corporation (NYSE-NWE)	0.90
OGE Energy Corp. (NYSE-OGE)	1.05
Otter Tail Corporation (NDQ-OTTR)	0.85
Pinnacle West Capital Corp. (NYSE-PNW)	0.85
PNM Resources, Inc. (NYSE-PNM)	0.90
Portland General Electric Company (NYSE-POR)	0.85
PPL Corporation (NYSE-PPL)	1.05
Sempra Energy (NYSE-SRE)	0.95
Southern Company (NYSE-SO)	0.90
WEC Energy Group (NYSE-WEC)	0.80
Xcel Energy Inc. (NYSE-XEL)	0.75
Mean	0.86
Median	0.85

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

**Panel B**  
**Bulkley Proxy Group**

Company	Beta
ALLETE, Inc. (NYSE-ALE)	0.85
Alliant Energy Corporation (NYSE-LNT)	0.80
Avangrid (NYSE-AGR)	0.80
FirstEnergy Corporation (NYSE-FE)	0.85
Hawaiian Electric Industries (NYSE-HE)	0.80
NorthWestern Corporation (NYSE-NWE)	0.90
Portland General Electric Company (NYSE-POR)	0.85
PPL Corporation (NYSE-PPL)	1.05
Mean	0.86
Median	0.85

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

**Attachment JRW-10  
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).

Attachment JRW-10

Capital Asset Pricing Model  
Market Risk Premium

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range		Midpoint of Range	Mean	Median	
						Low	High				
<b>Historical Risk Premium</b>											
	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 Repor	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%	
<b>Ex Ante Models (Puzzle Research)</b>											
	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	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%		
	<b>Social Security</b>										
	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%		
					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									4.50%	
<b>Surveys</b>											
	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%		
	Welch - Academics	2008	30-Year Projection	Random Academics		5.00%	5.74%	5.37%	5.37%		
	Fernandez - Academics, Analysts, and Compan	2020	Long-Term	Survey of Academics, Analysts, and Companies					5.60%		
	Median									5.37%	
<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>										<b>4.86%</b>	
<b>Median</b>										<b>4.83%</b>	

Attachment JRW-10

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	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	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%
<b>Ex Ante Models (Puzzle Research)</b>	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%	
	Mschichowski - 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								
<b>Surveys</b>	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								
<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>										<b>4.99%</b>
<b>Median</b>										<b>5.13%</b>

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**

<i>Date</i>	<i>Risk-free Rate (<math>R_f</math>)</i>	<i><math>R_f</math> (%)</i>	<i>Duff &amp; Phelps Recommended ERP (%)</i>	<i>What Changed</i>
<b>Current Guidance:</b>				
<b>June 30, 2020 – UNTIL FURTHER NOTICE</b>	<b>Normalized 20-year U.S. Treasury yield</b>	<b>2.50</b>	<b>6.00</b>	<b><math>R_f</math></b>
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](http://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](http://www.DPCostofCapital.com).

Source: <https://www.duffandphelps.com/-/media/assets/pdfs/publications/valuation/coc/erp-risk-free-rates-jan-2008-present.ashx?la=en>

**Panel A**  
**KPMG Market Risk Premium Recommendation**



Please find an overview of the historic MRP estimates by KPMG Corporate Finance in the graph below.



Source: <https://assets.kpmg/content/dam/kpmg/nl/pdf/2020/services/equity-market-risk-premium-research-summary-march-2020.pdf>

**Panel B**  
**Market-Risk-Premia.com Implied Market Risk Premium**  
**31-May-20**

Implied Market-risk-premia (IMRP): USA  
 Equity market



Source: <http://www.market-risk-premia.com/us.html>